

Monetary Policy and De-Dollarization Dynamics in a Two-Country DSGE Model: Evidence from the US and CN

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Abstract

This paper develops and estimates a two-country New Keynesian open-economy DSGE model to study monetary spillovers between the United States (US) and China (CN) and to quantify a reduced-form de-dollarization mechanism in the Chinese monetary transmission process. The model features CES consumption over domestic and imported bundles, Calvo price rigidities, terms-of-trade and exchange-rate linkages, and Taylor-type policy rules. A China-specific dollarization state enters the CNpolicy rule and evolves as an autoregressive process subject to de-dollarization shocks. We estimate the model using Bayesian methods with quarterly macroeconomic data for both economies and report posterior parameter estimates, impulse responses, and MCMC diagnostics. The results highlight strong cross-border linkages and provide evidence that financial de-dollarization in CNcan alter the effectiveness of domestic monetary policy and the magnitude of international spillovers.

Keywords: DSGE, New Keynesian, open economy, monetary spillovers, de-dollarization, Bayesian estimation, US–CN

JEL codes: E32, E52, F41, F42

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1 The Model

We develop a two-country New Keynesian open-economy model with nominal rigidities to study cross-border monetary spillovers between the United States (US) and China (CN). The model is built “benchmark-first”: its baseline structure and log-linear equilibrium system closely follow the canonical two-country New Keynesian framework used in [Jang and Okano \(2013\)](#). In particular, we retain standard CES consumption over home and foreign goods, terms-of-trade and exchange-rate linkages, New Keynesian IS and Phillips-curve relationships, and Taylor-type monetary policy rules. This benchmark provides a transparent reference point for interpretation and comparison.

Our contribution is to adapt this baseline to a US–CNinterpretation and extend it with a de-dollarization mechanism. Relative to the benchmark, we (i) map the home block to the United States and the foreign block to China, and (ii) introduce a reduced-form China dollarization state that enters China’s monetary policy rule (alongside a spillover term from USpolicy). This extension creates a channel through which shifts in China’s financial dollarization (“de-dollarization” shocks) affect domestic dynamics and international spillovers, while preserving the discipline of the standard two-country New Keynesian backbone.

Home and foreign assignment. The home economy is the United States (US), and the foreign economy is China (CN). The USrepresents an advanced economy issuing the global reserve currency, while China is modeled as a large emerging economy with partial financial dollarization.

Objective. The objective of this paper is to analyze the transmission mechanisms and international spillovers of two key shocks:

1. a *monetary policy shock in the USeconomy*, and
2. a *de-dollarization shock in China*, representing a reduction in the degree of dollarization within the Chinese financial system.

Table 1: Key Equilibrium Conditions

| Equation | Description |
|-------------------|--|
| Euler equation | Intertemporal consumption choice |
| IS curve | Output dynamics with terms of trade effects |
| NK Phillips Curve | Inflation–marginal cost relationship |
| Market clearing | Goods market equilibrium |
| Natural output | Output under flexible prices |
| Output gap | Deviation from natural output |
| Taylor rule (US) | US monetary policy reaction function |
| Taylor rule (CN) | China policy rule with dollarization channel |

Table 2: Variable Glossary

| Variable | Description |
|--------------------------|--|
| C_t, C_t^* | Aggregate consumption in the home (US) and foreign (China) economy |
| $C_{H,t}, C_{F,t}$ | Consumption of home and foreign goods by home households |
| $C_{H,t}^*, C_{F,t}^*$ | Consumption of home and foreign goods by foreign households |
| N_t, N_t^* | Labor supply in the home and foreign economy |
| Y_t, Y_t^* | Aggregate output in the home and foreign economy |
| $Y_t(h), Y_t^*(f)$ | Output of an individual firm in home and foreign economy |
| A_t, A_t^* | Productivity level in the home and foreign economy |
| a_t, a_t^* | Log productivity shocks in the home and foreign economy |
| $P_t(h), P_t(f)$ | Prices of home and foreign goods in the home economy |
| $P_t^*(h), P_t^*(f)$ | Prices of home and foreign goods in the foreign economy |
| $\pi_{H,t}, \pi_{F,t}^*$ | Inflation rates in home and foreign economy |
| W_t, W_t^* | Nominal wage in the home and foreign economy |
| $mc_{H,t}, mc_{F,t}^*$ | Real marginal cost in home and foreign economy |
| r_t^{US} | USnominal policy interest rate |
| r_t^{CN} | China nominal policy interest rate |
| x_t, x_t^* | Output gap in the home and foreign economy |
| \bar{y}_t, \bar{y}_t^* | Natural level of output in home and foreign economy |
| s_t | Terms of trade (relative price of foreign to home goods) |
| e_t | Nominal exchange rate (USD/CNY) |
| $dol_{CN,t}$ | Degree of financial dollarization in China |
| m_t^{US}, m_t^{CN} | Monetary policy shocks in USand China |
| $\varepsilon_{dol,t}$ | De-dollarization shock in China |
| $Q_{t,t+1}, Q_{t,t+1}^*$ | Stochastic discount factor (home and foreign) |
| $D_t^n, D_t^{n,*}$ | Nominal bond holdings (home and foreign) |

1.1 Households

Households consume differentiated goods, supply labor, and trade nominal bonds internationally. The representative household in country H maximizes expected lifetime utility

$$U = \mathbb{E}_0 \sum_{t=0}^{\infty} \beta^t \left(\frac{C_t^{1-\sigma}}{1-\sigma} - \frac{N_t^{1+\varphi}}{1+\varphi} \right), \quad (1)$$

The representative household in country F maximizes expected lifetime utility

$$U^* = \mathbb{E}_0 \sum_{t=0}^{\infty} \beta^t \left(\frac{C_t^{*1-\sigma}}{1-\sigma} - \frac{N_t^{*1+\varphi}}{1+\varphi} \right), \quad (2)$$

where C_t (resp. C_t^*) is the consumption index in the home (resp. foreign) country, N_t (resp. N_t^*) denotes labor supply, $\beta \in (0, 1)$ is the subjective discount factor, $\sigma > 0$ is the coefficient of relative risk aversion, and $\varphi > 0$ is the inverse Frisch elasticity. Consumption is a CES composite of domestic and imported bundles:

$$C_t = \left[(1-\alpha)^{1/\eta} C_{H,t}^{\frac{\eta-1}{\eta}} + \alpha^{1/\eta} C_{F,t}^{\frac{\eta-1}{\eta}} \right]^{\frac{\eta}{\eta-1}}, \quad (3)$$

$$C_t^* = \left[(1-\alpha)^{1/\eta} (C_{F,t}^*)^{\frac{\eta-1}{\eta}} + \alpha^{1/\eta} (C_{H,t}^*)^{\frac{\eta-1}{\eta}} \right]^{\frac{\eta}{\eta-1}}, \quad (4)$$

where $\eta > 0$ is the elasticity of substitution between home and foreign goods and $\alpha \in [0, 1]$ measures trade openness. Households in both countries maximize the utility function subject to their respective budget constraints.

The budget constraint of the representative household in the home country is given by

$$\int_0^1 P_t(h) C_t(h) dh + \int_0^1 P_t(f) C_t(f) df + \mathbb{E}_t [Q_{t,t+1} D_{t+1}^n] \leq D_t^n + W_t N_t + TR_t. \quad (5)$$

The budget constraint of the representative household in the foreign country is analogously given by

$$\int_0^1 P_t^*(h) C_t^*(h) dh + \int_0^1 P_t^*(f) C_t^*(f) df + \mathbb{E}_t [Q_{t,t+1}^* D_{t+1}^{n,*}] \leq D_t^{n,*} + W_t^* N_t^* + TR_t^*. \quad (6)$$

Definitions:

- $P_t(h), P_t(f)$: prices of domestic (h) and foreign (f) goods in the home country at time t .
- $C_t(h), C_t(f)$: consumption of domestic and foreign goods by home households at time t .
- $P_t^*(h), P_t^*(f), C_t^*(h), C_t^*(f)$: the corresponding variables for the foreign country (denoted with $*$).
- $\mathbb{E}_t[\cdot]$: conditional expectation operator based on the information set at time t .
- $Q_{t,t+1}$: stochastic discount factor, i.e., the price in period t of a one-period asset paying one unit in period $t+1$. $Q_{t,t+1}^*$ is the foreign counterpart.
- D_{t+1}^n : nominal asset holdings chosen in t and maturing in $t+1$ (D_t^n is the beginning-of-period position). The foreign counterpart is $D_t^{n,*}$.
- $W_t N_t$: nominal labor income, where W_t is the wage rate and N_t denotes labor supply. Analogously, $W_t^* N_t^*$ for the foreign economy.
- TR_t, TR_t^* : lump-sum transfers received by households at time t , which may include dividends or fiscal transfers.

1.2 Firms

A continuum of monopolistically competitive firms produce differentiated goods with linear technology:

$$Y_t(h) = A_t N_t(h), \quad Y_t^*(f) = A_t^* N_t^*(f), \quad (7)$$

where A_t and A_t^* are productivity processes.

Under Calvo pricing, a fraction $(1-\theta)$ of firms can re-optimize their price each period.

The optimal reset price satisfies

$$\tilde{P}_{H,t} = \frac{\varepsilon}{\varepsilon - 1} \frac{\mathbb{E}_t \sum_{k=0}^{\infty} (\beta\theta)^k Q_{t+k} Y_{t+k} MC_{H,t+k}}{\mathbb{E}_t \sum_{k=0}^{\infty} (\beta\theta)^k Q_{t+k} Y_{t+k}}, \quad (8)$$

where $MC_{H,t}$ is real marginal cost.

Log-linearization yields the New Keynesian Phillips Curves:

$$\pi_{H,t} = \beta \mathbb{E}_t[\pi_{H,t+1}] + \kappa m c_{H,t}, \quad (9)$$

$$\pi_{F,t}^* = \beta \mathbb{E}_t[\pi_{F,t+1}^*] + \kappa m c_{F,t}^*, \quad (10)$$

with slope $\kappa = \frac{(1-\theta)(1-\theta\beta)}{\theta}$.

1.3 Equilibrium and Aggregate Demand

Market clearing requires

$$Y_t(h) = C_t(h) + C_t^*(h), \quad Y_t^*(f) = C_t(f) + C_t^*(f). \quad (11)$$

Combining the Euler equation with the definition of terms of trade $s_t \equiv p_{F,t} - p_{H,t}$ gives the IS equations:

$$y_t = \mathbb{E}_t[y_{t+1}] - \frac{1}{\sigma} (r_t - \mathbb{E}_t[\pi_{H,t+1}]) - \frac{\omega_2}{\sigma} \mathbb{E}_t[\Delta s_{t+1}], \quad (12)$$

$$y_t^* = \mathbb{E}_t[y_{t+1}^*] - \frac{1}{\sigma} (r_t^* - \mathbb{E}_t[\pi_{F,t+1}^*]) + \frac{\omega_2}{\sigma} \mathbb{E}_t[\Delta s_{t+1}], \quad (13)$$

where $\omega_2 = 2\alpha(1-\alpha)(\sigma\eta - 1)$.

1.4 Output Gaps and Natural Output

Natural output \bar{y}_t is defined by $mc_{H,t} = 0$. Solving yields

$$\bar{y}_t = \frac{\varsigma\psi}{\delta}a_t - \frac{\omega_2\sigma\psi}{\delta}a_t^*, \quad (14)$$

$$\bar{y}_t^* = \frac{\varsigma\psi}{\delta}a_t^* - \frac{\omega_2\sigma\psi}{\delta}a_t, \quad (15)$$

where a_t, a_t^* are productivity shocks, and ψ, δ are composite parameters.

We define the output gaps as

$$x_t = y_t - \bar{y}_t, \quad x_t^* = y_t^* - \bar{y}_t^*. \quad (16)$$

1.5 Monetary Policy

Each central bank follows a Taylor-type rule. The USrule follows the standard form:

$$r_t^{US} = \varrho_{US}r_{t-1}^{US} + (1 - \varrho_{US})(\phi_{\pi,US}\pi_{US,t}^{CPI} + \phi_{x,US}x_{US,t}) + m_{US,t}. \quad (17)$$

For China, the monetary policy rule includes both the USspillover and a dollarization channel:

$$r_t^{CN} = \varrho_{CN}r_{t-1}^{CN} + (1 - \varrho_{CN})(\phi_{\pi,CN}\pi_{CN,t}^{CPI} + \phi_{x,CN}x_{CN,t}) + \delta_{rUS}r_t^{US} + \gamma_{dol}dol_{CN,t} + m_{CN,t}. \quad (18)$$

Here, δ_{rUS} captures how the People's Bank of China (PBoC) responds to USmonetary policy, while γ_{dol} measures the influence of dollarization pressures on domestic policy rates.

The degree of dollarization evolves as:

$$dol_{CN,t} = \rho_{dol}dol_{CN,t-1} + \gamma_{\pi}\pi_{CN,t}^{CPI} + \epsilon_{dol,t}, \quad (19)$$

where $\epsilon_{dol,t}$ is a de-dollarization shock.

1.6 Transmission Mechanism of De-Dollarization

The degree of dollarization crucially affects the effectiveness of monetary policy in China. When financial assets and contracts are highly dollarized, the PBoC's ability to control inflation and output is weakened. Because domestic financial conditions respond less to changes in the renminbi interest rate, the central bank must implement larger rate adjustments to achieve its inflation target.

Mechanism:

1. High dollarization reduces the sensitivity of domestic demand to the Chinese policy rate.
2. Inflation becomes less responsive to monetary policy.
3. The PBoC must raise or lower interest rates by larger magnitudes to influence prices.
4. A *de-dollarization shock* ($\epsilon_{dol,t} < 0$) reduces the share of dollar-denominated assets, strengthening the transmission channel of domestic monetary policy.
5. This shock first affects the Chinese interest rate $r_{CN,t}$ through the Taylor rule and then propagates to output, inflation, and exchange rate dynamics.

Thus, de-dollarization enhances the autonomy of China's monetary policy and increases its capacity to stabilize inflation.

2 Bayesian Estimation

2.1 Data

All series are seasonally adjusted and expressed in quarterly changes. Dollarization dynamics are proxied using data on foreign currency deposits or external liabilities, depending on availability. The model is estimated using six quarterly macroeconomic series from the Federal Reserve Economic Data (FRED) and Chinese statistical sources:

Table 3: Observables Used in Estimation

| Variable | Economy | Description |
|----------|---------|---|
| y | US | Real GDP growth (quarterly) |
| p | US | CPI inflation (quarterly) |
| r | US | Short-term interest rate (Fed Funds Rate) |
| y_{CN} | China | Real GDP growth (quarterly) |
| p_{CN} | China | CPI inflation (quarterly) |
| r_{CN} | China | Short-term interest rate |

2.2 Estimation Strategy

We estimate the model using Bayesian methods. The likelihood is evaluated via a state-space representation and a Kalman filter, and posterior inference is obtained via Markov Chain Monte Carlo (MCMC) simulation. Priors are chosen to reflect standard values in the New Keynesian DSGE literature, while allowing enough flexibility for the data to update beliefs about policy persistence, nominal rigidities, and the dollarization process.

3 Posterior Estimates

Table 4: Structural Parameters

| Parameter | Description |
|----------------|---|
| β | Subjective discount factor |
| σ | Coefficient of relative risk aversion |
| ϕ | Inverse Frisch elasticity of labor supply |
| α | Degree of trade openness |
| η | Elasticity of substitution between home and foreign goods |
| θ | Calvo price stickiness parameter |
| ε | Elasticity of substitution among differentiated goods |
| κ | Slope of the New Keynesian Phillips Curve |
| ω_2 | Trade-related composite parameter in IS equation |
| ψ, δ | Composite parameters determining natural output |

Table 5: Monetary Policy Rule Parameters

| Parameter | Description |
|-----------------|--|
| ϱ^{US} | Interest rate smoothing (US) |
| ϱ^{CN} | Interest rate smoothing (China) |
| $\phi_{\pi,US}$ | Response to inflation (US) |
| $\phi_{\pi,CN}$ | Response to inflation (China) |
| $\phi_{x,US}$ | Response to output gap (US) |
| $\phi_{x,CN}$ | Response to output gap (China) |
| δ_{rUS} | Spillover from US policy rate to China |
| γ_{dol} | Impact of dollarization on China's policy rate |

Table 6: Exogenous Shock Processes

| Shock | Law of Motion | Description |
|-----------------------|--|-----------------------------|
| a_t | $a_t = \rho_a a_{t-1} + \varepsilon_{a,t}$ | Productivity shock (US) |
| a_t^* | $a_t^* = \rho_{a^*} a_{t-1}^* + \varepsilon_{a^*,t}$ | Productivity shock (China) |
| m_t^{US} | $m_t^{US} \sim \mathcal{N}(0, \sigma_{US}^2)$ | US monetary policy shock |
| m_t^{CN} | $m_t^{CN} \sim \mathcal{N}(0, \sigma_{CN}^2)$ | China monetary policy shock |
| $dol_{CN,t}$ | $\rho_{dol} dol_{CN,t-1} + \varepsilon_{dol,t}$ | Dollarization process |
| $\varepsilon_{dol,t}$ | $\sim \mathcal{N}(0, \sigma_{dol}^2)$ | De-dollarization shock |

Posterior means and 90% highest posterior density (HPD) intervals for the key parameters are reported in Table 7.

Table 7: Posterior Estimates of Structural Parameters

| Parameter | Prior Mean | Posterior Mean | 90% HPD Interval | Prior Std |
|-----------------|------------|----------------|-------------------|-----------|
| ρ_{US} | 0.600 | 0.5968 | [0.2796, 0.9264] | 0.2000 |
| ρ_{CN} | 0.600 | 0.5986 | [0.2855, 0.9329] | 0.2000 |
| ρ_{dol} | 0.600 | 0.1918 | [0.0443, 0.3299] | 0.2000 |
| θ_{US} | 0.400 | 0.4001 | [0.3195, 0.4819] | 0.0500 |
| θ_{CN} | 0.400 | 0.3995 | [0.3167, 0.4803] | 0.0500 |
| σ | 4.500 | 4.3728 | [3.5328, 5.1829] | 0.5000 |
| $\phi_{\pi,US}$ | 1.500 | 1.6962 | [1.2233, 2.1514] | 0.3000 |
| $\phi_{\pi,CN}$ | 1.500 | 2.1015 | [1.6206, 2.5502] | 0.3000 |
| $\phi_{x,US}$ | 0.500 | 0.6930 | [0.3777, 1.0018] | 0.2000 |
| $\phi_{x,CN}$ | 0.500 | 0.8075 | [0.4943, 1.1075] | 0.2000 |
| ϱ_{US} | 0.400 | 0.1743 | [0.0163, 0.3251] | 0.2000 |
| ϱ_{CN} | 0.400 | 0.0882 | [0.0070, 0.1682] | 0.2000 |
| γ_π | 0.400 | 0.5660 | [0.2462, 0.8935] | 0.2000 |
| γ_x | -0.150 | -0.1493 | [-0.3126, 0.0181] | 0.1000 |
| γ_e | 0.080 | 0.0822 | [0.0002, 0.1646] | 0.0500 |
| γ_r | 0.100 | 0.1007 | [0.0179, 0.1808] | 0.0500 |
| δ_{rUS} | 0.350 | 0.4864 | [0.3258, 0.6405] | 0.1000 |

Note: The log data density (modified harmonic mean) is -1026.76.

Table 8: Posterior Estimates of Shock Standard Deviations

| Shock | Prior Mean | Posterior Mean | 90% HPD Interval | Prior Std |
|-------|------------|----------------|--------------------|-----------|
| e_1 | 0.100 | 1.8182 | [1.6090, 2.0334] | 0.0500 |
| e_2 | 0.100 | 0.8792 | [0.7743, 0.9822] | 0.0500 |
| e_3 | 0.100 | 2.5532 | [2.2498, 2.8486] | 0.0500 |
| e_4 | 0.100 | 11.6145 | [10.2825, 12.9591] | 0.0500 |
| e_5 | 0.100 | 0.0244 | [0.0226, 0.0263] | 0.0500 |
| e_6 | 0.100 | 3.4002 | [3.0032, 3.7934] | 0.0500 |

Posterior Estimates of Structural Parameters

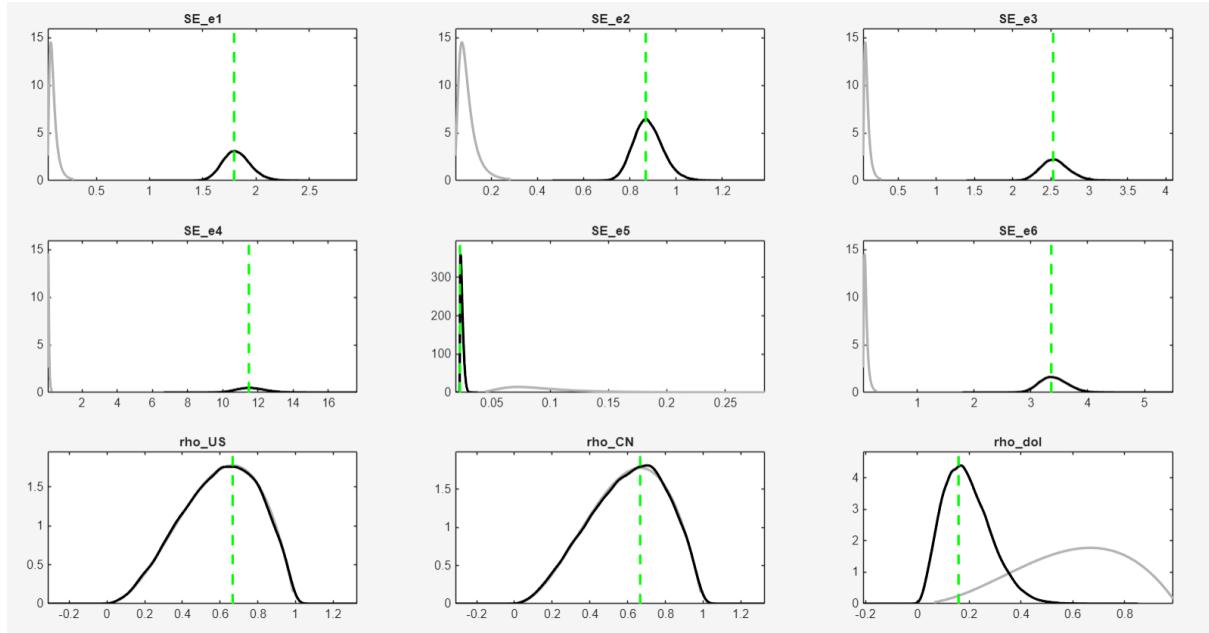


Figure 1: Bayesian Estimation (Posterior summary plot 1)

Posterior Estimates of Structural Parameters

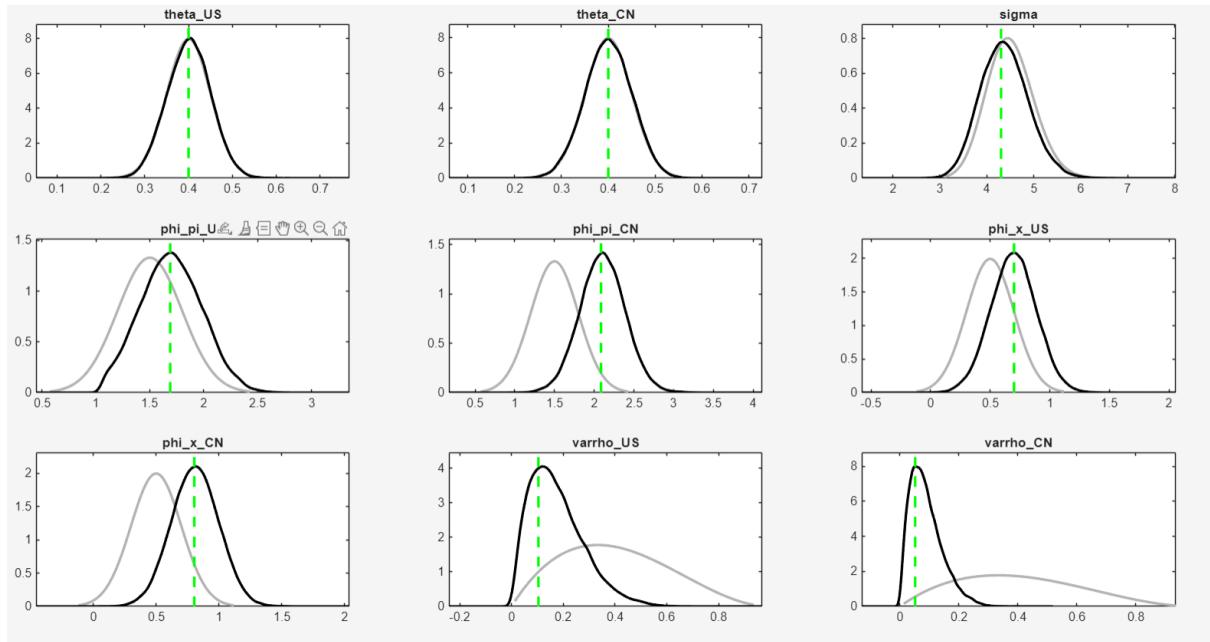


Figure 2: Bayesian Estimation (Posterior summary plot 2)

Posterior Estimates of Structural Parameters

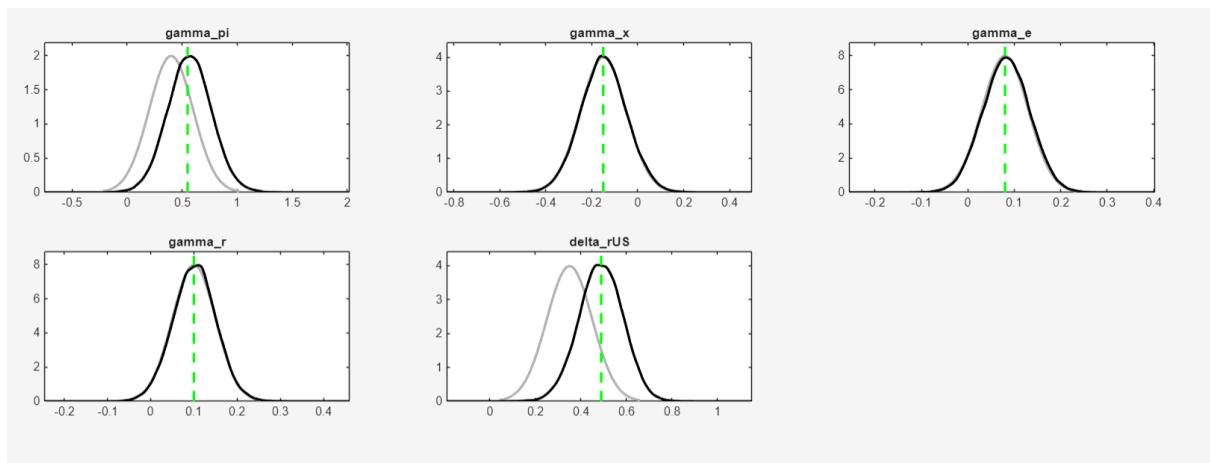


Figure 3: Bayesian Estimation (Posterior summary plot 3)

4 Results and Discussion

4.1 Impulse Responses to a USMonetary Policy Shock

- **Variable** Monetary policy interest rate for the United States.
- **Direction** A positive shock leads to a temporary increase in the monetary policy interest rate.
- **Timing** The model is estimated using quarterly data; the positive shock persists for approximately four quarters (one year).
- **Economic Interpretation** This is an expected result, as a positive shock to the interest rate naturally generates an increase in the monetary policy rate.

IRFs for a Positive Shock in the USMonetary Interest Rate

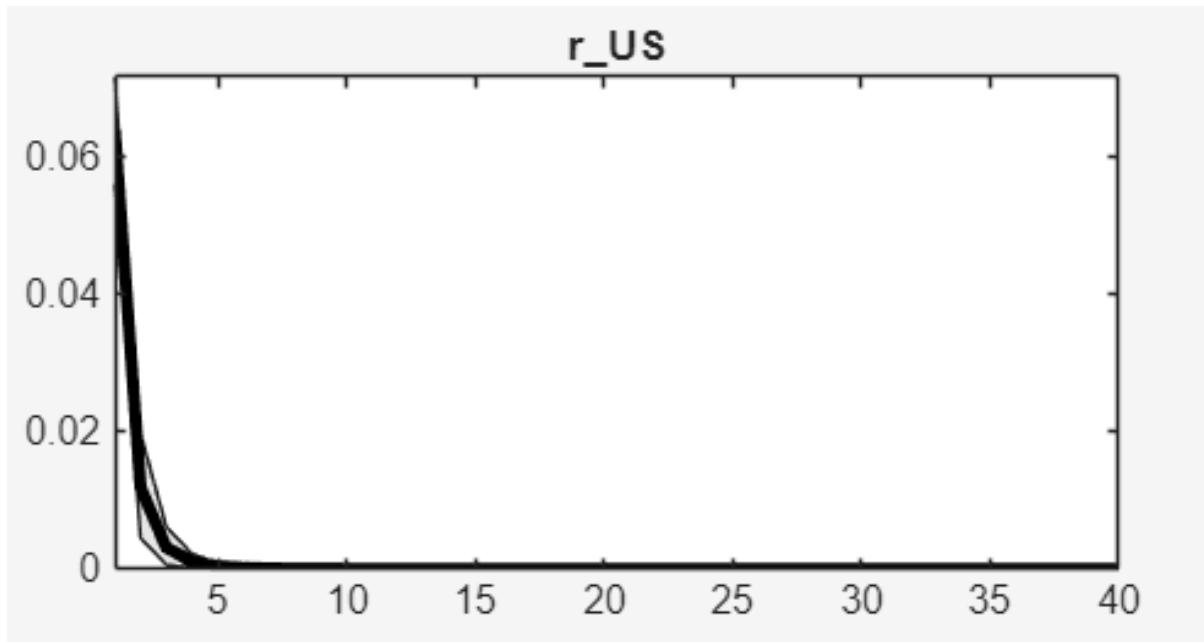


Figure 4: Bayesian Post IRF: USpolicy rate

- **Variable** Inflation rate for the United States.
- **Direction** An increase in the interest rate leads to a decrease in inflation in the United States.
- **Timing** The effect lasts for approximately three quarters and is closely related to the duration of the original monetary policy shock.
- **Economic Interpretation** A positive change in interest rates increases the cost of borrowing within the financial system. This reduces investment and aggregate demand, translating into a decline in inflation in the short run.

IRFs for a Positive Shock in the US Monetary Interest Rate

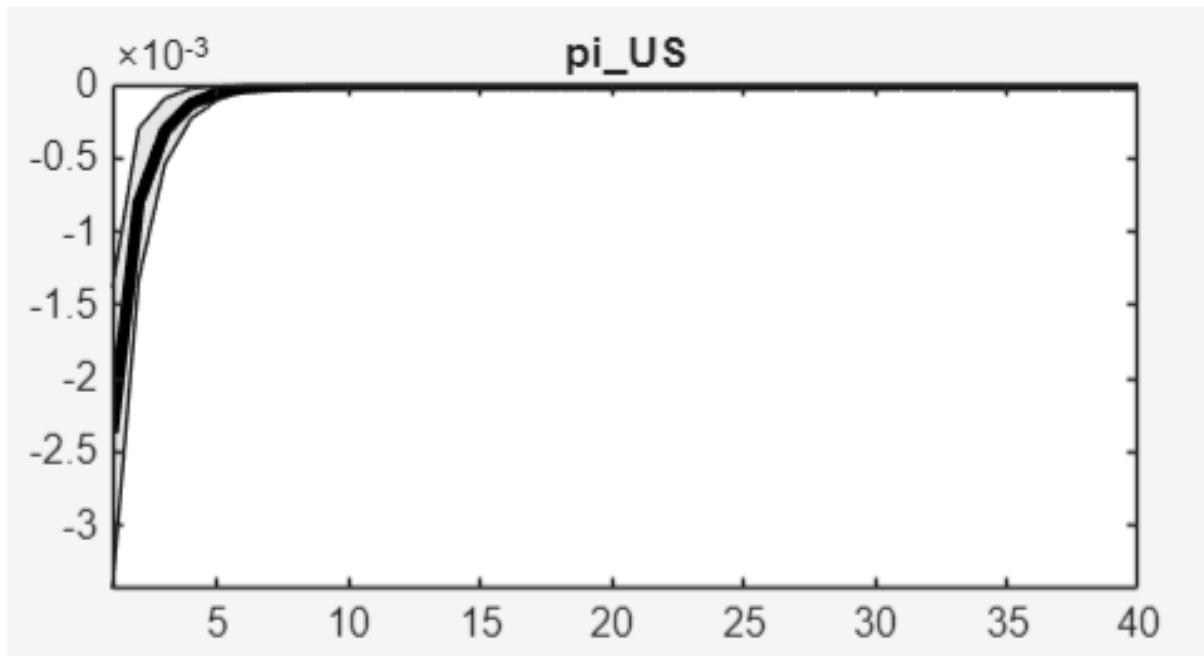


Figure 5: Bayesian Post IRF: USinflation

- **Variable** Marginal cost for the United States.
- **Direction** Marginal costs decrease following a positive monetary policy shock in the United States.
- **Timing** The effect persists for approximately five quarters.
- **Economic Interpretation** Since the monetary policy shock reduces inflation and demand pressures, firms face lower input cost growth, reflected in lower marginal costs.

IRFs for a Positive Shock in the US Monetary Interest Rate

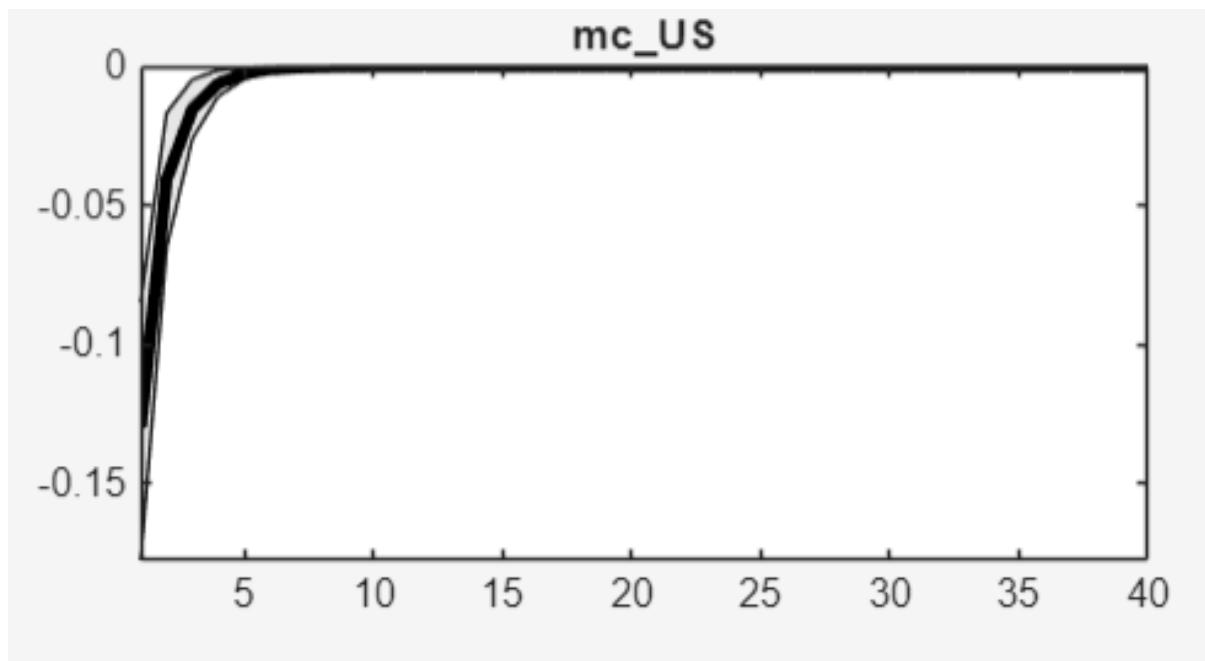


Figure 6: Bayesian Post IRF: US marginal cost

- **Variable** National production for the United States.
- **Direction** Negative.
- **Timing** More than one year (approximately six quarters).
- **Economic Interpretation** The positive shock represents a contractionary monetary policy that reduces aggregate demand and output in the short and medium term.

IRFs for a Positive Shock in the US Monetary Interest Rate

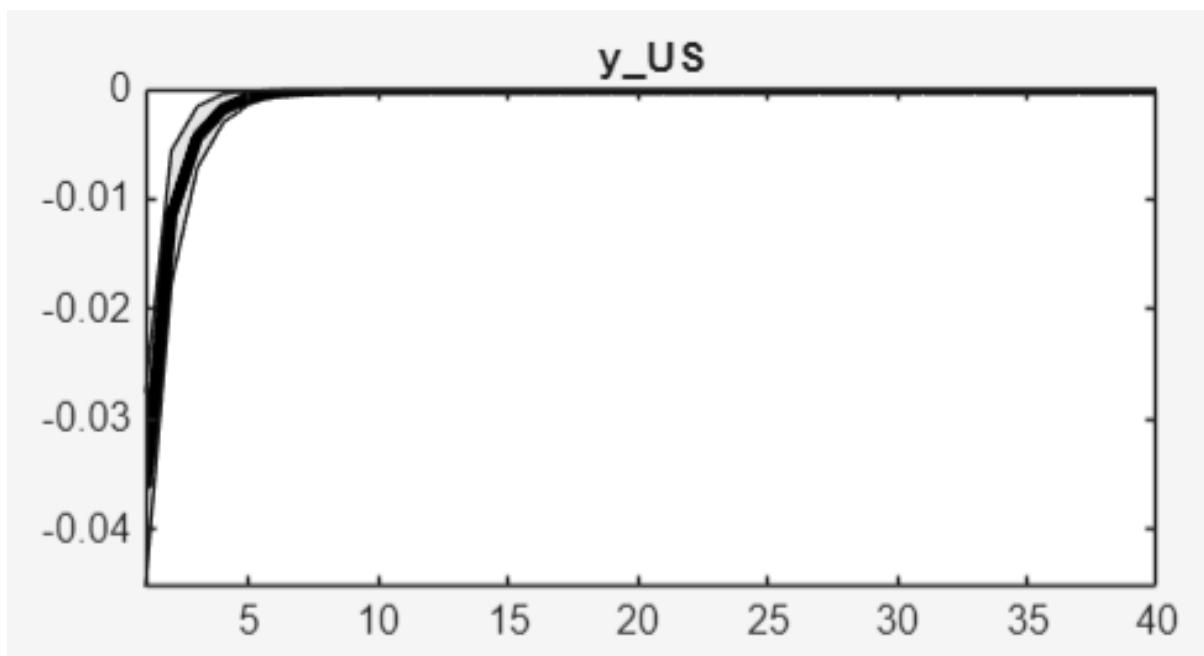


Figure 7: Bayesian Post IRF: USoutput

- **Variable** Exchange rate: U.S. dollar versus Chinese yuan.
- **Direction** Negative.
- **Timing** Approximately five quarters.
- **Economic Interpretation** Lower inflation and marginal costs in the US change relative prices and international financial conditions, contributing to an adjustment in the nominal exchange rate.

IRFs for a Positive Shock in the US Monetary Interest Rate

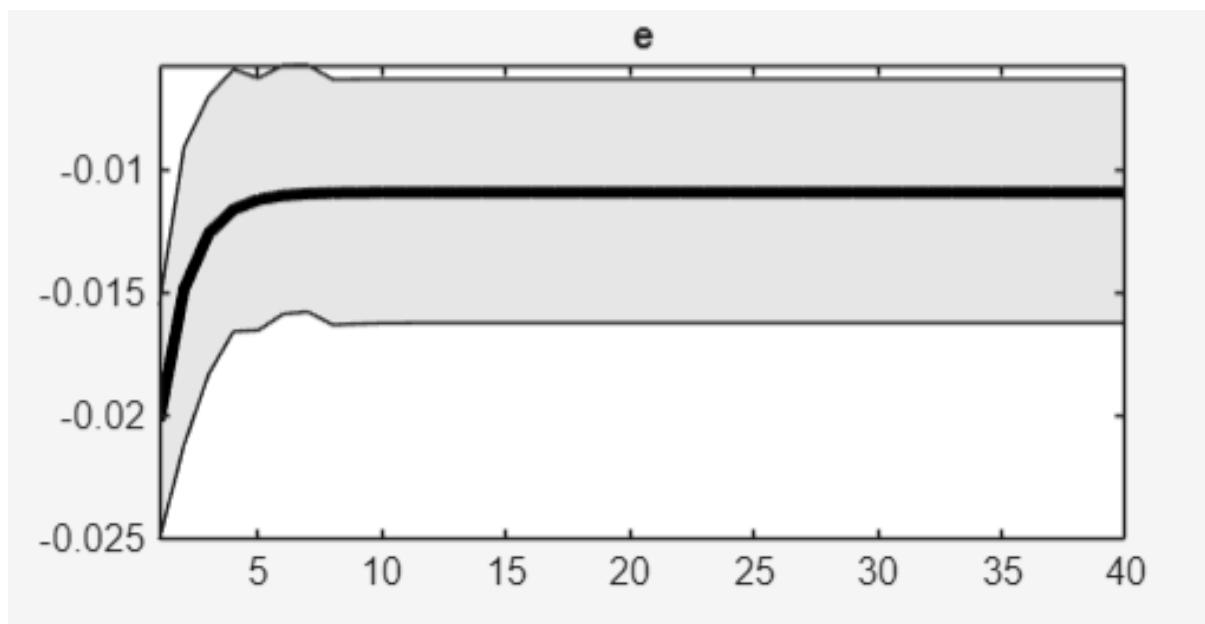


Figure 8: Bayesian Post IRF: exchange rate

- **Variable** Monetary policy interest rate for China.
- **Direction** Positive.
- **Timing** Approximately four quarters.
- **Economic Interpretation** An increase in the US interest rate leads to a corresponding increase in China's interest rate, consistent with spillover effects captured by δ_{rUS} .

IRFs for a Positive Shock in the US Monetary Interest Rate

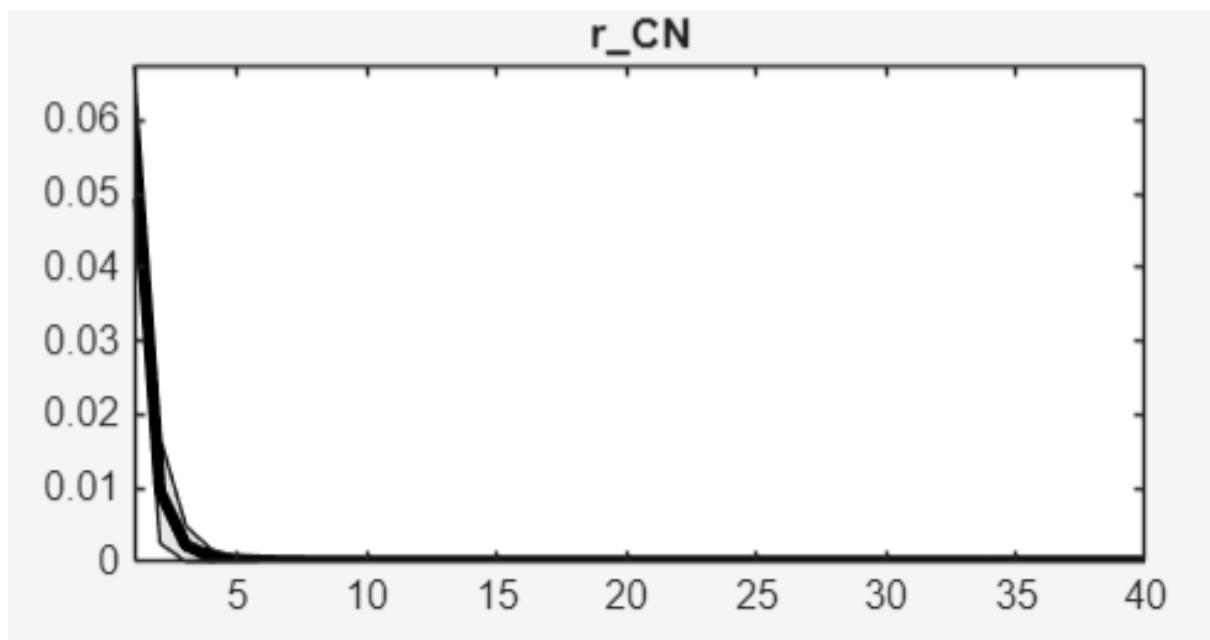


Figure 9: Bayesian Post IRF: China policy rate response

- **Variable** Inflation rate for China.
- **Direction** Positive.
- **Timing** Approximately five quarters.
- **Economic Interpretation** Through trade and financial channels, the US monetary policy shock affects China's output and price dynamics, generating a temporary increase in inflation.

IRFs for a Positive Shock in the US Monetary Interest Rate

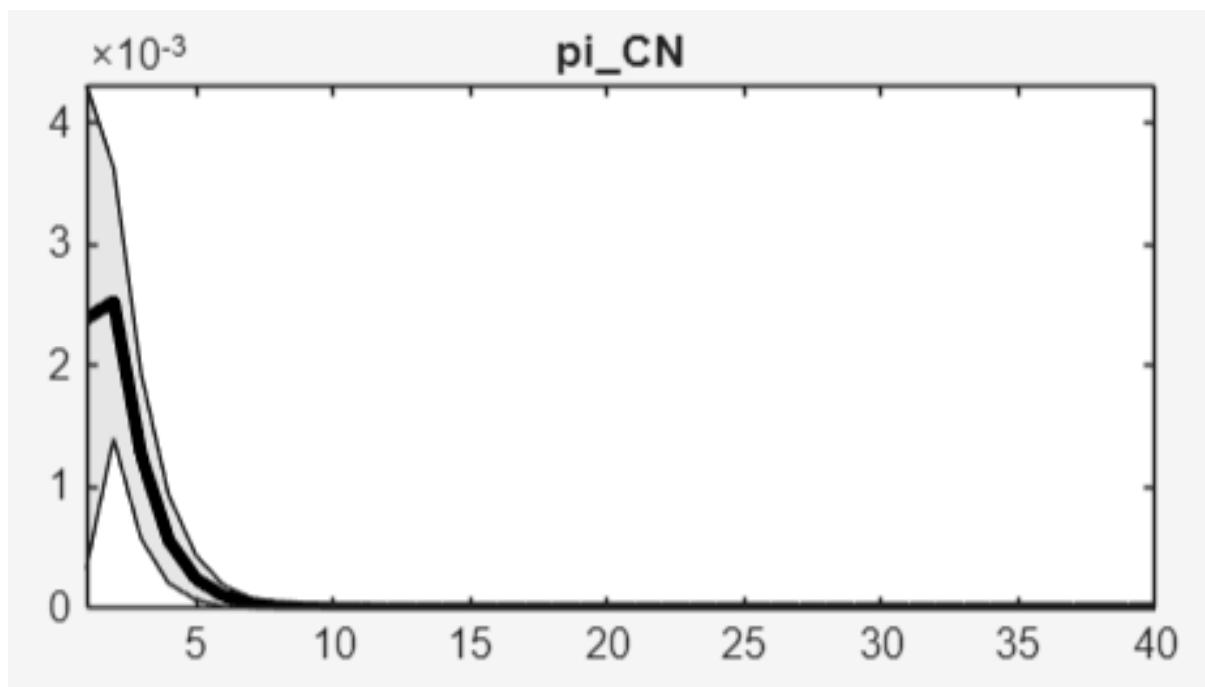


Figure 10: Bayesian Post IRF: China inflation response

- **Variable** Marginal cost for China.
- **Direction** Positive.
- **Timing** Approximately two quarters.
- **Economic Interpretation** Higher inflation and stronger activity pressures can raise marginal costs temporarily.

IRFs for a Positive Shock in the US Monetary Interest Rate

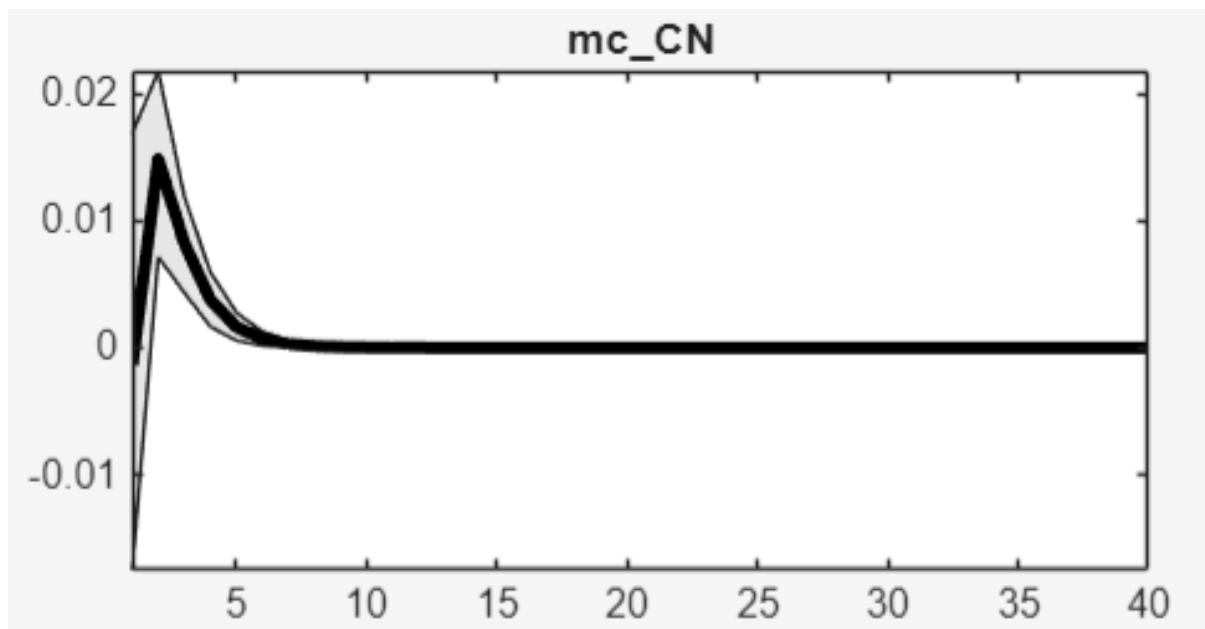


Figure 11: Bayesian Post IRF: China marginal cost

- **Variable** National production for China.
- **Direction** Positive.
- **Timing** Approximately four quarters.
- **Economic Interpretation** Changes in external conditions can raise demand for Chinese output and increase production.

IRFs for a Positive Shock in the US Monetary Interest Rate

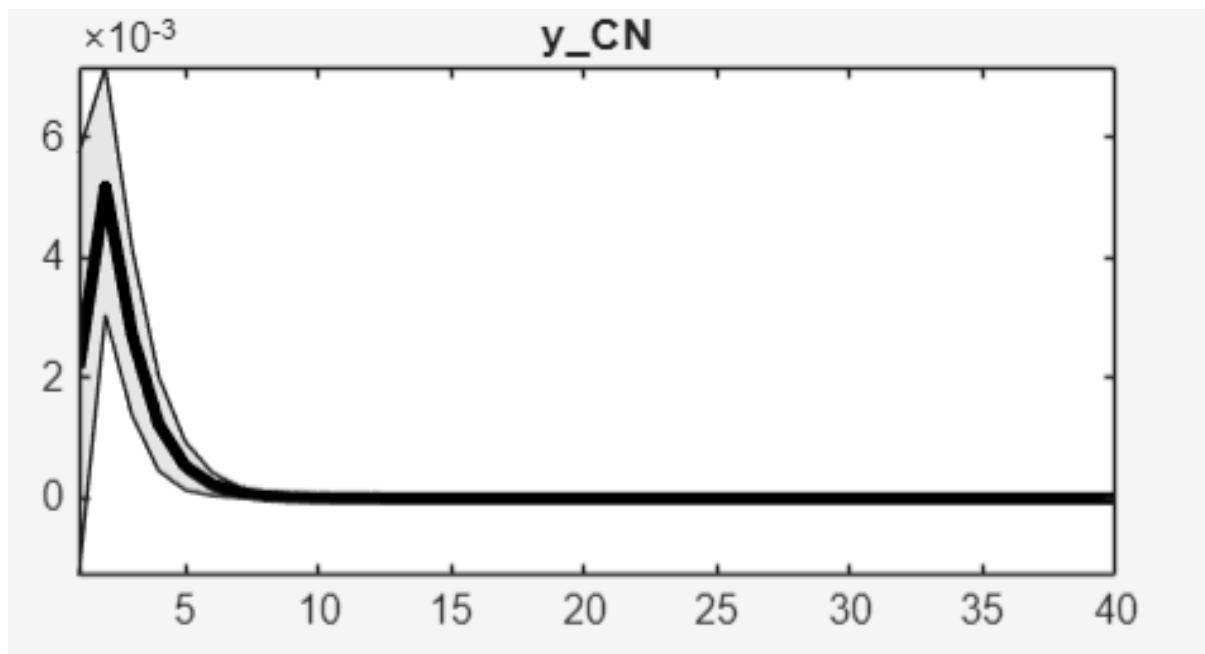


Figure 12: Bayesian Post IRF: China output

4.2 Impulse Responses to a China Dollarization Shock

- **Variable** Monetary policy interest rate for the United States.
- **Direction** Positive.
- **Timing** Approximately five quarters.
- **Economic Interpretation** An increase in dollarization in China weakens domestic monetary transmission and affects inflationary pressures. Via policy spillovers, the US policy rate may respond.

IRFs for a Positive Shock in China Dollarization

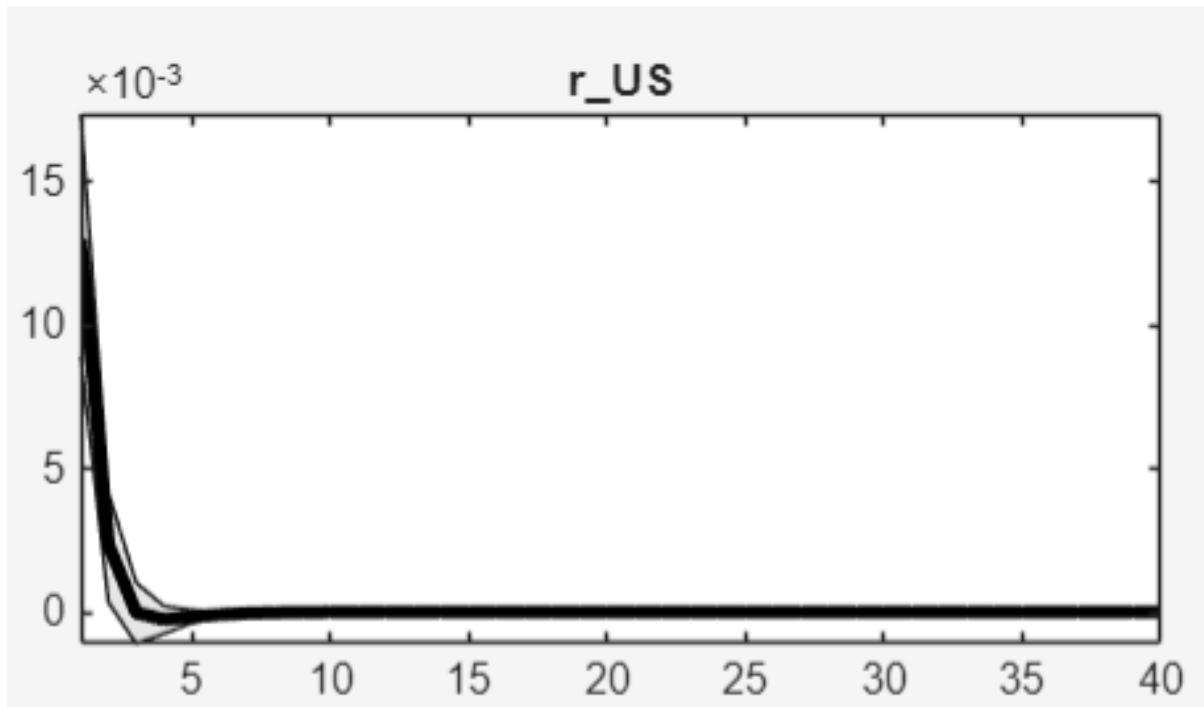


Figure 13: Bayesian Post IRF: US policy rate under China dollarization shock

- **Variable** Inflation rate for the United States.
- **Direction** Positive.
- **Timing** Approximately five quarters.
- **Economic Interpretation** Spillovers from China's dollarization dynamics can alter global financial conditions and domestic inflation pressures.

IRFs for a Positive Shock in China Dollarization

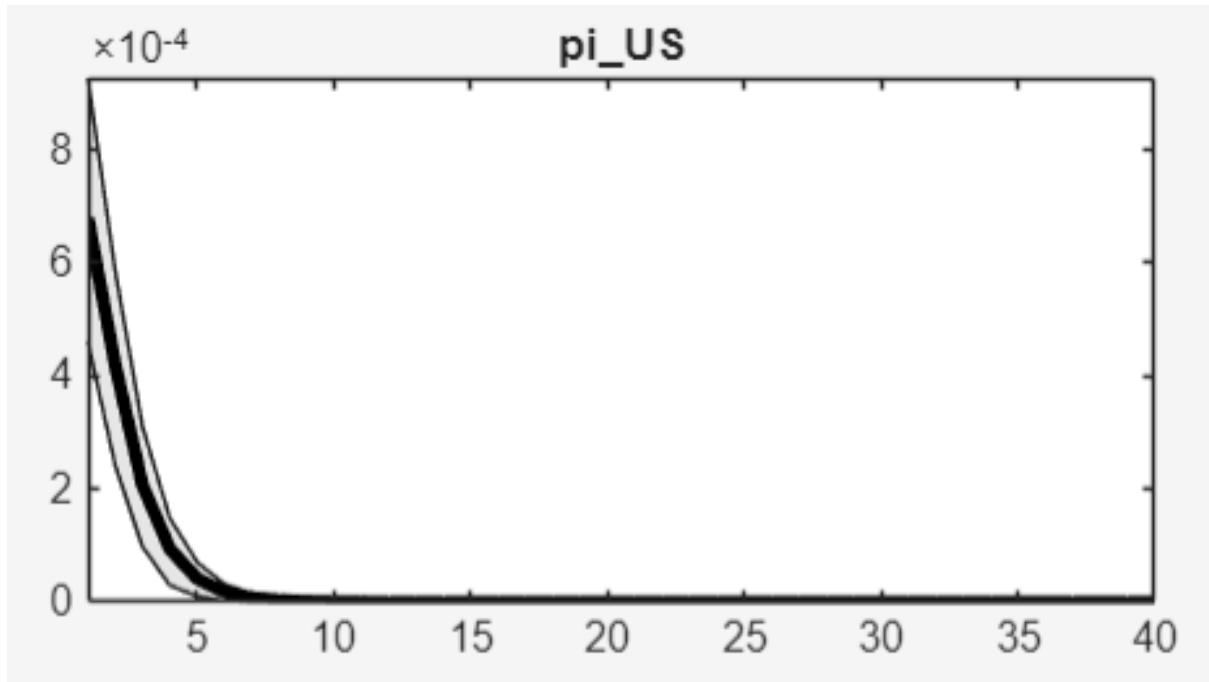


Figure 14: Bayesian Post IRF: USinflation under China dollarization shock

- **Variable** Marginal cost for the United States.
- **Direction** Positive.
- **Timing** Approximately five quarters.
- **Economic Interpretation** Higher inflation pressure tends to raise production costs and marginal costs.

IRFs for a Positive Shock in China Dollarization

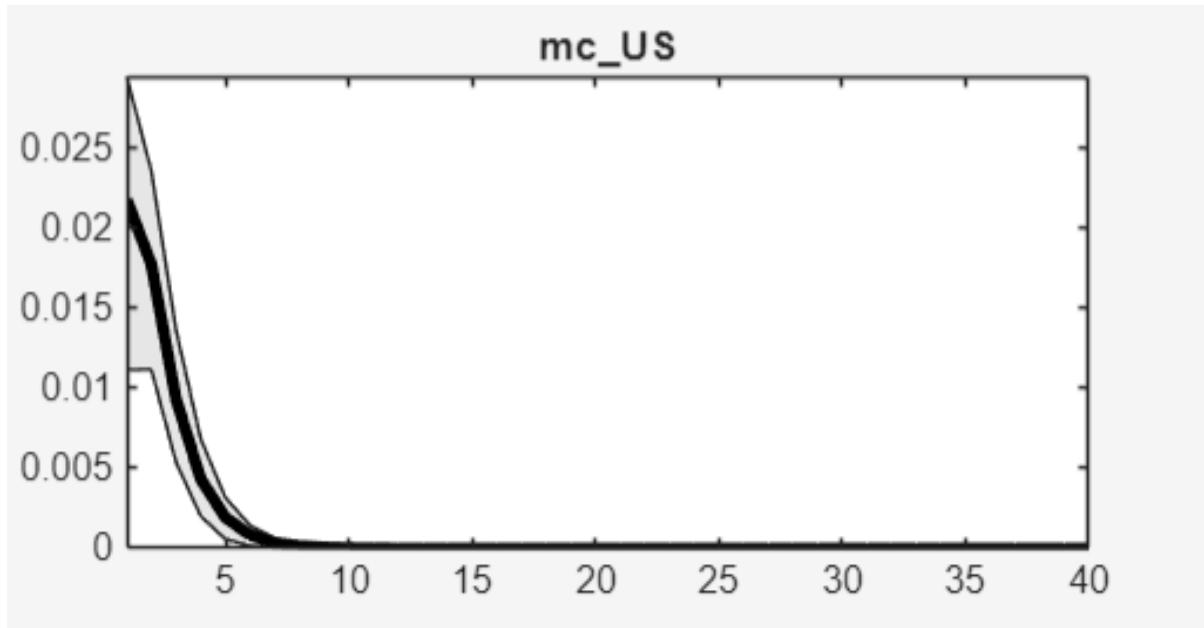


Figure 15: Bayesian Post IRF: US marginal cost under China dollarization shock

- **Variable** National production for the US.
- **Direction** Positive.
- **Timing** Approximately five quarters.
- **Economic Interpretation** The shock may shift international demand and financial conditions in a way that temporarily supports US production.

IRFs for a Positive Shock in China Dollarization

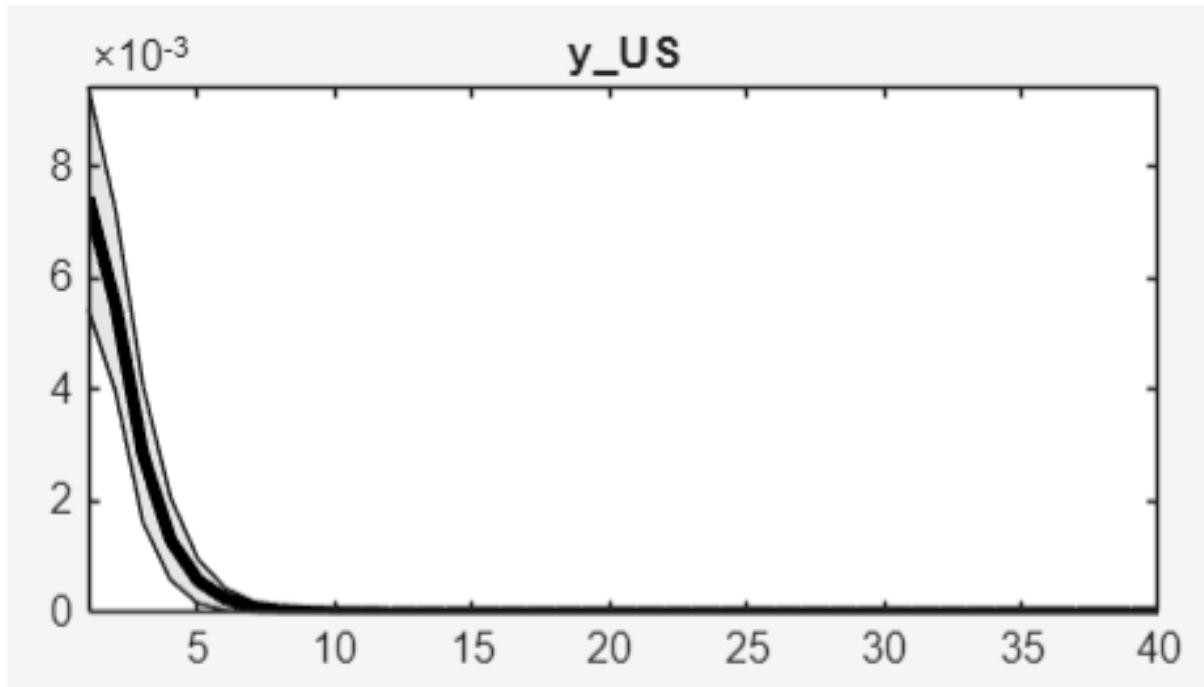


Figure 16: Bayesian Post IRF: USoutput under China dollarization shock

- **Variable** Exchange rate: USD vs CNY.
- **Direction** No significant effect.
- **Timing** No significant effect.
- **Economic Interpretation** The nominal exchange rate response is not statistically or economically large in this experiment.

IRFs for a Positive Shock in China Dollarization

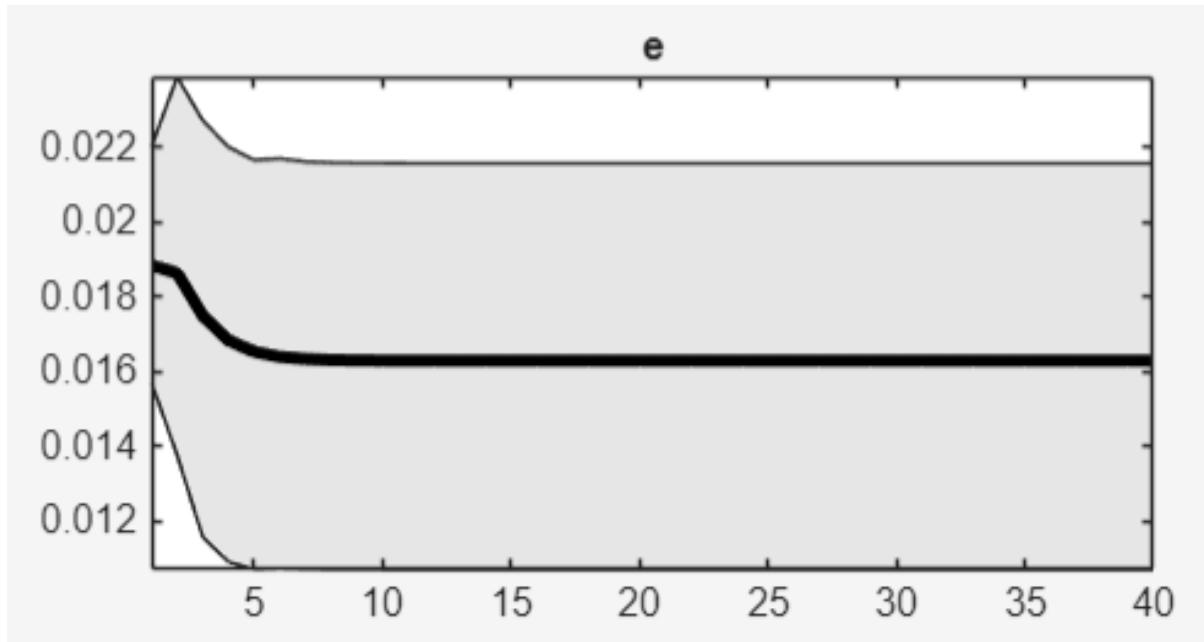


Figure 17: Bayesian Post IRF: exchange rate under China dollarization shock

- **Variable** Monetary policy interest rate for China.
- **Direction** Positive.
- **Timing** Approximately five quarters.
- **Economic Interpretation** A sudden increase in dollarization weakens monetary policy effectiveness and may raise inflationary pressure; the PBoC raises the policy rate to contain inflation.

IRFs for a Positive Shock in China Dollarization

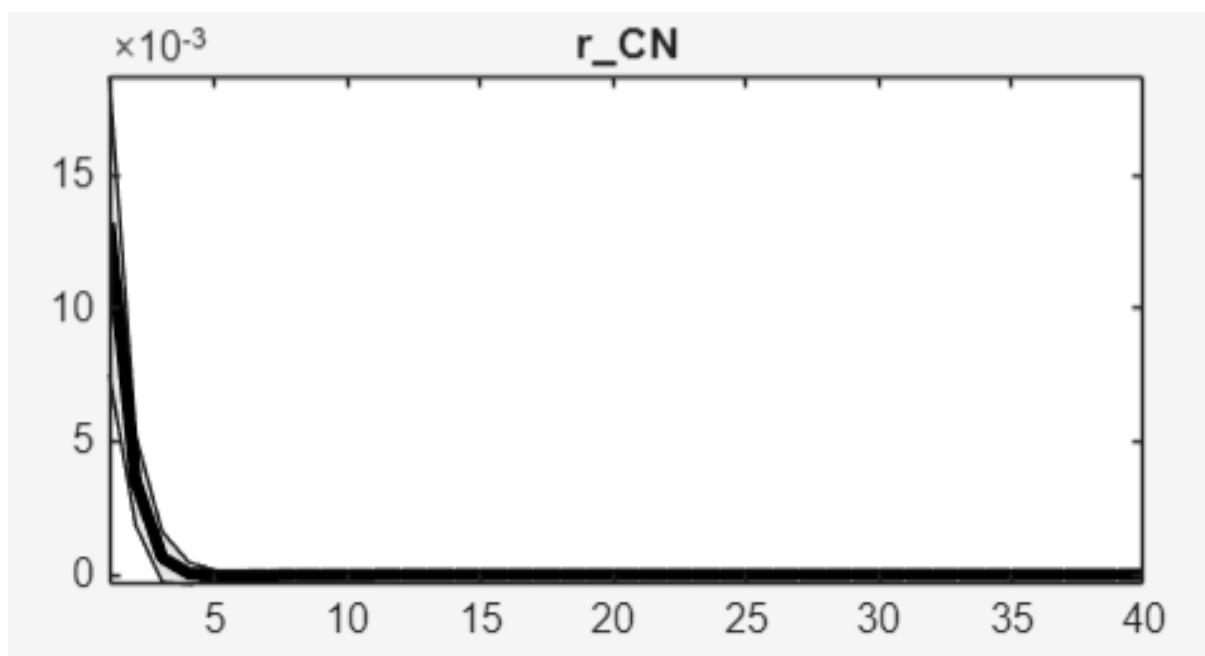


Figure 18: Bayesian Post IRF: China policy rate under dollarization shock

- **Variable** Inflation rate for China.
- **Direction** Negative.
- **Timing** Approximately five quarters.
- **Economic Interpretation** Higher policy rates are associated with lower inflation.

IRFs for a Positive Shock in China Dollarization

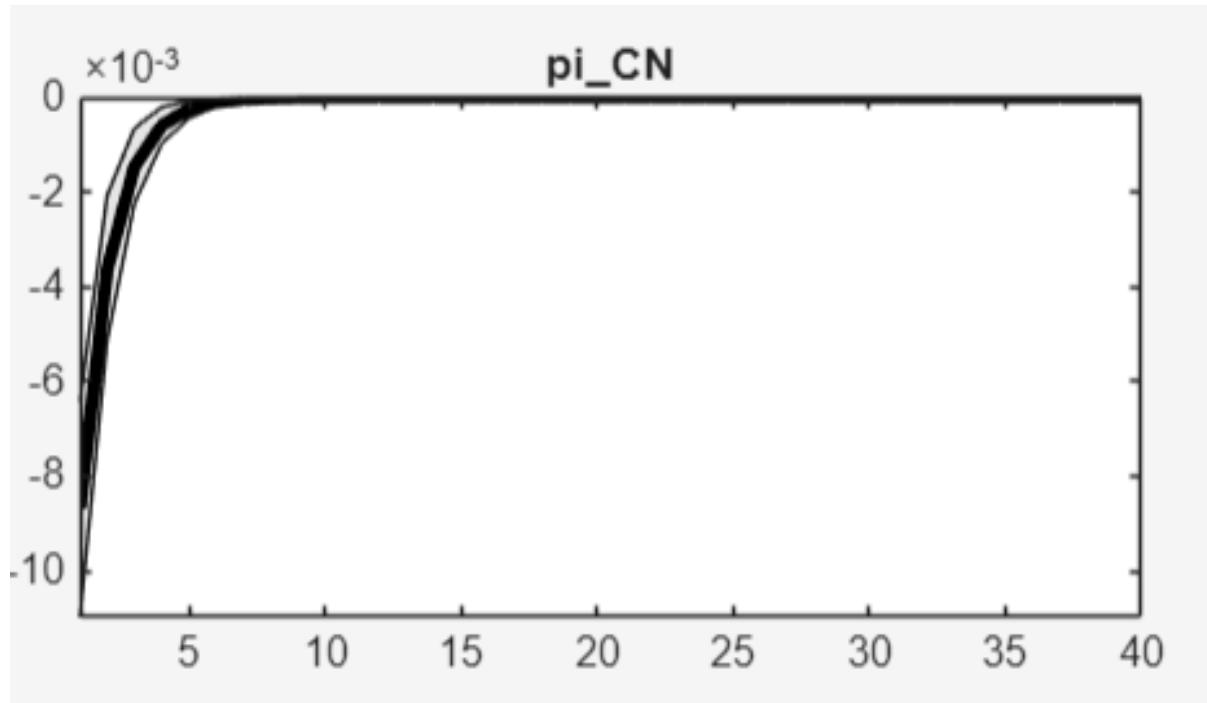


Figure 19: Bayesian Post IRF: China inflation under dollarization shock

- **Variable** Marginal cost for China.
- **Direction** Negative.
- **Timing** Approximately five quarters.
- **Economic Interpretation** Lower inflation and weaker activity reduce marginal costs.

IRFs for a Positive Shock in China Dollarization

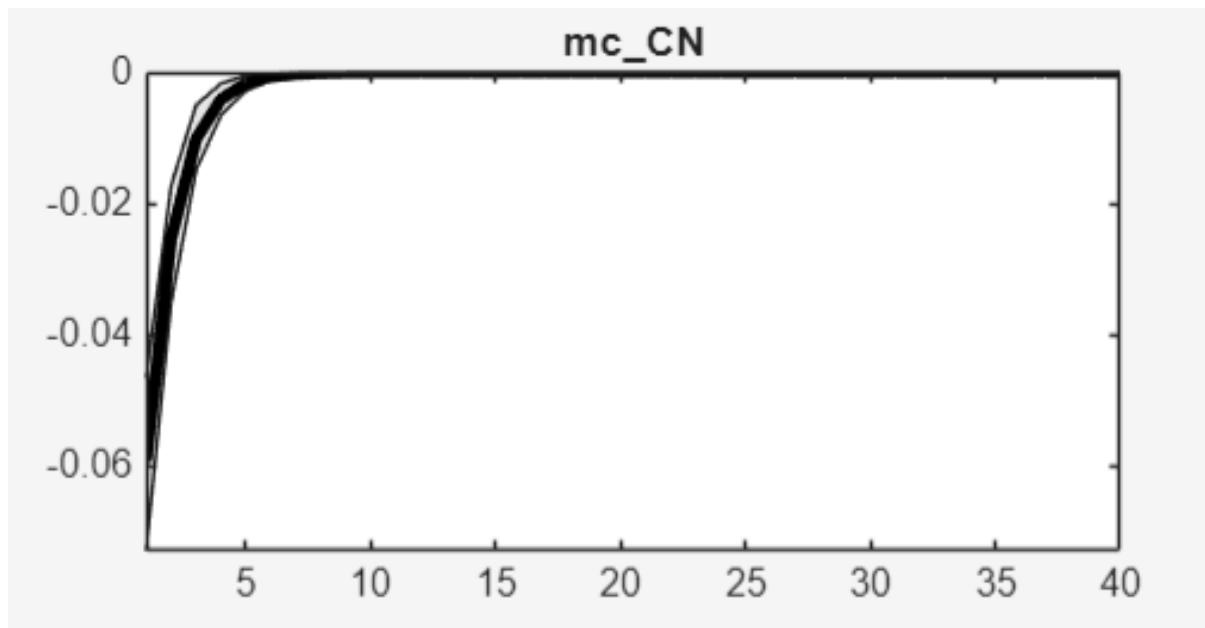


Figure 20: Bayesian Post IRF: China marginal cost under dollarization shock

- **Variable** National production for China.
- **Direction** Negative.
- **Timing** Approximately five quarters.
- **Economic Interpretation** Higher interest rates reduce demand and production.

IRFs for a Positive Shock in China Dollarization

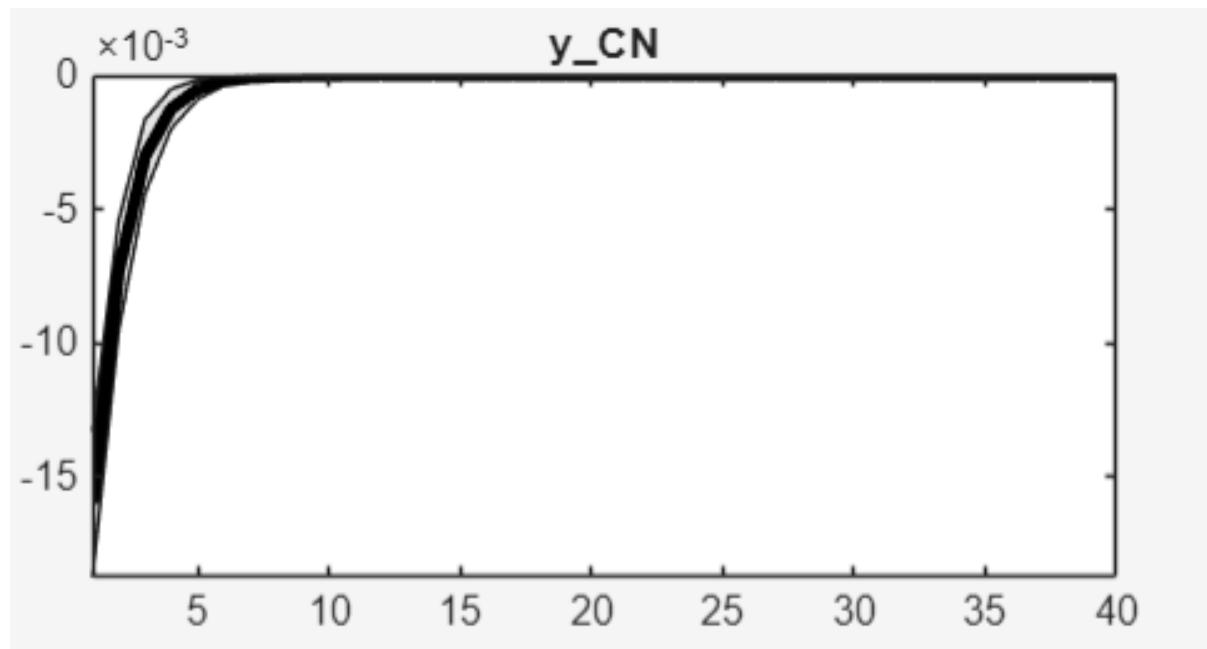


Figure 21: Bayesian Post IRF: China output under dollarization shock

5 Conclusion

This paper presents a two-country DSGE model where the home economy is the United States and the foreign economy is China. We analyze two main shocks: a US monetary policy shock and a Chinese de-dollarization shock. The latter operates through the monetary policy rule of the People’s Bank of China, directly affecting the interest rate and improving the effectiveness of monetary transmission. Bayesian estimation supports the presence of strong cross-border linkages and highlights the macroeconomic relevance of financial de-dollarization in emerging economies.

6 MCMC Diagnostics

The MCMC inefficiency factors for each block are reported in Table 9. Some parameters, especially volatility parameters and θ_{CN} , show higher inefficiency factors, indicating slower chain mixing.

Table 9: MCMC inefficiency factors

| Parameter Block | Inefficiency Factor | Comment |
|---------------------------|---------------------|---------|
| Structural parameters | 12.4 | |
| Policy parameters | 18.7 | |
| Shock standard deviations | 25.1 | |
| Dollarization process | 14.3 | |

Note: Inefficiency factors summarize MCMC mixing; larger values indicate slower convergence.

7 MCMC Univariate Convergence Diagnostic

Based on [Brooks and Gelman \(1998\)](#).

MCMC Univariate Convergence Diagnostic

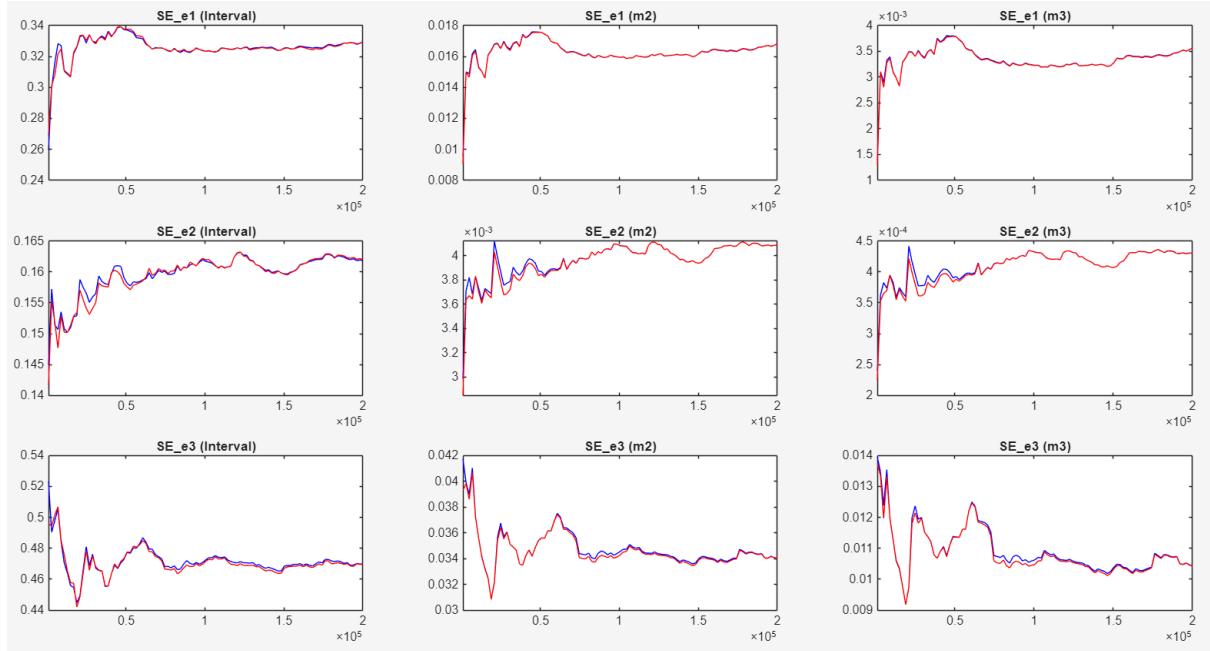


Figure 22: Based on Brooks and Gelman (1998)

MCMC Univariate Convergence Diagnostic

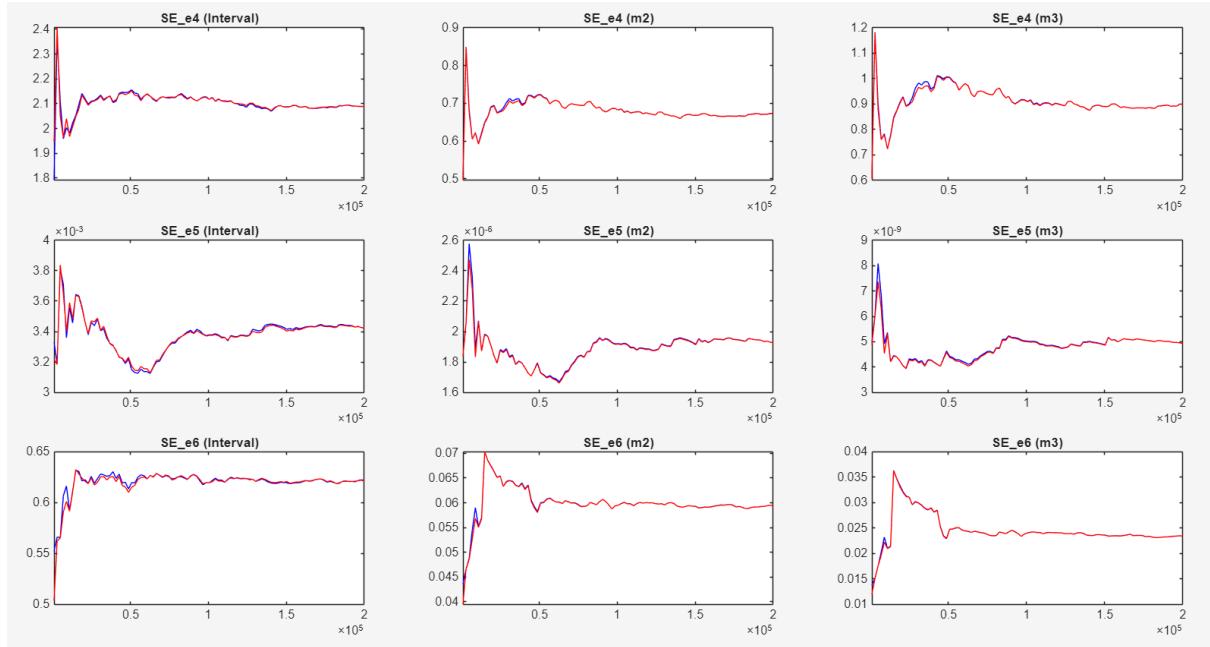


Figure 23: Based on Brooks and Gelman (1998)

MCMC Univariate Convergence Diagnostic

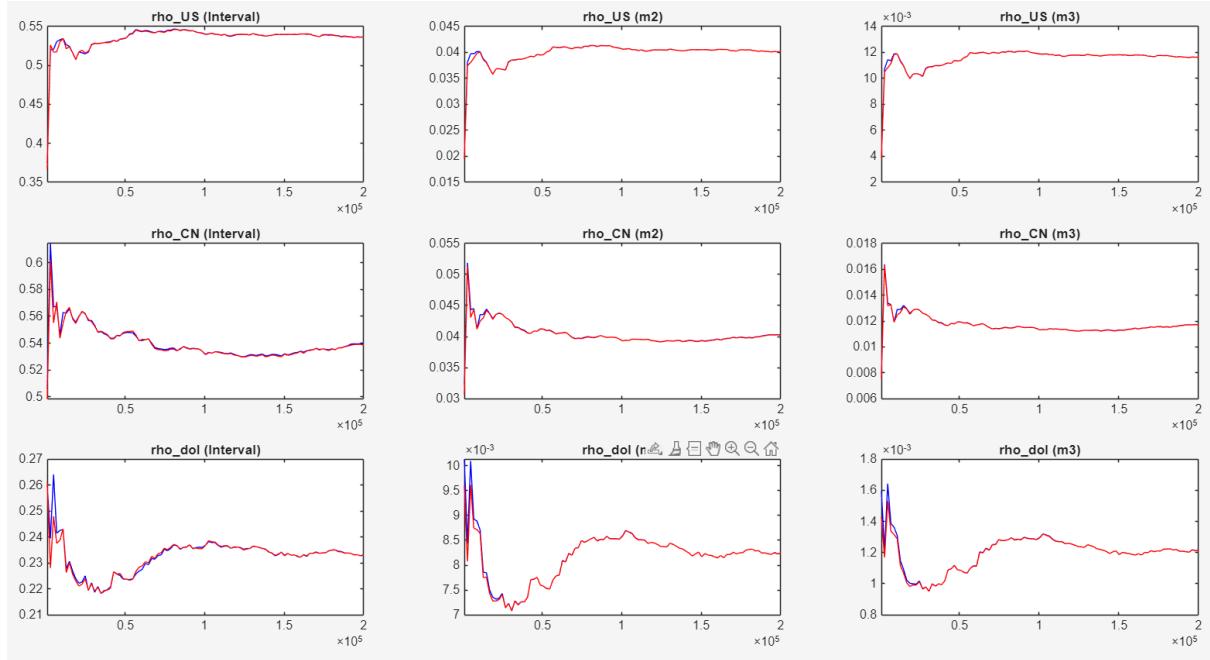


Figure 24: Based on Brooks and Gelman (1998)

MCMC Univariate Convergence Diagnostic

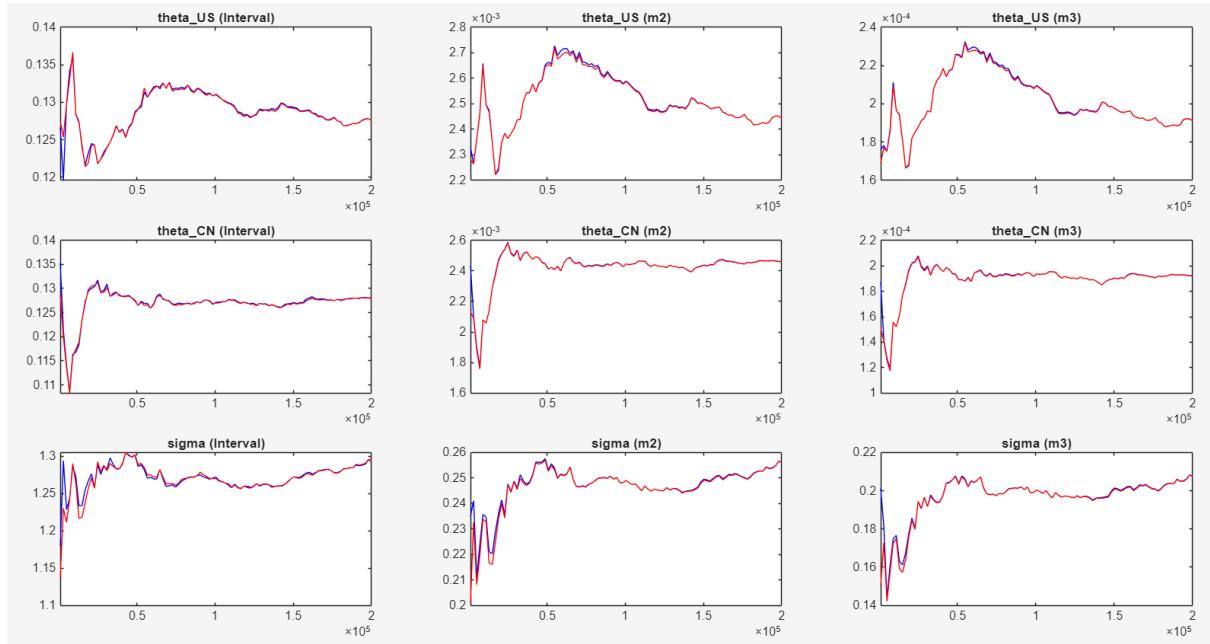


Figure 25: Based on Brooks and Gelman (1998)

Real Data Observed for the USand China

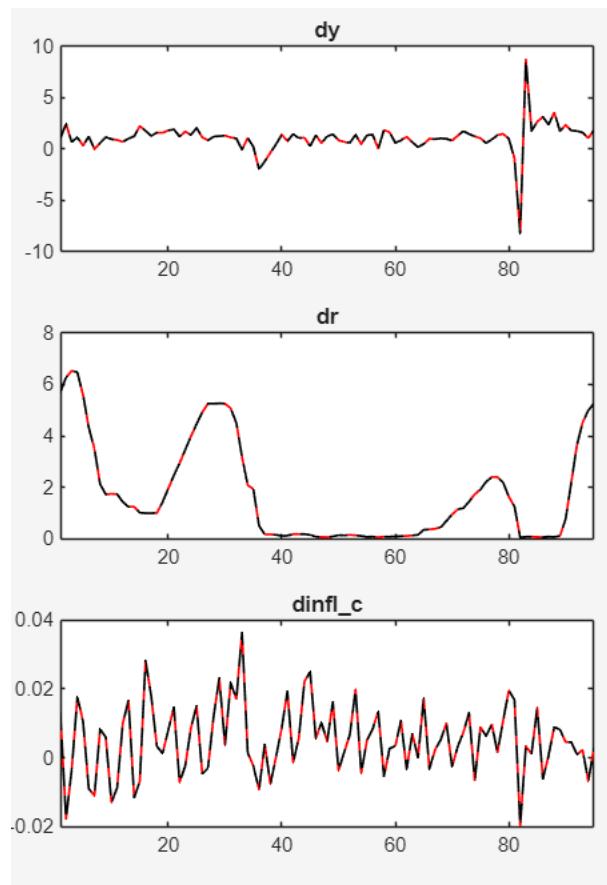


Figure 26: Observed data (USand China)

Real Data Observed for the USand China

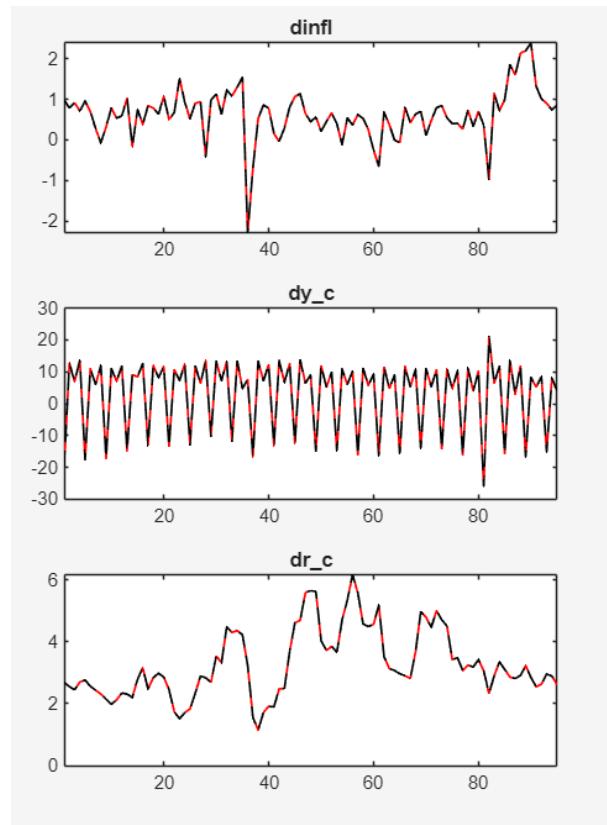


Figure 27: Observed data (USand China)

References

References

- Brooks, S. P., and Gelman, A. (1998). General methods for monitoring convergence of iterative simulations. *Journal of Computational and Graphical Statistics*, 7(4), 434–455.
- Jang, et al., and Okano (2013). *Productivity shocks and monetary policy in a two-country model*. Dynare Working Papers Series, Working Paper No. 29, December.

A Appendix A: Log-Linearized Model

All model equations are written in log-linear form around a zero-inflation steady state.

Variables are expressed as deviations from steady state unless otherwise stated.

A.1 Endogenous Variables and Exogenous Shocks

Table A.1: Endogenous variables (log-linear deviations)

| Variable | Description |
|--------------------|---------------------------------------|
| $x_{US,t}$ | US output gap |
| $\pi_{US,t}$ | US domestic inflation (non-CPI) |
| $\pi_{US,t}^{CPI}$ | US CPI inflation |
| $r_{US,t}$ | US nominal policy rate (deviation) |
| $\bar{r}_{US,t}$ | US natural rate (deviation) |
| $mc_{US,t}$ | US marginal cost (deviation) |
| $y_{US,t}$ | US output (deviation) |
| $\bar{y}_{US,t}$ | US natural output (deviation) |
| $p_{US,t}$ | US CPI price level (log) |
| $a_{US,t}$ | US productivity state |
| $dol_{CN,t}$ | China dollarization state |
| $x_{CN,t}$ | China output gap |
| $\pi_{CN,t}$ | China domestic inflation (non-CPI) |
| $\pi_{CN,t}^{CPI}$ | China CPI inflation |
| $r_{CN,t}$ | China nominal policy rate (deviation) |
| $\bar{r}_{CN,t}$ | China natural rate (deviation) |
| $mc_{CN,t}$ | China marginal cost (deviation) |
| $y_{CN,t}$ | China output (deviation) |
| $\bar{y}_{CN,t}$ | China natural output (deviation) |
| $p_{CN,t}$ | China CPI price level (log) |
| $a_{CN,t}$ | China productivity state |
| s_t | Terms of trade (log) |
| q_t | Real exchange rate (log) |
| e_t | Nominal exchange rate (log) |

A.2 Core Equilibrium Conditions

A.2.1 IS Equations

$$\begin{aligned}
 x_{US,t} = & \mathbb{E}_t x_{US,t+1} - \frac{\omega_4 + 1}{(\omega_2 + 1)\sigma} r_{US,t} + \frac{\omega_4 + 1}{(\omega_2 + 1)\sigma} \mathbb{E}_t \pi_{US,t+1} \\
 & + \frac{\omega_2}{\omega_2 + 1} (\mathbb{E}_t x_{CN,t+1} - x_{CN,t}) + \frac{\omega_4 + 1}{(\omega_2 + 1)\sigma} \bar{r}_{US,t}.
 \end{aligned} \tag{A.1}$$

Table A.2: Exogenous shocks

| Shock | Description |
|-----------------------|------------------------------------|
| $m_{US,t}$ | US monetary policy shock |
| $m_{CN,t}$ | China monetary policy shock |
| $\xi_{US,t}$ | US productivity innovation |
| $\xi_{CN,t}$ | China productivity innovation |
| $\varepsilon_{dol,t}$ | Dollarization innovation (China) |
| $e_{1,t} - e_{6,t}$ | Measurement errors for observables |

$$x_{CN,t} = \mathbb{E}_t x_{CN,t+1} - \frac{\omega_4 + 1}{(\omega_2 + 1)\sigma} r_{CN,t} + \frac{\omega_4 + 1}{(\omega_2 + 1)\sigma} \mathbb{E}_t \pi_{CN,t+1} + \frac{\omega_2}{\omega_2 + 1} (\mathbb{E}_t x_{US,t+1} - x_{US,t}) + \frac{\omega_4 + 1}{(\omega_2 + 1)\sigma} \bar{r}_{CN,t}. \quad (\text{A.2})$$

A.2.2 New Keynesian Phillips Curves

$$\pi_{US,t} = \beta \mathbb{E}_t \pi_{US,t+1} + \kappa_{US} \frac{\varsigma}{\omega_4 + 1} x_{US,t} + \kappa_{US} \frac{\omega_2 \sigma}{\omega_4 + 1} x_{CN,t} + \kappa_{US} r_{US,t}. \quad (\text{A.3})$$

$$\pi_{CN,t} = \beta \mathbb{E}_t \pi_{CN,t+1} + \kappa_{CN} \frac{\varsigma}{\omega_4 + 1} x_{CN,t} + \kappa_{CN} \frac{\omega_2 \sigma}{\omega_4 + 1} x_{US,t} + \kappa_{CN} r_{CN,t}. \quad (\text{A.4})$$

A.2.3 Monetary Policy Rules

$$r_{US,t} = \varrho_{US} r_{US,t-1} + (1 - \varrho_{US}) (\phi_{\pi,US} \pi_{US,t}^{CPI} + \phi_{x,US} x_{US,t}) + m_{US,t}. \quad (\text{A.5})$$

$$r_{CN,t} = \varrho_{CN} r_{CN,t-1} + (1 - \varrho_{CN}) (\phi_{\pi,CN} \pi_{CN,t}^{CPI} + \phi_{x,CN} x_{CN,t}) + \delta_{rUS} r_{US,t} + \gamma_{dol} dol_{CN,t} + m_{CN,t}. \quad (\text{A.6})$$

A.2.4 Natural Rates

$$\begin{aligned} \bar{r}_{US,t} &= -\sigma(1 - \rho_{US}) \psi \frac{(\omega_2 + 1)\varsigma - \omega_2^2 \sigma}{(\omega_4 + 1)\delta} a_{US,t} - \sigma(1 - \rho_{US}) \omega_2 \psi \frac{\varsigma - \sigma(\omega_2 + 1)}{(\omega_4 + 1)\delta} a_{CN,t}, \\ \bar{r}_{CN,t} &= -\sigma(1 - \rho_{CN}) \psi \frac{(\omega_2 + 1)\varsigma - \omega_2^2 \sigma}{(\omega_4 + 1)\delta} a_{CN,t} - \sigma(1 - \rho_{CN}) \omega_2 \psi \frac{\varsigma - \sigma(\omega_2 + 1)}{(\omega_4 + 1)\delta} a_{US,t}. \end{aligned} \quad (\text{A.7})$$

A.2.5 CPI Inflation

$$\pi_{US,t}^{CPI} = \pi_{US,t} + \frac{\alpha\sigma}{\omega_4 + 1} \left[(x_{US,t} - x_{US,t-1}) - (x_{CN,t} - x_{CN,t-1}) \right] + \tilde{\omega}_2 \left[(a_{US,t} - a_{US,t-1}) - (a_{CN,t} - a_{CN,t-1}) \right]. \quad (\text{A.8})$$

$$\pi_{CN,t}^{CPI} = \pi_{CN,t} + \frac{\alpha\sigma}{\omega_4 + 1} \left[(x_{CN,t} - x_{CN,t-1}) - (x_{US,t} - x_{US,t-1}) \right] + \tilde{\omega}_2 \left[(a_{CN,t} - a_{CN,t-1}) - (a_{US,t} - a_{US,t-1}) \right]. \quad (\text{A.9})$$

A.2.6 Marginal Costs

$$mc_{US,t} = \frac{\varsigma}{\omega_4 + 1} x_{US,t} + \frac{\omega_2\sigma}{\omega_4 + 1} x_{CN,t} + r_{US,t}. \quad (\text{A.10})$$

$$mc_{CN,t} = \frac{\varsigma}{\omega_4 + 1} x_{CN,t} + \frac{\omega_2\sigma}{\omega_4 + 1} x_{US,t} + r_{CN,t}. \quad (\text{A.11})$$

A.2.7 Output and Natural Output

$$\bar{y}_{US,t} = \frac{\varsigma\psi}{\delta} a_{US,t} - \frac{\omega_2\sigma\psi}{\delta} a_{CN,t}, \quad \bar{y}_{CN,t} = \frac{\varsigma\psi}{\delta} a_{CN,t} - \frac{\omega_2\sigma\psi}{\delta} a_{US,t}. \quad (\text{A.12})$$

$$y_{US,t} = x_{US,t} + \bar{y}_{US,t}, \quad y_{CN,t} = x_{CN,t} + \bar{y}_{CN,t}. \quad (\text{A.13})$$

A.2.8 Price Levels, Terms of Trade, and Exchange Rates

$$p_{US,t} = p_{US,t-1} + \pi_{US,t}^{CPI}, \quad p_{CN,t} = p_{CN,t-1} + \pi_{CN,t}^{CPI}. \quad (\text{A.14})$$

$$s_t = \frac{\sigma}{\omega_4 + 1} (y_{US,t} - y_{CN,t}), \quad q_t = (1 - 2\alpha)s_t, \quad e_t = q_t - p_{CN,t} + p_{US,t}. \quad (\text{A.15})$$

A.2.9 Exogenous Processes

$$a_{US,t} = \rho_{US} a_{US,t-1} + \xi_{US,t}, \quad a_{CN,t} = \rho_{CN} a_{CN,t-1} + \xi_{CN,t}. \quad (\text{A.16})$$

$$dol_{CN,t} = \rho_{dol} dol_{CN,t-1} + \gamma_\pi \pi_{CN,t}^{CPI} + \varepsilon_{dol,t}. \quad (\text{A.17})$$

A.3 Measurement Equations

The observables used for Bayesian estimation are:

$$\begin{aligned} \Delta y_{US,t} &= y_{US,t} - y_{US,t-1} + e_{1,t}, \\ \Delta p_{US,t} &= p_{US,t} - p_{US,t-1} + e_{2,t}, \\ \Delta r_{US,t} &= r_{US,t} - r_{US,t-1} + e_{3,t}, \\ \Delta y_{CN,t} &= y_{CN,t} - y_{CN,t-1} + e_{4,t}, \\ \Delta p_{CN,t} &= p_{CN,t} - p_{CN,t-1} + e_{5,t}, \\ \Delta r_{CN,t} &= r_{CN,t} - r_{CN,t-1} + e_{6,t}. \end{aligned} \quad (\text{A.18})$$

B Appendix B: Parameter Definitions and Composite Coefficients

The model uses a set of composite coefficients that are functions of deep parameters. In the implementation, these objects are defined as:

$$\kappa_{US} = \frac{(1 - \theta_{US})(1 - \theta_{US}\beta)}{\theta_{US}}, \quad \kappa_{CN} = \frac{(1 - \theta_{CN})(1 - \theta_{CN}\beta)}{\theta_{CN}}. \quad (\text{B.1})$$

$$\omega_2 = 2\alpha(1 - \alpha)(\sigma\eta - 1), \quad \omega_4 = 4\alpha(1 - \alpha)(\sigma\eta - 1). \quad (\text{B.2})$$

$$\psi = (\omega_4 + 1)(1 + \varphi), \quad \varsigma = (\omega_2 + 1)\sigma + (\omega_4 + 1)\varphi. \quad (\text{B.3})$$

$$\delta = \sigma^2(2\omega_2 + 1) + 2\sigma\varphi(\omega_2 + 1)(\omega_4 + 1) + (\omega_4 + 1)^2\varphi^2. \quad (\text{B.4})$$

$$\tilde{\omega}_2 = \alpha\sigma(1 + \varphi) \frac{\varsigma + \omega_2\sigma}{\delta}. \quad (\text{B.5})$$

C Appendix C: Bayesian Estimation Setup

Bayesian estimation is conducted using a linear state-space representation of the model and the measurement equations in Appendix A. The estimation uses the following settings: 200,000 Metropolis–Hastings draws, 2 blocks, and a burn-in fraction of 0.30; the posterior mode is computed using a numerical optimizer and verified with a mode check. Impulse responses are computed using Bayesian IRFs.

Table C.1: Estimated parameters and prior distributions

| Parameter | Prior distribution | Prior mean | Prior std. |
|-----------------|--------------------|------------|------------|
| ρ_{US} | Beta | 0.60 | 0.20 |
| ρ_{CN} | Beta | 0.60 | 0.20 |
| ρ_{dol} | Beta | 0.60 | 0.20 |
| θ_{US} | Normal | 0.40 | 0.05 |
| θ_{CN} | Normal | 0.40 | 0.05 |
| σ | Gamma | 4.50 | 0.50 |
| $\phi_{\pi,US}$ | Normal | 1.50 | 0.30 |
| $\phi_{\pi,CN}$ | Normal | 1.50 | 0.30 |
| $\phi_{x,US}$ | Normal | 0.50 | 0.20 |
| $\phi_{x,CN}$ | Normal | 0.50 | 0.20 |
| ϱ_{US} | Beta | 0.40 | 0.20 |
| ϱ_{CN} | Beta | 0.40 | 0.20 |
| γ_π | Normal | 0.40 | 0.20 |
| γ_x | Normal | -0.15 | 0.10 |
| γ_e | Normal | 0.08 | 0.05 |
| γ_r | Normal | 0.10 | 0.05 |
| δ_{rUS} | Normal | 0.35 | 0.10 |

Table C.2: Measurement error standard deviations and priors

| Shock | Prior distribution | Prior mean | Prior std. |
|-----------------------|--------------------|------------|------------|
| $\text{std}(e_{1,t})$ | Inverse-gamma | 0.10 | 0.05 |
| $\text{std}(e_{2,t})$ | Inverse-gamma | 0.10 | 0.05 |
| $\text{std}(e_{3,t})$ | Inverse-gamma | 0.10 | 0.05 |
| $\text{std}(e_{4,t})$ | Inverse-gamma | 0.10 | 0.05 |
| $\text{std}(e_{5,t})$ | Inverse-gamma | 0.10 | 0.05 |
| $\text{std}(e_{6,t})$ | Inverse-gamma | 0.10 | 0.05 |

In the Bayesian IRF analysis, the structural shocks directly activated are the US monetary policy shock $m_{US,t}$ and the dollarization shock $\varepsilon_{dol,t}$.

D Appendix D: Bayesian impulse response functions

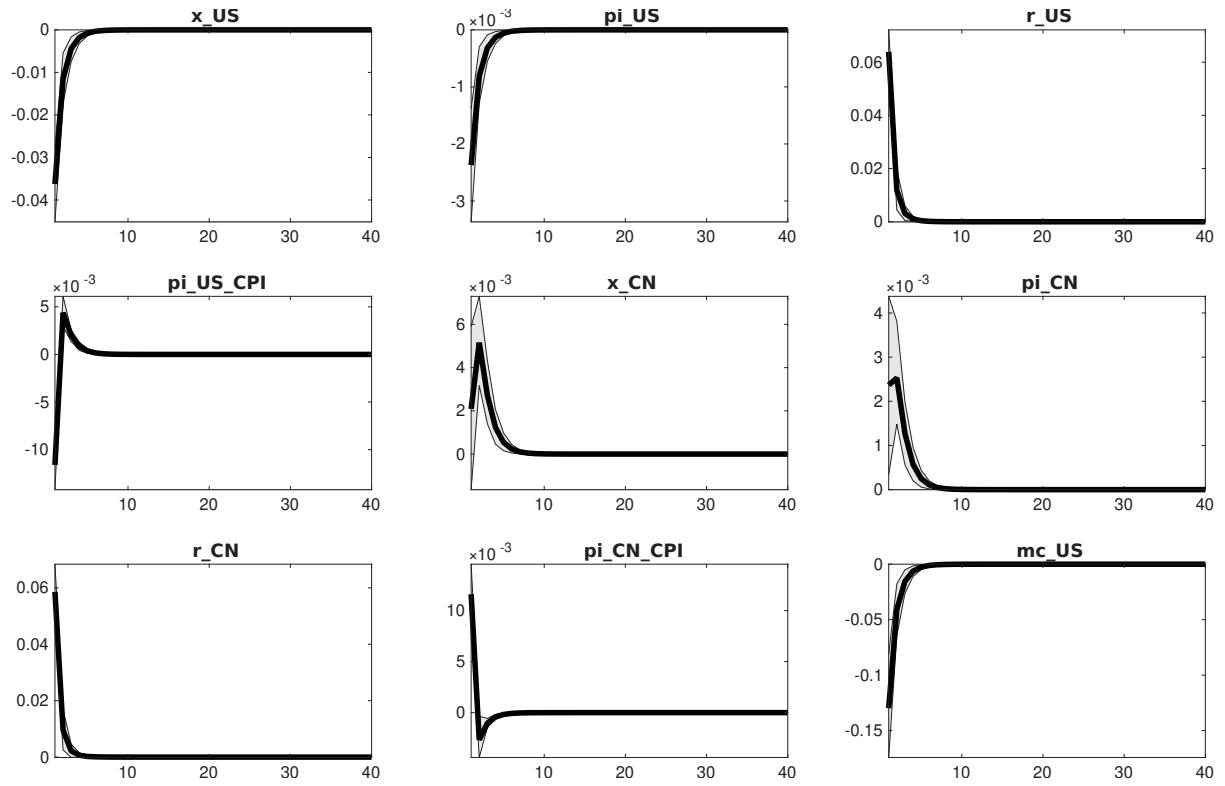


Figure 28: Bayesian impulse responses to a US monetary policy shock (set 1).

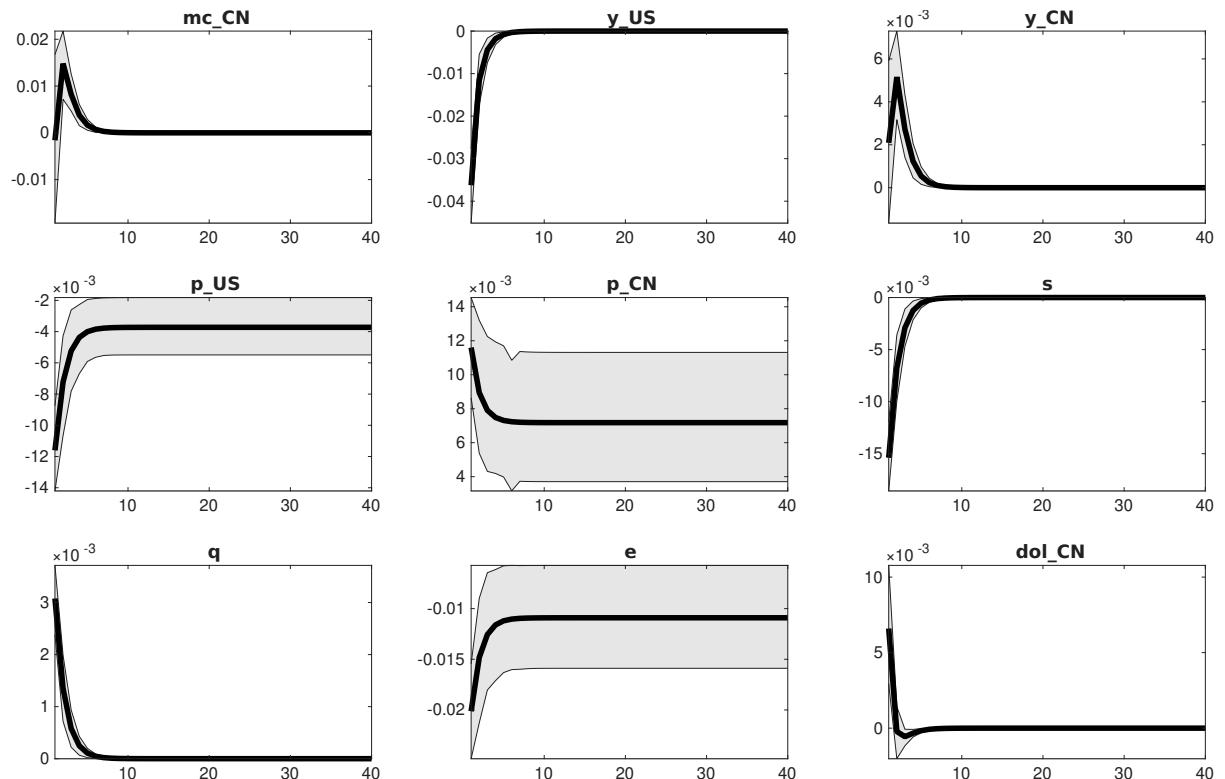


Figure 29: Bayesian impulse responses to a US monetary policy shock (set 2).

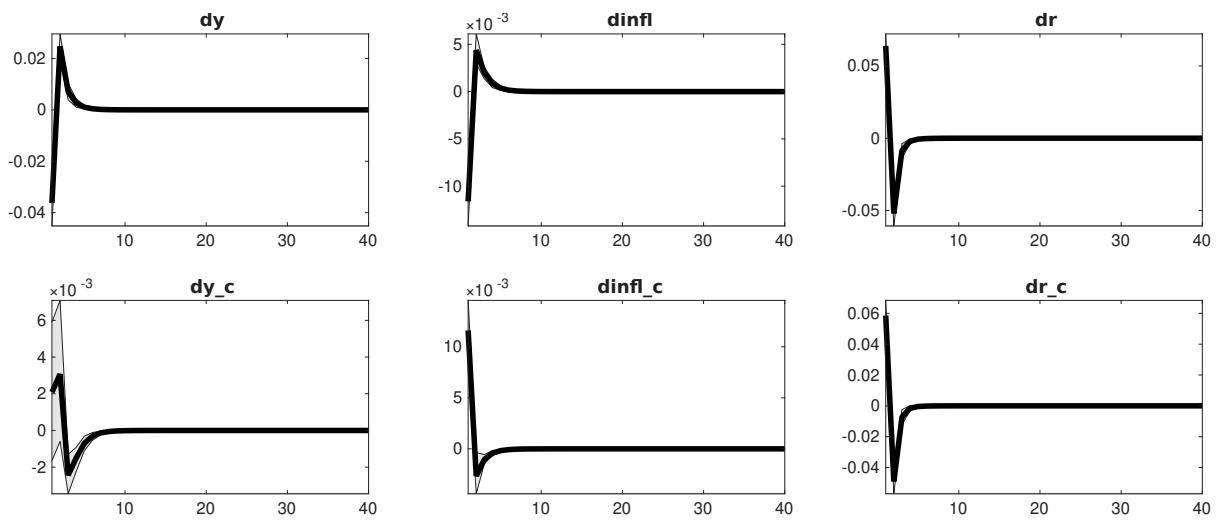


Figure 30: Bayesian impulse responses to a US monetary policy shock (set 3).

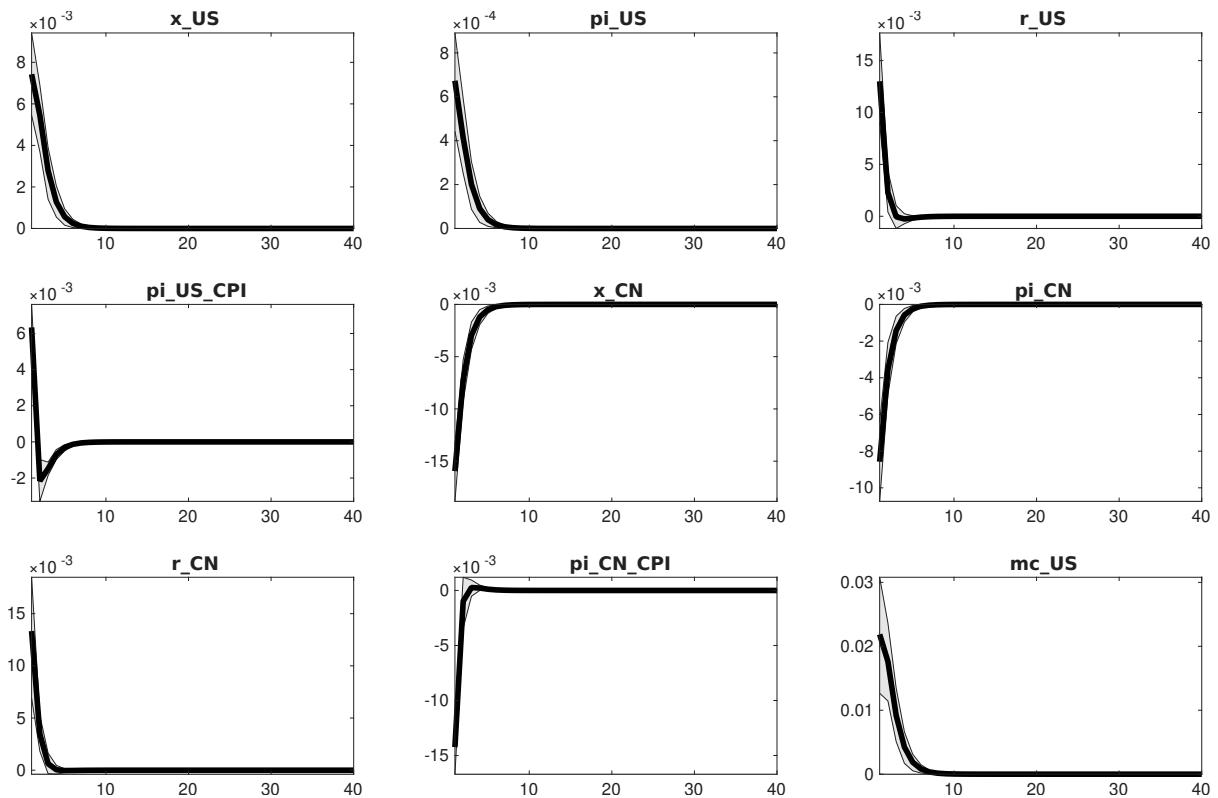


Figure 31: Bayesian impulse responses to a dollarization shock in China (set 1).

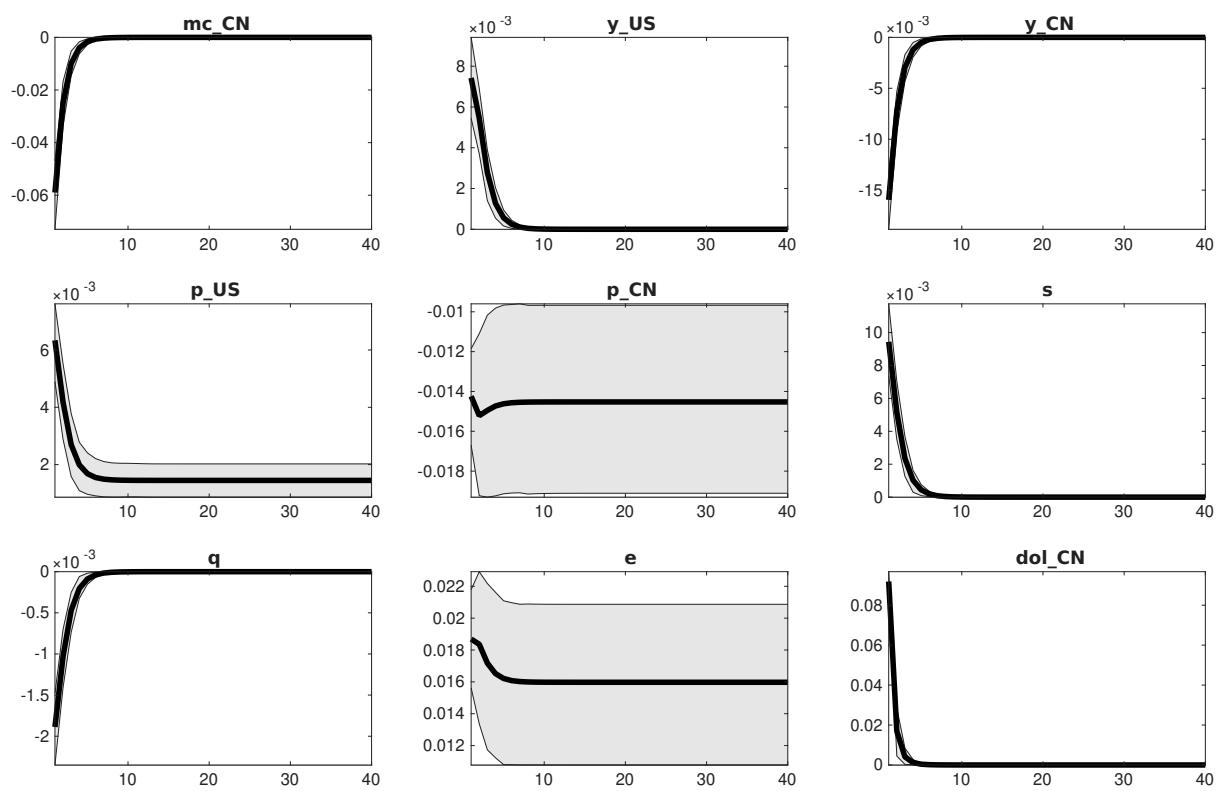


Figure 32: Bayesian impulse responses to a dollarization shock in China (set 2).

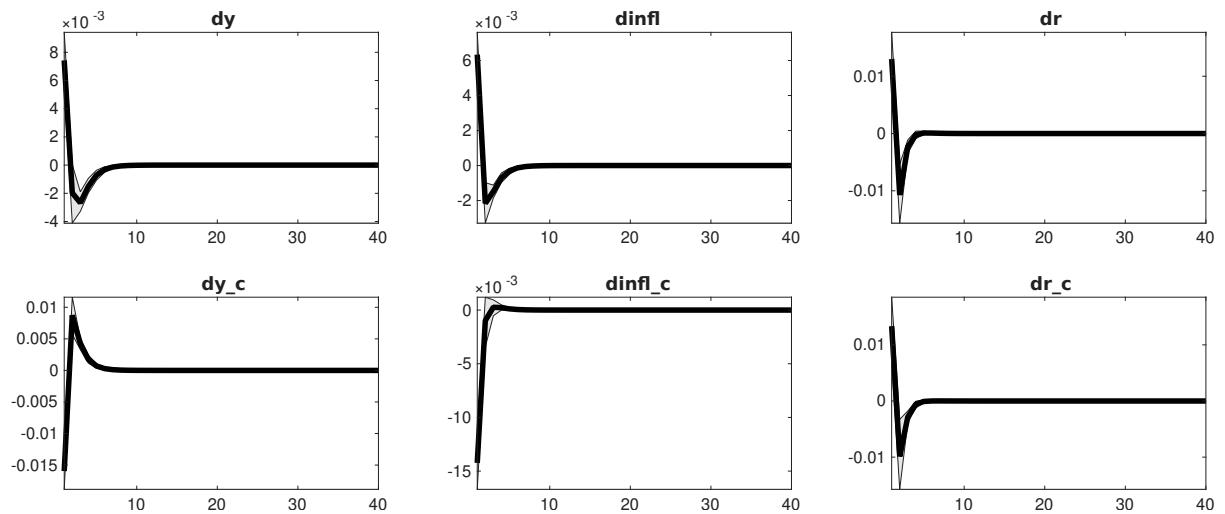


Figure 33: Bayesian impulse responses to a dollarization shock in China (set 3).

E Dynare Code

This appendix reproduces the Dynare implementation used to estimate the model and generate Bayesian impulse responses (file: `final_model.mod`).

```

// -----
// DSGE model with dollarization and Bayesian estimation
// -----


var x_US pi_US r_US pi_US_CPI
    x_CN pi_CN r_CN pi_CN_CPI
    rbar_US rbar_CN
    a_US a_CN
    mc_US mc_CN
    y_US y_CN ybar_US ybar_CN
    p_US p_CN s q e dol_CN
    dy dinfl dr dy_c dinfl_c dr_c;

varexo m_US m_CN xi_US xi_CN eps_dol e1 e2 e3 e4 e5 e6;

// -----
// Parameters
// -----
parameters sigma eta beta theta_US theta_CN alpha varphi
    kappa_US kappa_CN omega_2 omega_4 psi varsigma delta
    sigma_omega oomega_2 rho_US rho_CN rho_dol
    phi_pi_US phi_pi_CN phi_x_US phi_x_CN varrho_US varrho_CN
    delta_rUS gamma_dol gamma_pi gamma_x gamma_e gamma_r;

// -----
// Calibration
// -----
sigma = 4.5;
eta   = 2.5;
beta  = 0.99;

theta_US = 0.9;
theta_CN = 0.75;
alpha    = 0.6;
varphi   = 3;

kappa_US = (1 - theta_US)*(1 - theta_US*beta)/theta_US;
kappa_CN = (1 - theta_CN)*(1 - theta_CN*beta)/theta_CN;

omega_2 = alpha*2*(1-alpha)*(sigma*eta-1);
omega_4 = alpha*4*(1-alpha)*(sigma*eta-1);
psi     = (omega_4+1)*(1+varphi);

```

```

varsigma= (omega_2+1)*sigma + (omega_4+1)*varphi;
delta   = sigma^2*(2*omega_2+1) + 2*sigma*varphi*(omega_2+1)*(omega_4+1) + (omega_4+1)
sigma_omega = (omega_2+1)*sigma/(omega_4+1);
oomega_2    = alpha*sigma*(1+varphi)*(varsigma + omega_2*sigma)/delta;

// Dollarization
rho_US = 0.3;
rho_CN = 0.5;
rho_dol= 0.5;

phi_pi_US = 1.5;  phi_pi_CN = 1.5;
phi_x_US  = 0.5;  phi_x_CN   = 0.5;
varrho_US = 0.4;  varrho_CN = 0.4;

delta_rUS = 0.35;
gamma_dol = 0.5;
gamma_pi  = 0.4;
gamma_x   = -0.15;
gamma_e   = 0.08;
gamma_r   = 0.1;

// -----
// Model equations
// -----
model(linear);

// US IS curve
x_US = x_US(+1) - (omega_4+1)/((omega_2+1)*sigma)*r_US + (omega_4+1)/((omega_2+1)*s
+ omega_2/((omega_2+1)*(x_CN(+1)-x_CN)) + (omega_4+1)/((omega_2+1)*sigma)*rbar

// US Phillips curve
pi_US = beta*pi_US(+1) + kappa_US*varsigma/(omega_4+1)*x_US + kappa_US*omega_2*sigm

// China IS curve
x_CN = x_CN(+1) - (omega_4+1)/((omega_2+1)*sigma)*r_CN + (omega_4+1)/((omega_2+1)*s
+ omega_2/((omega_2+1)*(x_US(+1)-x_US)) + (omega_4+1)/((omega_2+1)*sigma)*rbar

// China Phillips curve
pi_CN = beta*pi_CN(+1) + kappa_CN*varsigma/(omega_4+1)*x_CN + kappa_CN*omega_2*sigm

// Taylor rules
r_US = varrho_US*r_US(-1) + (1-varrho_US)*(phi_pi_US*pi_US_CPI + phi_x_US*x_US) + m
r_CN = varrho_CN*r_CN(-1) + (1-varrho_CN)*(phi_pi_CN*pi_CN_CPI + phi_x_CN*x_CN) + d

// Natural rates
rbar_US = -sigma*(1-rho_US)*psi*((omega_2+1)*varsigma - omega_2^2*sigma)/((omega_4+
- sigma*(1-rho_US)*omega_2*psi*(varsigma - sigma*(omega_2+1))/((omega_4+1)
rbar_CN = -sigma*(1-rho_CN)*psi*((omega_2+1)*varsigma - omega_2^2*sigma)/((omega_4+
- sigma*(1-rho_CN)*omega_2*psi*(varsigma - sigma*(omega_2+1))/((omega_4+1)

```

```

// CPI
pi_US_CPI = pi_US + alpha*sigma/(omega_4+1)*(x_US-x_US(-1) - x_CN+x_CN(-1)) + oomeg
pi_CN_CPI = pi_CN + alpha*sigma/(omega_4+1)*(x_CN-x_CN(-1) - x_US+x_US(-1)) + oomeg

// Marginal costs
mc_US = varsigma/(omega_4+1)*x_US + omega_2*sigma/(omega_4+1)*x_CN + r_US;
mc_CN = varsigma/(omega_4+1)*x_CN + omega_2*sigma/(omega_4+1)*x_US + r_CN;

// Output
ybar_US = varsigma*psi/delta*a_US - omega_2*sigma*psi/delta*a_CN;
ybar_CN = varsigma*psi/delta*a_CN - omega_2*sigma*psi/delta*a_US;
y_US = x_US + ybar_US;
y_CN = x_CN + ybar_CN;

// Prices, exchange rate, terms of trade
p_US = pi_US_CPI + p_US(-1);
p_CN = pi_CN_CPI + p_CN(-1);
s = sigma/(omega_4+1)*(y_US-y_CN);
q = (1-2*alpha)*s;
e = q - p_CN + p_US;

// Shocks
a_US = rho_US*a_US(-1) + xi_US;
a_CN = rho_CN*a_CN(-1) + xi_CN;
dol_CN = rho_dol*dol_CN(-1) + gamma_pi*pi_CN_CPI + eps_dol;

// Observables
dy      = y_US - y_US(-1) + e1;
dinfl   = p_US - p_US(-1) + e2;
dr      = r_US - r_US(-1) + e3;
dy_c    = y_CN - y_CN(-1) + e4;
dinfl_c = p_CN - p_CN(-1) + e5;
dr_c    = r_CN - r_CN(-1) + e6;
end;

// -----
// Initial values
// -----
initval;
x_US = 0; pi_US = 0; r_US = 0; pi_US_CPI = 0;
x_CN = 0; pi_CN = 0; r_CN = 0; pi_CN_CPI = 0;
rbar_US = 0; rbar_CN = 0;
a_US = 0; a_CN = 0;
mc_US = 0; mc_CN = 0;
y_US = 0; y_CN = 0; ybar_US = 0; ybar_CN = 0;
p_US = 0; p_CN = 0; s = 0; q = 0; e = 0;
dol_CN = 0;

```

```

end;

steady;
check;

// -----
// Shocks
// -----
shocks;
    var m_US; stderr 0.1;
    var eps_dol; stderr 0.1;
end;

// -----
// Observables
// -----
varobs dy dinfl dr dy_c dinfl_c dr_c;

// -----
// Estimated parameters
// -----
estimated_params;

// Persistence

rho_US , beta_pdf , 0.6 , 0.2;
rho_CN , beta_pdf , 0.6 , 0.2;
rho_dol , beta_pdf , 0.6 , 0.2;

// Structural
theta_US , normal_pdf , 0.4 , 0.05;
theta_CN , normal_pdf , 0.4 , 0.05;
sigma     , gamma_pdf , 4.5 , 0.5;

// Taylor rules
phi_pi_US , normal_pdf , 1.5 , 0.3;
phi_pi_CN , normal_pdf , 1.5 , 0.3;
phi_x_US   , normal_pdf , 0.5 , 0.2;
phi_x_CN   , normal_pdf , 0.5 , 0.2;

varrho_US, beta_pdf , 0.4 , 0.2;
varrho_CN, beta_pdf , 0.4 , 0.2;

```

```

// Dollarization
gamma_pi , normal_pdf , 0.4 , 0.2;
gamma_x , normal_pdf ,-0.15 , 0.1;
gamma_e , normal_pdf , 0.08 , 0.05;
gamma_r , normal_pdf , 0.1 , 0.05;
delta_rUS , normal_pdf , 0.35 , 0.1;

// Observable shocks
//stderr e1 , normal_pdf , 0.1 , 0.05;
//stderr e2 , normal_pdf , 0.1 , 0.05;
//stderr e3 , normal_pdf , 0.1 , 0.05;
//stderr e4 , normal_pdf , 0.1 , 0.05;
//stderr e5 , normal_pdf , 0.1 , 0.05;
//stderr e6 , normal_pdf , 0.1 , 0.05;

stderr e1 , inv_gamma_pdf , 0.1 , 0.05;
stderr e2 , inv_gamma_pdf , 0.1 , 0.05;
stderr e3 , inv_gamma_pdf , 0.1 , 0.05;
stderr e4 , inv_gamma_pdf , 0.1 , 0.05;
stderr e5 , inv_gamma_pdf , 0.1 , 0.05;
stderr e6 , inv_gamma_pdf , 0.1 , 0.05;

end;

// -----
// Bayesian estimation
// -----
estimation(datafile='data_6.m', mh_rePLIC=200000, mh_nbLoCks=2, mh_drop=0.3, diffuse_...

```