# Fiscal Spillover in Emerging Economies: Real vs. Financial Channels

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# Motivation

- Fiscal policy is an important tool for business cycle stabilization and has significant spillover due to real and financial channels.
- Fiscal spillover has been researched extensively in recent years for advanced economies.
- Most of the existing studies suggest that fiscal expansion in the US leads to depreciation of the real exchange rate for the US (see Kim and Roubini 2008; Corsetti and Muller 2006; Monacelli and Perotti 2010; Ravn et al. 2012; and Enders et al. 2011)

# Motivation

- Facinni et al. (2016) suggest that spillover of US fiscal policy works mainly through the financial channel (real rate channel).
- There is not enough literature on US fiscal spillover in emerging economies.
- Real rate channel may not be operative in emerging economies
- Policy rate disconnect in emerging economies due to countercyclical risk (De Leo et al. 2022; Kalemli- Ozcan 2019).

# This Paper

- We estimate the spillover of US government expenditure shock in emerging economies.
- We estimate the US government expenditure shock using two methods; Cholesky factorization (Blanchard and Perotti, 2002) and max share identification (Kumar and Mallick, 2024)
- With both these methods, we estimate three types of government expenditure shocks.
  - First: using real government expenditure, real GDP, and real tax.
  - Second: using normalized variables following Gordon and Krenn (2010).
  - Third: using real defense expenditure instead of real government expenditure following Ramey (2011) and Ramey (2016).

# Summary of Findings

- Both policy and real policy rate decline in the emerging economies due to the US government expenditure shock.
- Most of these declines in policy rate and real policy rates are direct effect of US fiscal shock.
- The US government expenditure shock leads to the steepening of the yield curve in the emerging economies whereas it has negligible effect in the US economy.
- The US government expenditure shock leads to a prolonged depreciation (appreciation) of real effective exchange rates in the US (emerging economies)

# Methodology

# Cholesky Decomposition

A general SVAR model is given by:

$$A_0 y_t = a + \sum_{j=1}^{p} A_j y_{t-j} + \epsilon_t$$

The reduced form model is given by

$$y_t = b + \sum_{j=1}^{p} B_j y_{t-j} + u_t$$

The reduced form model can be estimated by OLS and reduced form residuals can be obtained. The covariance matrix of the reduced form shocks $E(u_t, u_t') = \sum$ is known. One can do Cholesky decomposition of $\sum$ as

$$\sum = PP'$$

and can write the impulse response matrix at horizon $h$ as:

$$IR^h = C(h)A_0^{-1}$$

# Max Share Identification I

The forecast error variance of the $i^{th}$ variable due to a shock associated with $j^{th}$ variable at horizon $h$ is given by

$$\sum_{h=0}^{h=h} IR^h(i,j)IR^h(i,j)' = \sum_{h=0}^{h=h} q_j' c_{ih} c_{ih}' q_j = q_j' \left( \sum_{h=0}^{h=h} c_{ih} c_{ih}' \right) q_j$$

The forecast error variance of the $i^{th}$ variable due to all shocks is given by $\sum_{h=0}^{h=h} c_{ih}' c_{ih}$. The share of $j^{th}$ variable in the forecast error variance of $i^{th}$ variable is given by

$$FEV(i,j,h) = \frac{q_j' \left( \sum_{h=0}^{h=h} c_{ih} c_{ih}' \right) q_j}{\sum_{h=0}^{h=h} c_{ih}' c_{ih}}$$

We define

$$FEV(i,h) = \frac{\left( \sum_{h=0}^{h=h} c_{ih} c_{ih}' \right)}{\sum_{h=0}^{h=h} c_{ih}' c_{ih}}$$

# Max Share Identification II

The matrix $P$ obtained by Cholesky decomposition is not the only matrix that satisfies the $\sum = PP'$ as we can always write:

$$\sum = PQQ'P'$$

For any orthonormal matrix $Q$ ($QQ' = I$). This gives us $A_0^{-1} = PQ$ and hence the structural impulse response can be written as

$$IR^h = C(h)PQ$$

We identify multiple columns (all columns as well) of $Q$ using the following optimization problem

$$Q^*_{1,k} = \arg\max_{Q_{1:k}} \sum_{i=1}^{k} q_i' FEV(i,h) q_i$$

Subject to

$$q_j' FEV(j,h) q_j \geq q_j' FEV(i,h) q_j \quad \text{for} \quad j = 1, ..., k, \forall i \in I_{-j}$$

$$Q_{1:k}' Q_{1:k} = I_n$$

# Responses to the Identified Shocks: Direct Effect

We estimate the response for the US using the local projection regression based on Cloyne et al. (2023) and Jorda (2005). We estimate the equation given by:

$$Y_{t+h} - Y_{t-1} = \mu^h + f_t\beta^h + \sum_{t=-2}^{t=0}(x_t - \bar{x})\gamma^h + e_{t+h}$$

where $Y$ is one of the variables of interest, $f_t$ is one of the six US government expenditure shocks identified above and $x$ includes the GDP growth and inflation. $\beta^h$ is the coefficient of interest which gives the effect of US government expenditure shock at $t = 0$ on $Y$ at time $t = h$. We estimate a similar regression in a panel framework for emerging economies

$$Y_{i,t+h} - Y_{i,t-1} = \mu_i^h + f_t\beta^h + \sum_{t=-2}^{t=0}(x_{i,t} - \bar{x}_i)\gamma_i^h + e_{i,t+h}$$

# Responses to the Identified Shocks: Direct & Indirect Effect

To control for indirect effects, we include the interaction of the US government expenditure shock with GDP growth and inflation and the extended model is given by:

$$Y_{i,t+h} - Y_{i,t-1} = \mu_i^h + f_t \beta^h + f_t \left(x_{i,t} - \bar{x}_i\right) \theta_x^h + \sum_{t=-2}^{t=0} \left(x_{i,t} - \bar{x}_i\right) \gamma_i^h + e_{i,t+h}$$

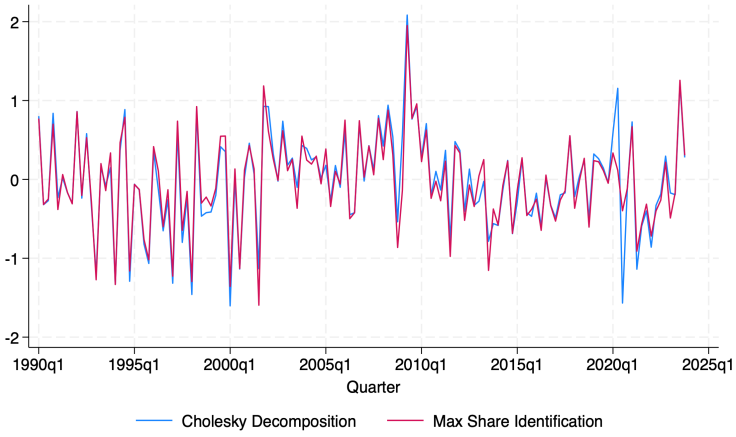
$\beta^h$ is the coefficient of interest which gives the direct effect of US government expenditure shock at $t = 0$ on $Y$ at time $t = h$ after teasing out the indirect effect being captured by $\gamma_i^h$. We compare the $\beta^h$ from these two regression models to evaluate the relative role of real and financial channels.

# Data

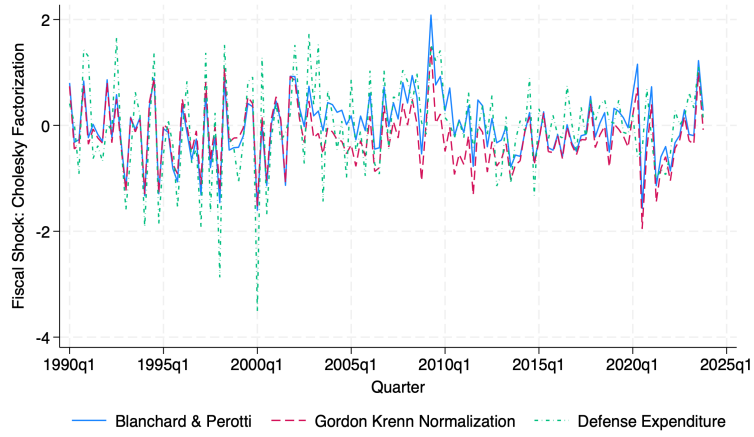
- Quarterly data for the US is obtained from the Federal Reserve Bank of Saint Louis.
- For emerging economies, we use IMF classification and obtain quarterly data from 1990 from IFS-IMF
- We have an unbalanced panel of countries
- The US government expenditure shocks are identified using a longer sample based on data availability.

# Identified Shocks

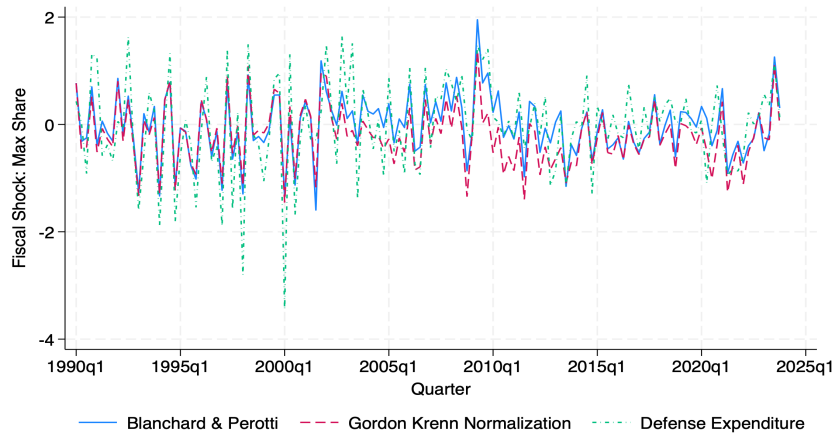
# Identified Shocks




(a) Cholesky and Max Share Identification




(b) Cholesky Decomposition




(c) Max Share Identification

Figure: Identified Shocks

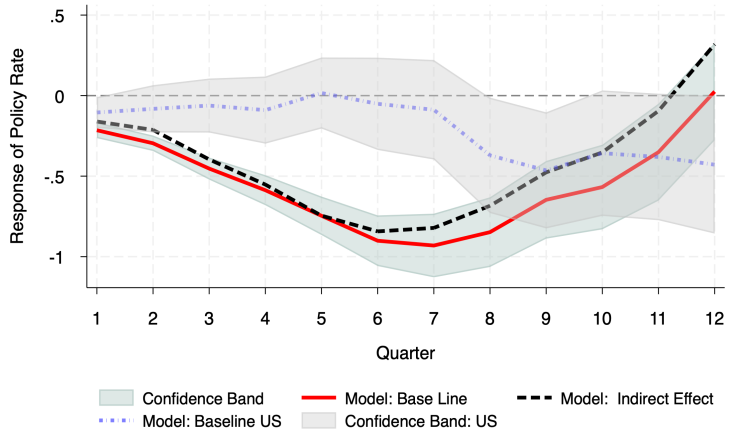
# Correlation Among Shocks

Table: Correlation Among Shocks

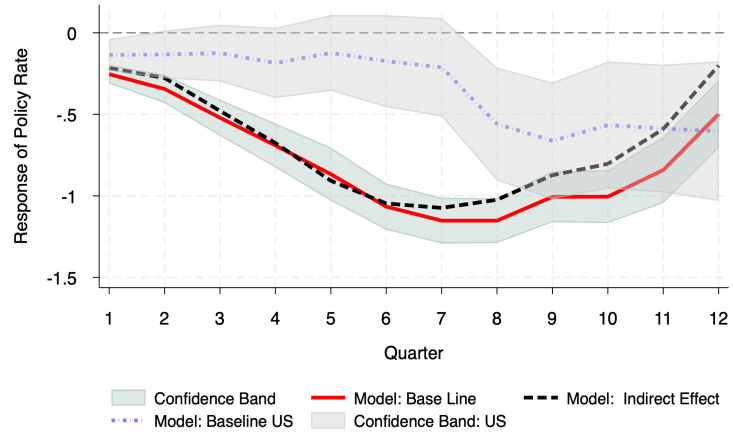
| | | Cholesky | | | Max Share | | |
|---|---|---|---|---|---|---|---|
| Cholesky | Blanchard Perotti | 1.00 | | | | | |
| | Gordon and Krenn | 0.95 | 1.00 | | | | |
| | Defense Expenditure | 0.65 | 0.61 | 1.00 | | | |
| Max Share | Blanchard Perotti | 0.98 | 0.92 | 0.64 | 1.00 | | |
| | Gordon and Krenn | 0.94 | 0.99 | 0.61 | 0.94 | 1.00 | |
| | Defense Expenditure | 0.65 | 0.61 | 1.00 | 0.65 | 0.62 | 1.00 |

# Responses to Identified Shocks

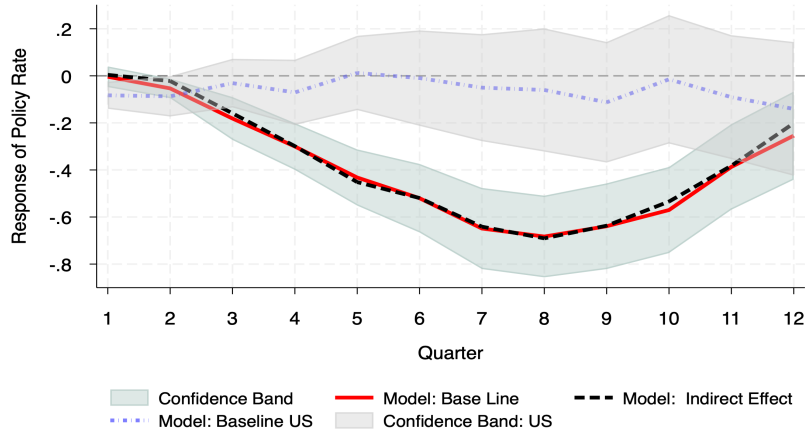
# Response of monetary policy rate




(a) Shock: Baseline



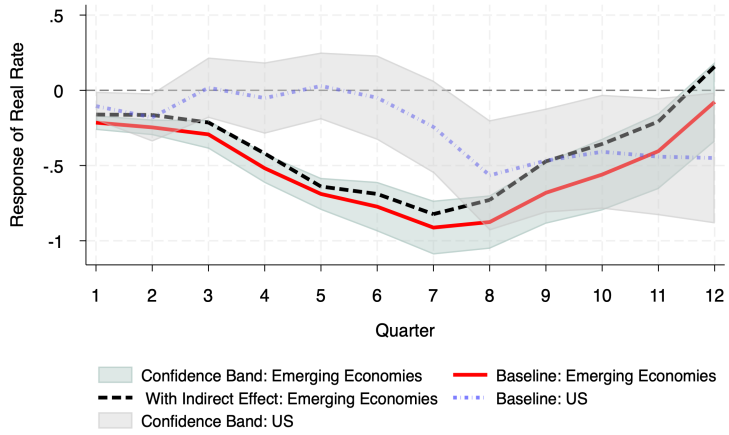

(b) Shock: Normalised variables



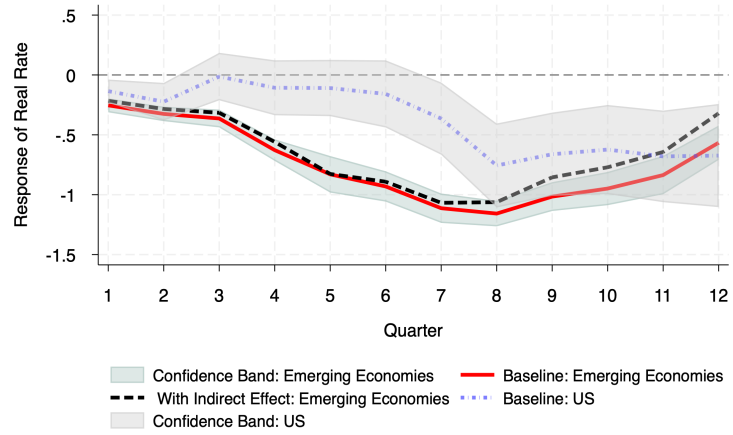

(c) Shock: US defense expenditure

Figure: Response of monetary policy rate

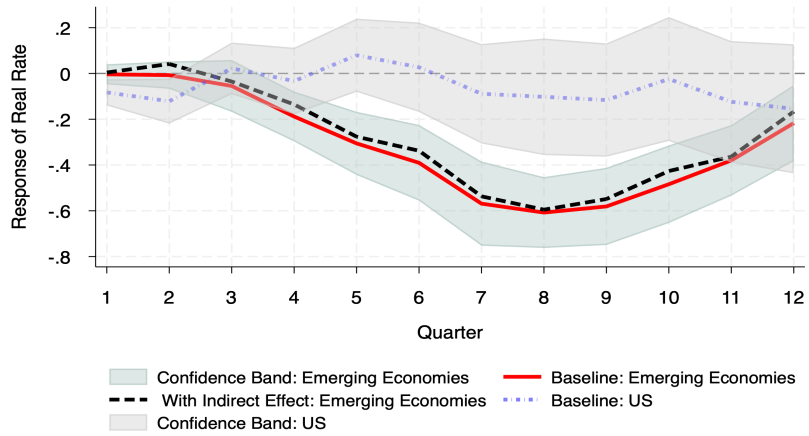
# Response of real monetary policy rate




(a) Shock: Baseline



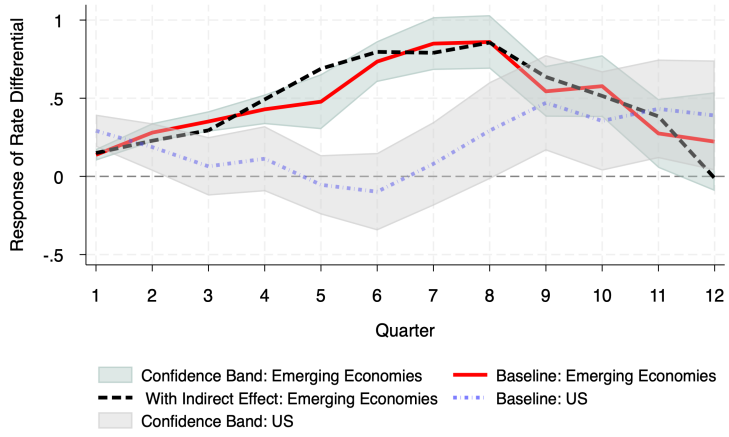

(b) Shock: Normalised variables



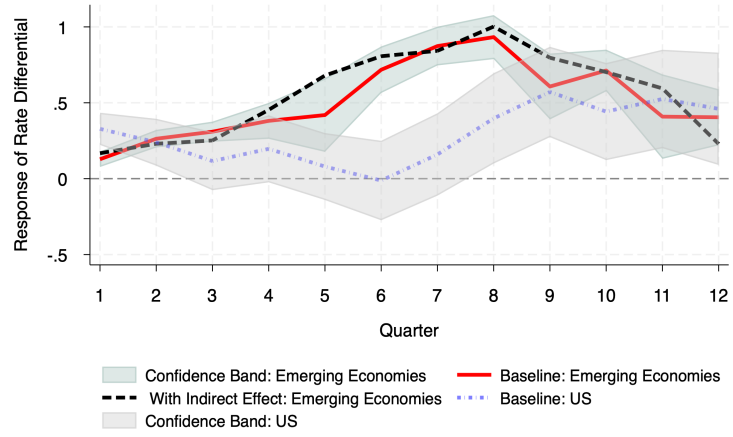

(c) Shock: US defense expenditure

Figure: Response of real monetary policy rate

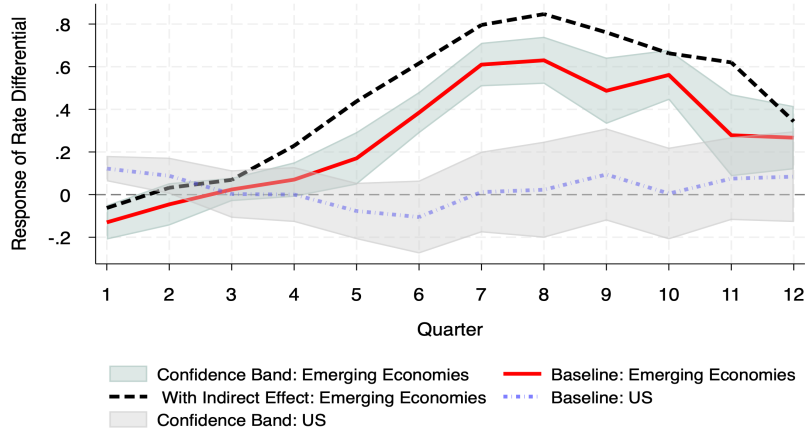
# Response of the slope of the yield curve




(a) Shock: Baseline



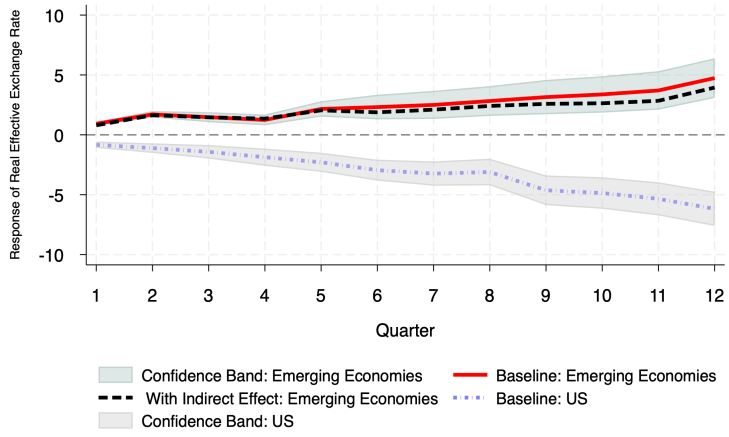

(b) Shock: Normalised variables



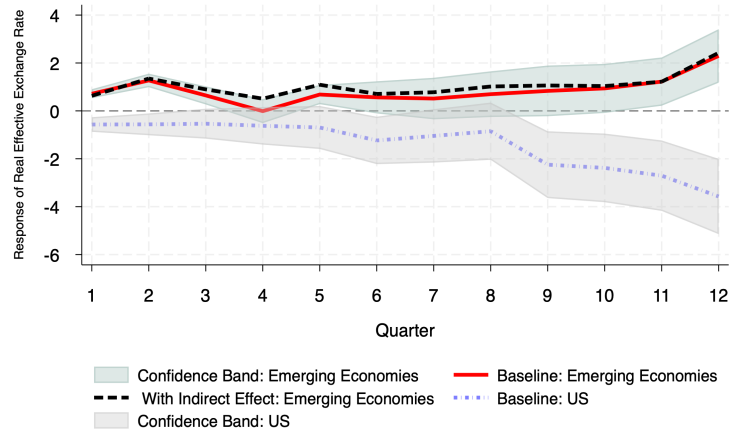

(c) Shock: US defense expenditure

Figure: Response of the slope of the yield curve

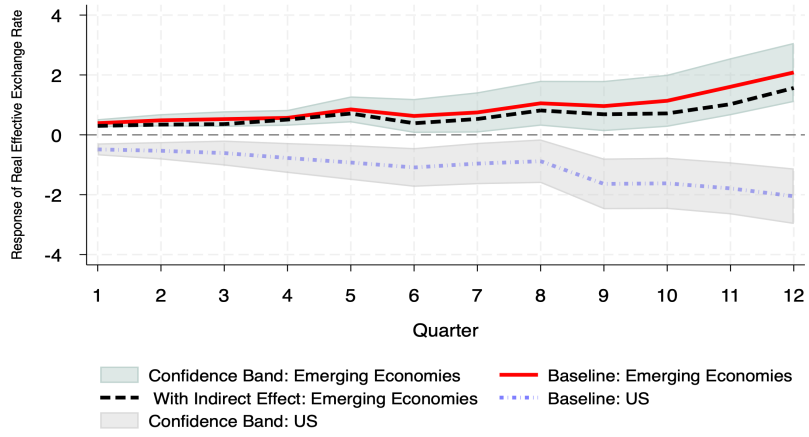
# Response of real effective exchange rate




(a) Shock: Baseline



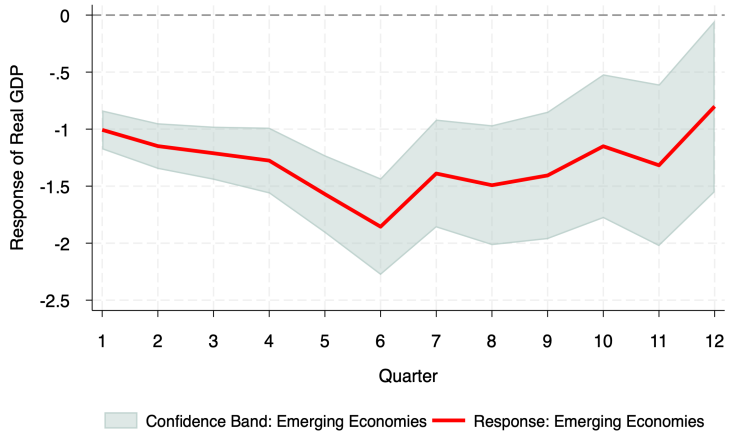

(b) Shock: Normalised variables



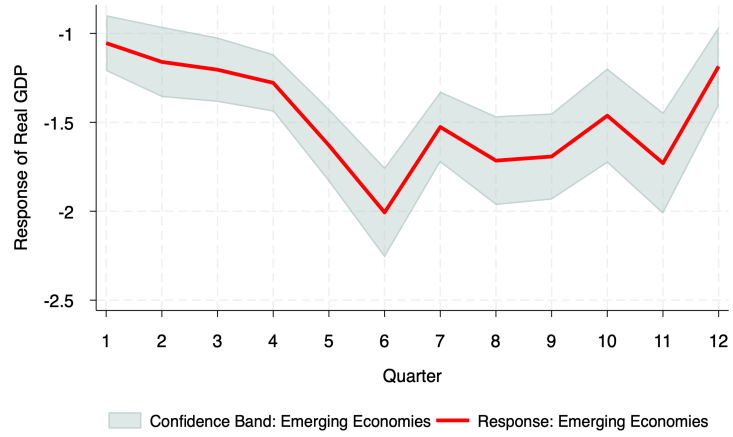

(c) Shock: US defense expenditure

Figure: Response of real effective exchange rate

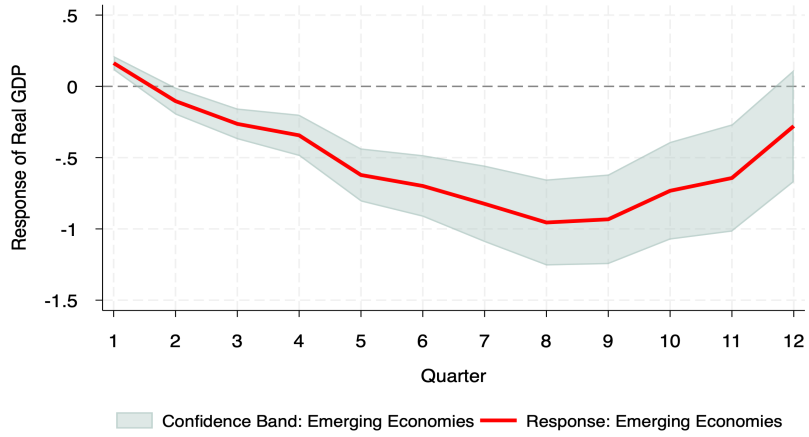
# Response of GDP growth in emerging economies




(a) Shock: Baseline




(b) Shock: Normalised variables




(c) Shock: US defense expenditure

Figure: Response of GDP growth in emerging economies

# Concluding Remarks

- We find that the US government expenditure shock leads to a lowering of monetary policy and real policy rates in emerging economies unlike in the US.
- Results suggest a disconnect between long-term and policy rates that leads to the steepening of the yield curve in emerging economies due to the shock.
- Similar to the findings in the existing literature, we find that the US government expenditure shock leads to the depreciation of the real effective exchange rate in the US but causes appreciation of real effective exchange rates in emerging economies and hurts their external competitiveness.