Discussion of
"Spillovers from U.S. Monetary Shocks: Role of Policy Drivers and Cyclical Conditions"
by Arbatli-Saxegaard, Furceri, Gonzalez Dominguez, Ostry, and Peiris.

Matteo Iacoviello
Division of International Finance
Federal Reserve Board

APEC Conference, San Francisco Fed
November 17, 2023

Summary of the Paper

- In-depth analysis of foreign spillovers from higher U.S. interest rates.

- Spillovers depend on drivers of interest rate changes.

- Spillovers depend on the state of business cycle.

- Tighter U.S. monetary policy affects the left tail of growth distribution disproportionately.

My discussion

1. Interest rate spillovers through the lens of a simple model.

2. Risks of two-step estimation.

3. How to make the results easier to interpret

4. Some practical suggestions

5. A bit of shameless self-promotion

1. Spillovers in a Simple Model

- **Consider simple model of global activity --- each country "small" relative to the United States --- inflation is fixed --- countries peg their interest rate to that of US: $i = i^*$.**

$$
\begin{aligned}
y^* &= \alpha_y y - \alpha_i i \quad &\leftarrow \text{Foreign activity} \\
i &= \phi y + u_i \quad &\leftarrow \text{U.S. Taylor rule} \\
y &= -\kappa i + u_y \quad &\leftarrow \text{U.S. IS equation}
\end{aligned}
$$

- **What are foreign spillovers, and how do we measure them?**

  Simplest answer: Spillover is the direct impact of i on y.

$$
\frac{dy^*}{di} = -\alpha_i
$$

- **This measure does not tell U.S. what is driving i, but is still useful for forecasting purposes. Authors not `interested' in this measure, but it's a useful benchmark.**

Ways of Measuring Spillovers

- **Solve for all variables as a function of fundamental shocks.**

$$i = \frac{1}{1+\kappa\phi}(u_i + \phi u_y)$$

$$y = \frac{1}{1+\kappa\phi}(u_y - \kappa u_i)$$

$$y^* = \frac{1}{1+\kappa\phi}((\alpha_y - \phi\alpha_i)u_y - (\alpha_i + \kappa\alpha_y)u_i)$$

$$y^* = \alpha_y y - \alpha_i i$$
$$i = \phi y + u_i$$
$$y = -\kappa i + u_y$$

- **Spillover conditional on demand shocks...**

$$\frac{dy^*}{di} = \frac{dy^*/du_y}{di/du_y} = -\alpha_i + \frac{\alpha_y}{\phi}$$

U.S. demand and U.S. policy response

- **...and on monetary shocks.**

$$\frac{dy^*}{di} = \frac{dy^*/du_i}{di/du_i} = -\alpha_i - \kappa\alpha_y$$

U.S. demand and U.S. monetary policy effectiveness

Guide Reader through Interpretation

- **Spillovers through U.S. demand shocks capture:**
    1. **Effect of U.S. rates on foreign activity $-$**
    2. **U.S. policy response to U.S. demand $-$**
    3. **Demand channel of U.S. on foreign activity $+$**

$$\frac{dy^*}{di} = \frac{dy^*/du_y}{di/du_y} = -\alpha_i + \frac{\alpha_y}{\phi}$$

- **Spillovers through monetary shocks capture:**
    1. **Effect of U.S. rates on foreign activity $-$**
    2. **Effect of U.S. rates on U.S. activity $-$**
    3. **Demand channel of U.S. on foreign activity $-$**

$$\frac{dy^*}{di} = \frac{dy^*/du_i}{di/du_i} = -\alpha_i - \kappa\alpha_y$$

- **Suggestion: comparing spillovers tells us about strength of demand channels and about U.S. monetary policy response and effectiveness.**
    - **e.g. when trade channels are small and U.S. monetary policy is ineffective, the two instruments give the same answer.**

2. Risks of Two-step Estimation

- **What could go wrong?**

- **Authors estimate a U.S.-only VAR with i and y (and other U.S. variables), extract shocks, and feed them into equations for y^*.**

- **Assume a common global factor drives U.S. and foreign activity, e.g.**

$$y^* = \alpha_y y - \alpha_i i + u_g$$
$$i = \phi y + u_i$$
$$y = -\kappa i + u_y + u_g$$

- **In this case, ignoring foreign conditions in the estimation of the U.S. shocks recovers biased estimates of the spillovers and estimating the model the way the authors do is problematic.**

  - e.g., positive effect of U.S. demand shock likely overstated, since U.S. demand shock may capture global demand factor driving global activity.

- **Suggestion: control for global variables in the estimation of the U.S. VAR.**
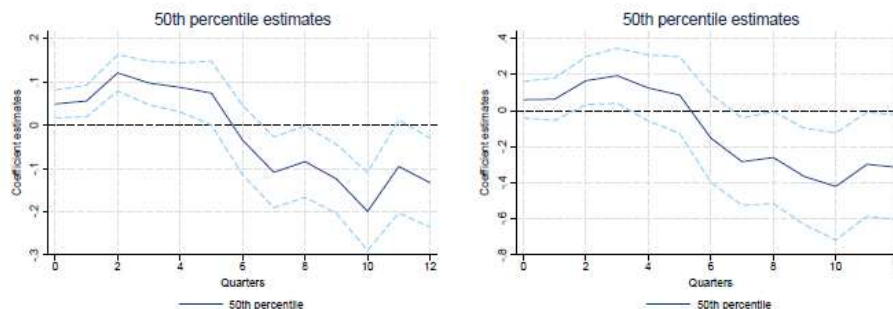
3. Make Interpretation Easier

- **Authors report throughout the results of these projections**

$$y_{i,t+h} - y_{i,t-1} = \alpha_{i,h,q} + \beta_{h,q} s_t + \theta_{h,q} Z_{i,t} + \epsilon_{i,t}$$

...where s is either demand shock, or monetary shock.

- **The resulting figure 6 is hard to interpret**

Figure 6: Impulse Responses to Different Structural Shocks: 50th percentile


- **Suggestion: Project $y_{i,t+h}$ on U.S. interest rate i directly, instrumenting i with either demand or monetary shock**
  - allows for easier comparison of the magnitudes, since estimated $\beta_{h,q}$ are now interest rate elasticities

4. Other Practical Suggestions

- **Clarify which controls one should use and not use above.**
  - One does not and should not control for U.S. activity. Tell the reader why.

- **Make charting better, easier to read, more intuitive.**

- **Check the block bootstrapping: suspiciously tight confidence intervals.**

(a) Real GDP: Resp. to demand shock

50th-5th percentile coefficient estimates
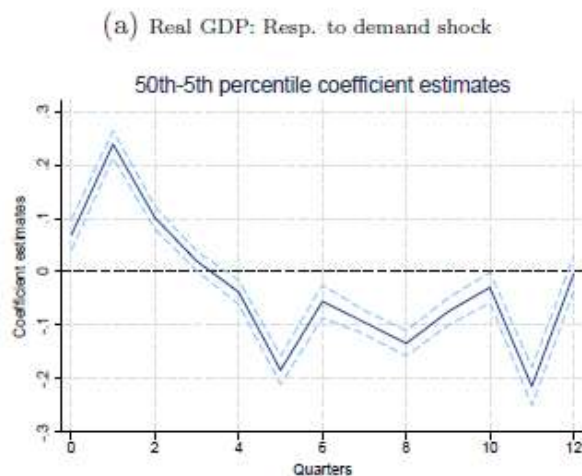
+/- 2 standard deviations.

5. Spillovers and the State of the Cycle

Caldara et al. (2023): Tighter monetary policy actions in one country lower GDP home and abroad. Effects amplified when tightening episodes are synchronous and growth is low.

Table 1. Spillovers and nonlinear effects of monetary shocks.

	(1) $\Delta GDP(t+8)$	(2) $\Delta GDP(t+8)$	(3) $\Delta GDP(t+8)$
Dummy own tightening	−0.96***	−0.50**	−0.56***
	(−5.09)	(−2.31)	(−2.59)
Dummy foreign tightening	−0.85***	−0.42**	−0.46***
	(−4.41)	(−2.57)	(−2.91)
Dummy Own × Foreign Tightening		−0.88***	
		(−3.22)	
Dummy Own × Foreign Tightening: Hi Growth			−0.27
			(−1.23)
Dummy Own × Foreign Tightening: Lo Growth			−1.63***
			(−4.09)
Observations	3026	3026	2994
Fixed effects	Yes	Yes	Yes

Notes: This table shows the results of a regression of log quarterly GDP eight quarters ahead against a time-t dummy for contractionary monetary shocks at home or abroad.