Discussion: The Scars of Supply Shocks

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The views expressed in this presentation are my own and do not necessarily reflect those of the Board of Governors of the Federal Reserve System.
Overview of paper

- Develop model in which temporary supply shocks have scarring effects
- Central mechanism: endogenous investment in productive capacity $\rightarrow$ endogenous productivity growth $g$
- Key insights:
  - Optimal monetary policy response to temporary supply shock is the *opposite* of the conventional exogenous-$g$ setup
    - Lower $i_t$ after supply disruption, rather than raise it
  - Inflation can be *more persistent* due to endogenous $g$ (!):
    - Lower investment today $\rightarrow g$ slows, but wage growth not as much (assuming not fully indexed to productivity)
  - Tight monetary policy can backfire (!!)
    - Weakens economy today $\rightarrow g$ slows $\rightarrow$ higher inflation in the future
My comments

- Elegant analysis, no need for approximations, clean theoretical results
- Simple model setup with surprisingly rich implications and powerful insights
- Comments focused on
  1. Some surprising aspects of key results
  2. Evidence on scarring and thoughts on the broader agenda
Comment 1: “Knife-edge” nature of main proposition

Proposition 3: Assume \( Z_0 < 1, \rho > 0 \). Then the interest rate path that implements the optimal policy is characterized by \( i_t < \bar{i} \) for all \( t \geq 0 \).

- Starkly contrasts exogenous-\( g \) case, which calls for \( i_t > \bar{i} \)
- Holds \textit{regardless of parameter values}
- Somewhat puzzling: would have expected cases with optimal policy in-between (e.g. \( g \) is endogenous, but responds very little to shocks)
- Related to linear innovation technology?
Comment 2: Does endogenous $g$ change nature of optimal policy?

**Proposition 1:** Consider a central bank that operates under discretion and maximizes households’ expected utility, subject to (19), (20), (21), and $L_t \leq \bar{L}$. The solution to this problem satisfies $L_t = \bar{L}$ for all $t \geq 0$.

- Resulting allocation is the same as under flexible wages $\rightarrow$ monetary policy undoes rigid-wage distortion
- **The same is true with exogenous $g$**
- Role of growth externality?
- Does the result hold under commitment?
Comment 3: How strong is the evidence?
Effect of crises on real GDP

**Asian Crises**
- Indonesia
- Korea
- Malaysia
- Thailand

**Debt Crises**
- Argentina
- Brazil
- Chile
- Mexico

**Figure 1**

*Source: Cerra & Saxena (2008)*
Effect of crises on real GDP

Source: Cerra & Saxena (2008)
Effect of crises on productivity

Fig. 1. Impulse responses to a banking crisis.
Note: The figure reports impulse responses of output, hours, and productivity to a banking crisis, obtained by estimating Eq. (1). The black solid line represents the full sample, the orange dashed line restricts the sample to emerging market crises, and the blue dash-dotted line restricts the sample to advanced economy crises. Dark and light shaded regions indicate 1 standard deviation and 95% confidence intervals respectively, computed by drawing 100,000 realizations of the coefficients in Eq. (1) from a multivariate normal with covariance given by the estimated coefficient covariance matrix, and computing the impulse responses for each set of coefficients.

Source: Queralto (2020)
Potential GDP and MFP in the United States

Source: Reifschneider, Wascher, & Wilcox (2015)
VAR-based effects of a monetary shock

Source: Moran & Queralto (2018)
Identified effects of a monetary shock using the trilemma

Figure 3: Baseline response to 100 bps shock: Real GDP and Solow decomposition. Full sample, 1890–2015.

(a) Estimates using raw data

Source: Jordà, Singh, & Taylor (2020)
Comment 4: Comparability to textbook NK model

- Simplifying assumptions (e.g. inelastic labor supply, exogenous wage process) help deliver sharp insights

- But useful to study settings closer to conventional textbook NK model (e.g. Gali 2015)
Comment 4: Comparability to textbook NK model

- Queralto (2021) augments textbook NK model with endogenous $g$
  - Final output: $Y_t(i) = \left( \int_0^A Z_t(i,j) \frac{\vartheta}{\vartheta+1} dj \right)^{\frac{\vartheta+1}{\vartheta}}$, $\vartheta > 0$
  - Varieties created with "skilled" labor, s.t. externalities

- Equilibrium takes form
  \[
  \begin{align*}
  y_t &= -\left[ i_t - \mathbb{E}_t \{ \pi_{t+1} \} - r_t^* \right] + \frac{1}{\vartheta} g_t + \mathbb{E}_t \{ y_{t+1} \} \\
  \pi_t &= \lambda y_t + \beta \mathbb{E}_t \{ \pi_{t+1} \} \\
  g_t &= g_t^* + \eta y_t + \delta \mathbb{E}_t \{ y_{t+1} \} + \beta \gamma \mathbb{E}_t \{ g_{t+1} \}
  \end{align*}
  \]

  $\delta > 0$: expected monopoly profits; $\eta \geq 0$: learning from current production

- Price stability $\pi_t = 0$ generally not optimal

- Instead, optimal to let $\pi_t > 0$ when growth externality high
  - If $\eta = 0$, requires commitment

- Add cost-push shock $\rightarrow$ optimal to allow higher $\pi_t$ than with exogenous $g$
Figure: Dynamic responses to a cost-push shock

Output gap, $\hat{y}_t$

Inflation, $\pi_t$ (a.r.)

Aggregate TFP, $\frac{1}{\delta - 1} \hat{a}_t$

Cost-push shock, $u_t$

Optimal discretionary policy
Optimal policy if CB assumes $g_t$ exogenous
Conclusion

- Paper delivers highly relevant insights in a clean and elegant setup

- Part of a broader agenda that continues to develop