Macro-prudential Policies in a Commodity Exporting Economy

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Outline

Motivation

Event-study analysis
  Oil price shock
  Event analysis

The model
  Key elements
  Experiment: unexpected oil price reversal
Motivation

- Small, open and commodity exporting economies are subject to large foreign shocks, like commodity prices or international interest rates.
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- Not much is known about how monetary and macroprudential policies cope with foreign shocks in a commodity exporting economy.

- We estimate a model to bring it into a policy environment. We use the model to assess the benefits and the costs of conventional and unconventional policy instruments in the face of foreign shocks.
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Large increases in oil prices

Oil shock \equiv the maximum value of the oil price during the last 36 months. It occurs when the oil price change is larger than two std. deviations, Hamilton (2003).
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Macro variables around oil price shocks

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- Key: financial accelerator (BGG) in both sectors where net worth is influenced by valuation effects.
Key 1: Financial accelerator
tradable and nontradable ($j = N, T$)

- Perfectly competitive banks make commercial loans to entrepreneurs, $b_t^j$, by taking deposits from households, $d_t$, and borrowing from international financial markets, $b_t^*$. 

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tradable and nontradable \((j = N, T)\)

- Perfectly competitive banks make commercial loans to entrepreneurs, \(b^j_t\), by taking deposits from households, \(d_t\), and borrowing from international financial markets, \(b^*_t\).

- Financial intermediation subject to frictions (CSV problem) on the side of the asset side of the banks. Thus, spreads depend on firms’ net worth, \(n^j_t\) and the value of capital, \(p^k_t k^j_t\).

\[
\mathbb{E}_t \left[ r_{t+1}^{k^j_t} \right] = \left( \frac{n^j_t}{p^k_t k^j_t} \right)^{-v^j_t} (1 + r_t)(rp_t)
\]

We define a “regulation premium”, \(rp_t\), as any policy that increases credit costs.
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Key 2: Conventional and unconventional tools

- Monetary policy rule: reacts to deviations of total inflation relative to the target $\overline{\pi}$

$$i_t = i_t^{\rho_i} \left( i \left( \frac{\pi_t}{\overline{\pi}} \right)^{\varphi_\pi} \right) \exp (\varepsilon_t^\mu)$$
Key 2: Conventional and unconventional tools

- Monetary policy rule: reacts to deviations of total inflation relative to the target $\bar{\pi}$
  \[ i_t = i_{t-1}^\rho \left( \bar{i} \left( \frac{\pi_t}{\bar{\pi}} \right)^{\varphi_{\pi}} \right) \exp \left( \varepsilon_t^\mu \right) \]

- Regulation premium rule: reacts to credit deviations from its long-run value
  \[ r_{pt} = \exp \left( \mu_{rp} \left( \frac{c_{rt}}{c_r} - 1 \right) \right) \]
Key 3: Oil production and country risk

- Changes in oil revenues are ultimately transferred to households, relaxing their budgets. In addition, oil affects the country risk premium:

\[
(1 + i_t^*) = (1 + \bar{r}^*)(1 + \pi_t^*) Z_t^* \frac{\exp \left( \nu_{b} \left( \frac{q_t b_t^*}{\text{GDP}_t} - \bar{b}^* \right) \right)}{\exp \left( \nu_{oil} \left( oil_t - \bar{oil} \right) \right)}
\]

- The value of oil activities is exogenous:

\[
oil_t = \rho_{z_{oil}} oil_{t-1} + (1 - \rho_{z_{oil}}) \log(\bar{oil}) + \epsilon_{oil}^t
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Unexpected oil price reversal
Conventional policy response to persistent oil shock

\( \pi_{ct} \)

Total inflation (\( \pi_{ct} \))

Nominal interest rate (\( i_t \))

RER (\( q_t \))

 Tradable Output (\( y^T_t \))

Non Tradable Output (\( y^N_t \))

Tradable Credit (\( b^T_t \))

Non Tradable Credit (\( b^N_t \))

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Conventional policy response to unexpected oil price reversal

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persistent reversal macro-prudential