Monetary and Macroprudential Policies in Emerging Economies

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Motivation

• The use of Macroprudential policies (MaPP) has been a legacy of the recent financial crisis
  – Cyclical dimension
  – Cross-section and systemic dimension
• How MaPP interact with Monetary Policy (MP)? Polar views
  – Clear separation between monetary and financial stability functions. Low and stable inflation is sufficient for macroeconomic stability.
  – MP should have a macroprudential (MaP) orientation. Low and stable inflation does not guarantee financial and macroeconomic stability.
Outline

• Monetary and Macro-prudential Policies in Structural Models

• A structural model to analyze reserve requirement as a Macro-prudential tool to deal with capital flows fluctuations
Monetary and Macro-prudential Policies in Structural Models
Traditional New-Keynesian models focused on the inflation-output tradeoff

• Basic NK model

\[ x_t = E_t[x_{t+1}] - \sigma E_t[i_t - \pi_{t+1} - \bar{r}_t] + g_t \]

\[ \pi_t = \beta E_t[\pi_{t+1}] + \kappa(x_t) + \nu_t \]

  – \( x \): output gap
  – \( \pi \): inflation minus inflation target

• Relative consensus on the magnitude and sign of the main parameters
Financial frictions modifies the transmission of MP

- Basic NK model with financial frictions (e.g. Curdia and Woodford, 2010)

\[
x_t = E_t[x_{t+1}] - \delta E_t \left[ i_t - \pi_{t+1} - \bar{r}_t \right] - \phi f_t + \hat{g}_t
\]

\[
\pi_t = \beta E_t \left[ \pi_{t+1} \right] + \kappa(x_t) + \lambda f_t + \nu_t
\]

\[
f_t = \theta E_t \left[ f_{t+1} \right] + \omega E_t \left[ i_t - \pi_{t+1} - \bar{r}_t \right] + \varphi x_t
\]

\[\text{--} f: \text{indicator of financial constraints}\]
And MP rate has to balance three dimensions: inflation, output and financial “conditions”

• Basic NK model with financial frictions

\[
\begin{align*}
    x_t &= E_t [x_{t+1}] - \delta E_t [i_t - \pi_{t+1} - \bar{r}_t] - \phi f_t + \hat{g}_t \\
    \pi_t &= \beta E_t [\pi_{t+1}] + \kappa(x_t) + \lambda f_t + \hat{v}_t \\
    f_t &= \theta E_t [f_{t+1}] + \omega E_t [i_t - \pi_{t+1} - \bar{r}_t] + \varphi x_t
\end{align*}
\]

• But the assessment of this balance depends on new parameters with less knowledge and evidence of their magnitude and signs
A Macro-prudential tool can help to have more availability to balance the three dimensions

- Model extended with a MaP tool

\[ x_t = E_t[x_{t+1}] - \tilde{\sigma}E_t[i_t - \pi_{t+1} - r_t] - \tilde{\phi}f_t + \eta_x \tau_t + \tilde{g}_t \]

\[ \pi_t = \tilde{\beta}E_t[\pi_{t+1}] + \tilde{\kappa}(x_t) + \tilde{\lambda}f_t + \eta_\pi \tau_t + \tilde{\nu}_t \]

\[ f_t = \tilde{\theta}E_t[f_{t+1}] + \tilde{\omega}E_t[i_t - \pi_{t+1} - r_t] + \tilde{\phi}x_t + \eta_f \tau_t \]

- \( \tau \): Macroprudential tool

- But new questions: interactions between MP and MaP

- And again, the answers will depend on new parameters with less knowledge and evidence of their magnitude and signs
Why the magnitude and sign of new parameters is important? Think of the effect MP in the financial constraints.

- In the extended model with a MaP tool

\[ f_t = \tilde{\theta} E_t[f_{t+1}] + \tilde{\omega} E_t[i_t - \pi_{t+1} - r_t] + \tilde{\phi} x_t + \eta_f \tau_t \]

- Sign of \( \tilde{\omega} \)?

- One view: Increasing MP rate should rise the opportunity cost of lending; make more severe financial constraints (\( f \uparrow \))

- Other view: Rising the MP rate can increase some asset prices used as collateral, make less severe financial constraints (\( f \downarrow \))
The second view sounds familiar in emerging economies where credit might be linked to capital flows

• An increase in MP rate induces an appreciation of the domestic currency

• If the severity of financial constraint reduces with an exchange rate appreciation, credit might increase ($f\downarrow$)

• Thus, the interaction between MP and MaP is trickier in emerging open economies
A structural model to analyze reserve requirement as a Macro-prudential tool to deal with capital flows fluctuations
Several EM countries have adjusted reserve requirements in the recent years as a stabilization tool.
A few analytical papers on the use of Reserve Requirements as a MaPP tool

• Several studies in closed economy
• We focus on the following aspects:
  1. Model with nominal and financial frictions from microeconomic principles
     • New mechanism: financial sector needs liquidity in case of defaulted loans -> fire sales reinforce with the financial accelerator
  2. Shock to the world interest rate (UMP and “normalization”)
  3. Reserve requirement as a MaP tool
  4. Welfare-based measure to rank alternatives policies
Overview of the Model

• Small open economy
• Two differentiated tradable goods: Home and Foreign
• Nominal friction: price rigidity a-la-Calvo (1983)
• Financial friction: financial accelerator plus a fire-sales amplification mechanism
  – Solvency: loans’ default (Bernanke, Gertler and Gilchrist, BGG, 1999)
  – Liquidity: real and financial resources are needed to liquidate distressed assets (extension of Choi-Cook, 2012)
Households \rightarrow R^D \rightarrow \text{Liquidity Intermediaries} \rightarrow R^{IB} \rightarrow \text{Lending Intermediaries}

R^K > R^l > R^{IB} > R^D
Lending Intermediaries

• In the accelerator (BGG) the zero profit condition for credit intermediary is:

\[
[1 - \Phi(\bar{\omega}_{t+1})]R^l_{t+1}B_t + (1 - \mu_{t+1})R^k_{t+1}Q_t k_{t+1} \int_{0}^{\bar{\omega}_{t+1}} \omega d\Phi(\omega; \sigma_\omega) = R^{IB}_{t+1}B_t,
\]

• In contrast to BGG, cost of default is endogenous (and countercyclical), depending on the fire sales of defaulted capital

\[
\mu_{t+1} = \frac{(Q_{t+1} - FS_{t+1})(1 - \delta)}{VMPK_{t+1} + (1 - \delta)Q_{t+1}},
\]

• In a boom (recession) default decreases (increases) and recovery rates rises (falls).
Liquidity Intermediaries

• The financial sector need hold excess reserves to have liquidity in order to absorb defaulted loans/collateralized capital.
• Thus, fire sales will depend negatively of the default rate and positively on the volume of defaulted loans.
• Thus, Fire sale will be a “cash-in-the-market” price.
• Allocation of funds:

Evolution of capital:

\[ k_{t+1} = (1 - \delta) \left( k_t - k_{D,t}^{new} \right) + \left( 1 - \Delta \left( \frac{inv_t}{inv_{t-1}} \right) \right) inv_t + \eta_k (1 - \delta) k_{D,t} \]
Shock to the World Interest Rate
Alternative Policies

• We consider four alternative “regimes”
  1. Standard Taylor rule and constant reserve requirement (RR)
  2. Inflation Targeting and constant RR
  3. Augmented Taylor rule and constant RR

\[
\log\left(\frac{R_{t}^{IB}}{1+r}\right) = \psi_{\pi} \log(1+\pi_{t}) + \psi_{y} \log(y_{t}) + \psi_{b} \log(b_{t})
\]

4. Inflation Targeting and countercyclical RR

\[
\log\left(\frac{S_{t}^{MA}}{S_{t}^{MA}}\right) = -\phi_{xr} \log\left(\frac{xr_{t}}{xr}\right)
\]
## Higher Welfare with Countercyclical RR

<table>
<thead>
<tr>
<th>Policy Framework</th>
<th>Welfare</th>
<th>Losses expressed relative to the Natural EQ welfare in terms of SS consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Standard Taylor rule</td>
<td>-17.1602</td>
<td>11.27%</td>
</tr>
<tr>
<td>2 IT Regime</td>
<td>-16.9999</td>
<td>11.15%</td>
</tr>
<tr>
<td>3 Augmented Taylor rule</td>
<td>-17.0887</td>
<td>11.22%</td>
</tr>
<tr>
<td>4 IT regime and Countercyclical RR</td>
<td>-15.4649</td>
<td>10.00%</td>
</tr>
</tbody>
</table>
MP rate: coordinate with Macroprudential tool

- Tinbergen, Mundell principles

- MP rate has to follow the “natural” rate and be adjusted by the RR
Main results remain under alternative calibrations/specifications

• Include foreign debt (denominated in dollars) for entrepreneurs and credit intermediaries: More financial volatility, but same policy ranking.

• Loans to entrepreneurs are denominated in dollars. This also rises the volatility. Taylor rules “dominate” IT, **MaPP** improves the welfare even more.

• Wag rigidities: This increases the responses of asset prices and defaults. Still same ranking of policies.
Final remarks

• Need to continue the progress in the analytical frameworks to integrate and understand better the interactions between MP and MaP.

• In emerging open economies this interaction has been a regular concern, especially given the role of capital flows/exchange rate in financial stability.

• In particular, reserve requirement has been used in several emerging economies as a macro policy tool.

• In the paper discussed, we argue that
  – a countercyclical macroprudential policy is better suited to manage the volatility of world interest rates/capital flows.
  – Inflation Targeting continues to be the main monetary policy objective, but MP rate must accommodate moves in the “natural” interest rate and reserve requirements.