The Effects of Capital and Liquidity Requirements in a Dynamic Model with an Interbank Market

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Introduction

- The Basel Committee on Banking Supervision (BCBS) has introduced liquidity requirements to penalize banks’ excess reliance on the interbank market to obtain short-term liquidity.
- Interbank Rates and Interbank Trading Volume:

[Graph showing interbank rates and trading volume over time]

- This raises some macro-prudential questions:
  1. How do these Basel-style requirements affect banks’ behaviour and the interbank market activities?
  2. How do these requirements impact the real economy and social welfare?
  3. Has the target for mitigating macro-prudential issues been fulfilled as expected?

- In this paper, we build up a dynamic equilibrium model to
  1. Investigate the impacts of Basel-style requirements on banks, interbank market, and the real economy.
  2. Analyse from a macro-prudential perspective.
  3. Mimic bank lending and overnight interbank market (interbank rates and interbank trading volume).
  4. Compare the impacts among capital and liquidity requirements.

Contributions

- We evaluate the impacts of Basel-style requirements macro-prudentially, with the consideration of interbank markets.
- We propose a two-stage decision making process for our quantitative analysis.
- We propose a method to harmoniously incorporate both discrete- and continuous-time factors without compromising generality.

Timeline of the Model

Time Sequence:
- Banks make new investment choices \((\ell_n, v_n)\), based on the systematic credit shock \(\Sigma_{\text{sys}}\) and new aggregate deposits value \(\delta_v\).
- Idiosyncratic profit shock \(\delta_{\text{sys}}\), and idiosyncratic deposit value variations \(\delta_{\text{sys}}\) occur continuously within \(v \in [0,1]\).
- The profit shock occurs randomly to banks, and the deposit variation makes them a probability of \(\ell_n\) to increase liquidity-deficit sizes and a probability of \(1 - \ell_n\) to become liquidity-surplus banks. For each interval \(t = i\), banks make decisions \((\ell_{n+1}, v_{n+1})\).
- Banks may default following the idiosyncratic shocks.
- Corporate tax is levied on systematic credit shock \(\delta_v\) and new aggregate deposits value \(\delta_{\text{sys}}\) realized. Banks may default following the resolution of these shocks.

Key Results

- Capital and liquidity requirements reduce bank lending, interbank rates, and interbank trading volume.

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Capital</th>
<th>Liquidity</th>
</tr>
</thead>
<tbody>
<tr>
<td>No regulation</td>
<td>(x = 48)</td>
<td>(y = 12%)</td>
</tr>
<tr>
<td>Loans</td>
<td>1,580</td>
<td>2,177</td>
</tr>
<tr>
<td>Liquid Assets</td>
<td>-9,427</td>
<td>-0,048</td>
</tr>
<tr>
<td>Equity Issuance Ratio</td>
<td>-59,50%</td>
<td>-58,50%</td>
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<tr>
<td>Payout Ratio</td>
<td>28,50%</td>
<td>18,50%</td>
</tr>
<tr>
<td>Interbank Trading Volume</td>
<td>0,182</td>
<td>0,073</td>
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<tr>
<td>Interbank rate</td>
<td>26,54%</td>
<td>11,61%</td>
</tr>
<tr>
<td>S.D of Interbank rate</td>
<td>1,52%</td>
<td>0,05%</td>
</tr>
<tr>
<td>Book Equity Value</td>
<td>0,10%</td>
<td>0,05%</td>
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<tr>
<td>Social Welfare</td>
<td>5,81%</td>
<td>3,81%</td>
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<tr>
<td>S.D of Social Welfare</td>
<td>0,047</td>
<td>0,25%</td>
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</tbody>
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Key References