The Role of Bank Capital in the Propagation of Shocks

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The views expressed are those of the authors and not of the Bank of Canada.
In the last decade, there has been progress in building quantitative DSGE models with financial frictions that tend to fit aggregate data.

In practice, however, these models abstract from the state of the balance sheets of banks and interaction with the real economy.

- **Implication:** Supply of funds of banks unaffected by their balance sheet.

The recent crisis has reminded us that the state of the balance sheet of banks plays an important role in economic fluctuations.
1. We build a quantitative macroeconomic model in which bank capital matters because it mitigates an agency problem between a bank and its creditors.

2. We use the model to study how the presence of bank capital affects the transmission of shocks.
The bank capital channel greatly amplifies and propagates the effects of technology shocks, but plays a lesser role for monetary policy shocks.

When the bank capital channel is active, an economy with more bank capital is better able to absorb technology shocks than an economy with less bank capital.

A sudden scarcity of banking capital depresses bank lending and economic activity.
OUTLINE FOR THE REMAINING

1. Brief overview of the model
2. Findings
3. Conclusion
4. Work in Progress
BRIEF DESCRIPTION OF THE MODEL

- Workhorse model of central banks—DSGE model with nominal and real rigidities

- Banks key as they **intermediate** funds between households and firms

- Because of limited liability, banks can misbehave by taking excessive risk (moral hazard)

- Bank capital emerges to **mitigate this agency problem** between the bank and its creditor
  - Higher bank capital is a signal of the higher quality of the bank
  - Bank capital constrains the amount of bank lending

- Entrepreneurs are also financially constrained.

- Monetary policy set according a standard Taylor Rule.
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LENDING RELATIONSHIP

Two Sources of Moral Hazard

1. Moral Hazard
   Entrepreneurs may privately choose low return projects to enjoy private benefits

2. Moral Hazard
   Banks have an incentive not to monitor in order to save costs

Entrepreneurial Net Worth
Bank Net Worth
Table 1: Baseline Parameter Calibration

<table>
<thead>
<tr>
<th>Household Preferences and Wage Setting</th>
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<tbody>
<tr>
<td>$\gamma$</td>
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<tr>
<td>0.65</td>
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<table>
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<tr>
<th>Capital Good Production and Financing</th>
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<tbody>
<tr>
<td>$\mu$</td>
</tr>
<tr>
<td>0.025</td>
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<tr>
<th>Resulting Steady-State Characteristics</th>
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<tbody>
<tr>
<td>$CAR$</td>
</tr>
<tr>
<td>14%</td>
</tr>
</tbody>
</table>
Impulse Responses:

1. Technology shock
2. Technology shock with more bank capital
3. Bank capital shock
1. Response to Negative Technology Shock
One Standard Deviation Adverse Technology Shock
2. Response to Technology Shock with More Bank Capital
Negative Technology Shock: Eco. with More Bank Capital

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3. Response to Bank Capital Shock
Negative Shock to Bank Capital

- Output
- Investment
- Price of Capital
- Bank Capital–Asset Ratio
- Bank Net Worth
- Bank Lending
- Entrepreneurial Net Worth
- Short Term Rate
- Inflation

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CONCLUSION

- We presented a DSGE model in which bank capital mitigates an agency problem between banks and their creditors.

- The bank capital channel amplifies and propagates the effects of shocks (procyclicality).

- When the bank capital channel is active, an economy with more bank capital is better able to absorb shocks than an economy with less bank capital.
Interaction between Macroprudential and Monetary Policy:

- Macroeconomic implications of alternative bank capital regulation
  - Acyclical bank capital regulation
  - Countercyclical bank capital regulation
- This is underway at the Bank of Canada
  - Christensen, Meh, and Moran (2010))
  - Dib (2010)