Endogenous Risk-Exposure and Systemic Instability

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Discussion by
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Key Question: Do Interbank Exposures Induce Risk-taking?

Time 0: Each bank has a senior debt with a FV $v$ and a junior interbank loan with a FV $\tilde{d}$

```
Bank 1
\[
\begin{array}{c}
\tilde{d} \\
\downarrow v \\
Depositors
\end{array}
\]
```

```
\[
Bank 2
\begin{array}{c}
\tilde{d} \\
\downarrow v \\
Depositors
\end{array}
\]
```

Time 1: Each bank needs to choose between Project A and Project B:

```
Bank 1
\[
\begin{array}{c}
0 \\
1/2 \\
1/2 \\
0
\end{array}
\]
```

Project A: High NPV, Low Volatility

```
Bank 2
\[
\begin{array}{c}
0 \\
1/5 \\
4/5 \\
0
\end{array}
\]
```

Project B: Low NPV, High Volatility
Four Benchmark Cases

Case I: No deposits and no interbank loans
If $\bar{d} = v = 0$ then both banks choose Project A (First-best)

- Stand-alone banks without leverage don’t have incentives to do risk-shifting

Case II: Interbank loans only
If $\bar{d} = \frac{1}{2}, v = 0$ then both banks choose Project A (First-best)

- Banks internalize the cost of risk-shifting because their interbank loan payment is repaid back to them
- Interbank loans not necessary incentivize risk-shifting

Case III: Deposits only
If $\bar{d} = 0, v = \frac{1}{2}$ then both banks choose Project B (Risk-shifting)

- Equity holders gain from the increased volatility, depositors lose, $(E+D)$ drops by: $\text{NPV}_A - \text{NPV}_B$

Case IV: Deposits (junior) + interbank loans (senior)
If $\bar{d} = \frac{1}{4}, v = \frac{1}{4}$ then both banks choose Project B (Risk-shifting)

- Banks risk-shift because of the presence of deposits (like in Case III), but there are no strategic complementarities in risk-shifting because risk-shifting by Bank 1 does not affect leverage of Bank 2.
Case V: Deposits (senior) + interbank loans (junior)

If \( \tilde{d} = \frac{1}{4}, \nu = \frac{1}{4} \) then both banks choose Project B (Risk-shifting)

- There are effectively three tiers of debt that: senior debt (own depositors), mezzanine debt (depositors of the other bank) and junior debt to equity holders of the other bank (with face value \( \tilde{d} - \nu \))

- There is a strategic complementarity in risk-shifting because when Bank 1 chooses Project B it decreases the value of equity of Bank 2 (the junior loan to Bank 1) more than the value of debt of Bank 2 (the mezzanine loan). As a result, the market leverage of Bank 2 increases. Higher leverage, more incentives to risk-shift.

- Charter value: Interbank loans provides risk-sharing for depositors (Allen & Gale 2000). If depositors are risk-averse, this risk-sharing will benefit bank’s equity holders when they issue debt (this is outside of the model but introduced indirectly using charter value)

- Capital requirements: more equity less risk-taking (Lemma 4). It makes sense because debt becomes less risky with equity buffer so less risk-shifting.

- Bailouts: less risk-taking. If ex-post a bailout makes debt risk-free then equity becomes marginal & no risk-shifting

- Correlated risk: banks have incentives to perfectly correlate risk because it makes risk-shifting more profitable. Without risk-sharing, banks just need to maximize payoff if a project succeeds. However, if banks care about the charter value, this result will be challenged.

- CCP, network density and size: CCP & complete network makes deposits safer. Also, bigger network means more risk sharing so safer deposits. When the market value of debt increases, market leverage increases and therefore there are more incentives for risk shifting.
Recommendations

  o It is easier to explain and understand the results as risk-shifting in a risk-sharing financial network.
  o Market leverage determines incentives to risk-shift. When interbank loans are junior to deposits, market leverage changes in an interesting way as a function of the network structure.

- **Potential comparative statics:**
  o Corollary 1: When compare a stand-alone bank \(\bar{d} = 0\) and an interconnected bank’s \(\bar{d} > 0\) risk taking, the leverage changes. Maybe can at least make the book leverage the same.
  o Would interesting to see the effect on risk taking when switch the seniority of interbank loans and deposits. Can help to isolate the role of strategic complementarities.
  o Would be interesting to fix density and very the asymmetry in the degree distribution (Gofman, 2017). I conjecture that strategic complementarities will be even more pronounced.
  o Changing the face value of the senior debt of other banks, holding own senior claims constant.
Conclusion

- Really like the paper
- Very interesting analysis
- Learned a lot from reading it
- Currently R&R at the RFS, would love to see it published there