Endogenous Risk-Exposure and Systemic Instability
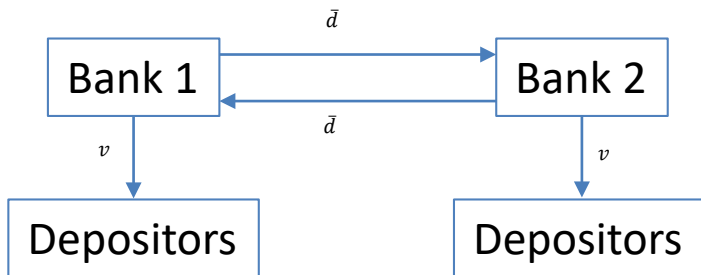
by Chong Shu

Discussion by
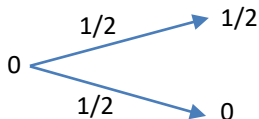Michael Gofman
University of Rochester

2020 Financial Stability Conference: Stress, Contagion, and Transmission
Cleveland Fed and OFR

Key Question: Do Interbank Exposures Induce Risk-taking?
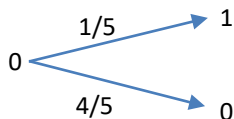
Time 0: Each bank has a senior debt with a FV v and a junior interbank loan with a FV $\bar{d}$

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

Project A: High NPV, Low Volatility

Project B: Low NPV, High Volatility

Four Benchmark Cases

Case I: No deposits and no interbank loans

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

> ➤ Equity holders gain from the increased volatility, depositors lose, (E+D) drops by: $NPV_A - NPV_B$

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 <u>no strategic complementarities</u> in risk-shifting because risk-shifting by Bank 1 does not affect leverage of Bank 2.

This paper: Risk-shifting in Presence of Interbank Exposures

Case V: Deposits (senior) + interbank loans (junior)

If $\bar{d} = \frac{1}{4}, v = \frac{1}{4}$ 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 $\bar{d} - v$)

➢ 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

➢ **Jensen & Meckling (1976) meets Allen & Gale (2000)**

- 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