Discussion of "Bank Interconnectivity and Leverage" by Alessandro Barattieri, Laura Moretti and Vincenco Quadrini.

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Summary

- The paper starts from the observation that the ratio of assets over equity in the US banking sector - a measure of leverage - shows a strong co-movement with the ratio of non-core liabilities over total assets - a measure of interconnectedness - in the data.
- Suggests an explanation for this co-movement based on optimal portfolio choice.
- Presents an empirical analysis of hypothesis resulting from the portfolio choice model for various levels of aggregation of banks.

The key mechanism in the model.

- An infinitely lived owner-managed bank faces a portfolio-choice problem under risk with three alternative investments: Issuing liabilities to the non-financial sector, making loans to the non-financial sector and buy and sell shares of the loans to the non-financial sector from and to other banks. Diversification is costly.
- Diversification of idiosyncratic risks from lending induce banks to issue more liabilities to the non-financial sector and invest more in the non-financial sector.
- Diversification costs and the return spread between loans and liabilities vis a vis the non-financial sector are then the main drivers of leverage and interconnectivity.

What have we observed in terms of interconnectedness?

A short intermediation chain. See Shin 2010.

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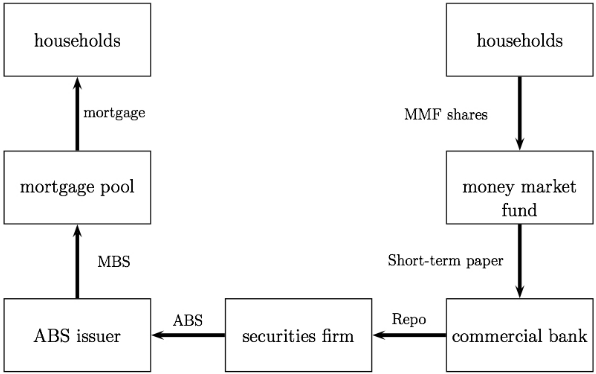
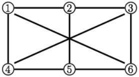
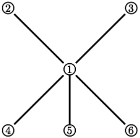


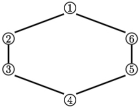
A long intermediation chain. See Shin 2010.

Does the measure used in the paper capture interconnectedness?

The ratio of non-core deposits to total assets is only a very indirect measure of interconnectedness. The measure would for instance not distinguish whether non-core deposits are held in either of the following three situations:







Does the measure used in the paper capture interconnectedness?

- If for a given structure of interconnectedness banks would substitute non-core deposits for core deposits or equity, the measure would indicate that interconnectedness has decreased, while it is the same in both situations.
- Core deposits over total assets is a ratio so weakly related to what we normally think of as interconnectedness, that it is almost a misleading term.

Is the mechanism plausible?

- The paper tells the story of co-movements of bank leverage and interconnectedness as a story of diversification of a loan portfolio within the banking sector.
- What we have observed before and after the crisis is however something that looks quite different.
- Banks have issued more and more liabilities against more and more asset classes of increasingly deteriorating quality and held these liabilities within the financial sector.

An alternative mechanism. Geanakoplos 2009

- The tranching and repackaging of financial claims allows to profit from the heterogeneity of different investors in their marginal valuation of income across time and states.
- This engineering of new collateral pushes the collateral value of different asset classes and creates space in the balance sheet of different investors for yet even more debt and more leverage.
- This process is self stabilizing in the system as a whole for an extended period, because in this process collateral becomes concentrated in the hands of like minded investors, decreasing volatility and reassuring lenders that lending is safe.

Another way of looking at the problem: Shin 2010

From Shin 2010, Risk and Liquidity we learn that the aggregate balance sheet of the financial sector can be viewed as the following identity:

Total lending to ultimate borrowers = total debt liabilities to non-banks + total equity of intermediaries

Manipulating the basic accounting identities appropriately, Shin shows that total debt liabilities to non-banks can equivalently be written as the sum accross intermediaries of

product of equity of intermediary x proportion of outside funding x (leverage - 1)

The balance sheet mechanics of a boom

When leverage increases, for total liabilities to non-banks being constant

- There must be a decline in outside funding.
- Banks must therefore lend more to each other
- The closely interconnected balance sheets of intermediaries is a necessary byproduct of a boom because lending and borrowing from each other is the only way intermediaries can increase their balance sheets and grow.

This is an implication of overall accounting.

The empirical results

The empirical results basically find a strong and positive correlation between the leverage and the interconnection measure at all levels of aggregation. It confirms also the theoretical hypothesis about the dependence of the interconnectedness measure on the return differential

A basic question on the empirical part

The strong positive correlation between the interconnectedness measure and the leverage measure seems to be built in mechanically by the definition of the measures.

A functional dependence

Denote total assets TA, equity E, core deposits D, total liabilities L

$$
\begin{aligned}
\text{Leverage} &= \frac{TA}{EQ} && (1)\\
\text{Interconnectedness} &= \frac{TA - EQ - D}{TA} && (2)\\
&= 1 - \frac{EQ}{TA} - \frac{D}{TA} && (3)
\end{aligned}
$$

So by construction leverage is an increasing function of interconnectedness.

Other comments

- The role of diversification costs are unclear. It seems they are just needed to get a solution out of the first order conditions.
- It is unclear what f_t actually is.
- It is unclear how l_t and f_t are pinned down. As the optimization problem is written there seems to be no limit to increasing l_t and f_t.
- Conceptually it seems quite inadequate to think of the relation between leverage and interconnectedness from the perspective of a single person decision problem against an exogenous environment which will absorb any sales and supply any purchases at the given prices. This seems to me an obviously inadequate perspective.

Conclusions

- The issue discussed in this paper is interesting and important. There is a literature which has analyzed how leverage and interconnectedness is related offering competing explanations and mechanisms with which this analysis should be compared and confronted.
- In the current form the paper has in my view some shortcomings with respect to
  - The measure of interconnectedness.
  - The theoretical model underlying the empirical analysis.
  - Empirics: Conceptual problems in the measures lead to conceptual problems in the empirical analysis.