

Network Risk and Key Players: A Structural Analysis of Interbank Liquidity

A Brief Summary

Link to the full paper: https://yeli-macrofinance.com/interbank_liquidity.pdf

The extent to which a bank can rely on interbank borrowing to smooth out liquidity shocks (rather than hold reserve buffers) depends on its location in the interbank network. In this paper, we develop a structural model that explains banks' reserve holdings with the entire network structure of interbank borrowing and lending as the key inputs. The model is estimated with data from the Bank of England.

In our model, the interbank credit network can generate strategic substitution in banks' reserve holdings or strategic complementarity. When neighboring banks on the credit network hold more reserves, a bank can rely more on interbank borrowing rather than its own reserves to cover payment outflows. This free-riding incentive gives rise to strategic substitution, and it exists even when the amount of depositors' payment activities stays constant. Strategic complementarity arises when the amount of payments grows dynamically through the propagation of economic activities. When neighboring banks on the interbank credit network hold more reserves, a bank has more accessible liquidity and supports more payments, for example, by issuing more demand deposits. This allows the bank's depositors to be more payment-active, and their transactions trigger others to conduct more economic activities, causing an increase in money velocity, the bank increases reserve holdings. We find that in regimes where strategic complementarity dominates, our estimated network multiplier indeed moves closely with measures of money velocity.

The type of equilibrium on the network varies over time. In the run-up to the GFC, strategic complementarity is the dominant force. As a result, the interbank credit network amplified liquidity shocks to banks' reserve holdings. During the GFC, strategic complementarity weakened, and the liquidity free-riding incentive strengthened. Strategic substitution eventually became the dominant force as the Bank of England started its QE in 2009. The interbank credit network turned from a shock amplifier pre-crisis to a shock absorber.

We develop a framework to identify systemically important banks. The advantage of having the entire network as input (rather than several network statistics as often done in reduced-form network analysis) is that we are able to fully utilize the information on network nodes and edges in our measures of systemic risk. We demonstrate that systemically important banks are not necessarily the largest ones. Banks' contribution to systemic risk depends on network topology.