A Network View on Interbank Liquidity

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Introduction

Interbank markets are...

- ... the major source of funding liquidity for euro area banks
  ⇒ Functioning interbank market crucial for financial stability

- ... first intermediary market in the implementation of monetary policy
  ⇒ Market disruptions can have real economic consequences
Introduction

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How did the Lehman event affect unsecured interbank lending in the euro area?
A Market Freeze in the Euroarea Interbank Market?

Figure: The Libor-OIS and Ted spread, measuring risk premia in the interbank market
Studying market freeze with payment system data

- Increase in risk premia is indication of market freeze
- Corresponding drop in volume in theory due to asymmetric information or precautionary liquidity hoarding
  \[\Rightarrow\text{Remedy: provide bank capital and liquidity}\]
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**Payment system data** allow more detailed view

- TARGET2 settles $\geq 90\%$ of all transactions between all European banks
- Unparalleled precision of data on unsecured interbank loans
Lending volumes increased after Lehman event and decreased after ESCB intervention

Figure: Normalized volume of the euro area overnight and term interbank market.
Prices remained stable, but price dispersion increased in the overnight segment after Lehman event.

**Figure:** Daily price of liquidity in the euro area overnight and term interbank market.
Cross-sectional variance in access to liquidity

- Our analysis shows signs of counterparty risk concerns in the overnight segment two weeks before Lehman event.
- After Lehman event, banks engage in maturity shortening (largely) irrespective of counterparty risk.
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- Our analysis shows signs of counterparty risk concerns in the overnight segment two weeks before Lehman event.

- After Lehman event, banks engage in maturity shortening (largely) irrespective of counterparty risk.

- The fact that the aggregate price for liquidity remained constant after Lehman event masks a large heterogeneity in banks’ access to liquidity.

- Heterogeneity is revealed when studying the interbank network structure.

- More than half of all bilateral lending relationships change from pre- to post-Lehman period.

⇒ Consequences of this structural change?
Figure: Sample interbank network. Each node is a bank, each link is an interbank loan. Balance sheet of borrower B is identical in both situations. Network position can be measured e.g. through betweenness centrality.
Higher centrality implies more bargaining power

Main Hypothesis:

- Banks with higher betweenness centrality make larger intermediation spreads
- Intermediation in networks through bilateral and multilateral bargaining

Betweenness centrality $\iff$ Bargaining power
Higher centrality implies more bargaining power

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**Betweenness centrality ⇔ Bargaining power**

**Supporting Hypotheses**
- Banks with higher betweenness centrality obtain and provide more liquidity during times of distress
- Banks with higher betweenness centrality pay a lower price on their interbank borrowing
Detailed data allow unbiased identification

- Use loan-level regressions controlling for demand

- Simplified bank balance sheet $D_{i,t} + B_{i,t} = L_{ij,t}$

- Diff-in-diff setup with restriction on banks that borrow from at least two lenders controlling for borrower fixed-effects:

$$\Delta L_{ij} = \beta_j + \beta_1 \Delta D_i + \epsilon_{ij} \quad (1)$$

- Access to interbank deposits $D_{i} \equiv \alpha \text{Network Position}_i$

- And similar for extensive margin

- Crucial for identification: unanticipated interbank deposit shock
Interbank network structure affects pricing of loans

Support of Main Hypothesis

- Intermediation spread in pre-Lehman period: $\sim 90$bp

- Banks that experience one standard deviation increase in betweenness centrality increase intermediation spread by $\sim 30$bp

- In line with experimental evidence on trading in networks
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Supporting Hypotheses

- 10% increase in betweenness \( \leftrightarrow 3.5\% \) more borrowing (bank-level)
- 10% increase in betweenness \( \leftrightarrow 9\% \) more lending (bank-level)
- 10% increase in betweenness \( \leftrightarrow 3.5\% \) lower spread
Discussion and Conclusion

- Extensive liquidity supply by the ESCB following Lehman event substituted part of the euro area overnight interbank market

- The resulting change in interbank network structure reduced bargaining power of betweenness central banks

- Betweenness central banks make smaller intermediation spreads, which affects their profitability

- Our paper relates the global structure of the interbank network with local liquidity re-allocation
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Thank you!