News and Networks

Using Text Analytics to Assess Bank Networks During COVID-19 Crisis

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Introduction

We study the *interconnectedness* of stress-tested banks by exploiting how they are mentioned together in the context of financial news. We use Ronnqvist and Sarlin (2015) text-to-network approach using the COVID-19 pandemic as an external shock to the banking system to examine how the network topology behaves during high-stress periods.

Methods

We use data from Factiva Analytics top financial news. Our sample consists of 18K articles with at least one co-occurrence (more than one DFAST bank mentioned in an article) and expands July 2019 – September 2020.

We build weekly DFAST banks network matrices based on the number of co-occurrences by bank across time. We use an eigenvector centrality measure to proxy systemic risk rankings.

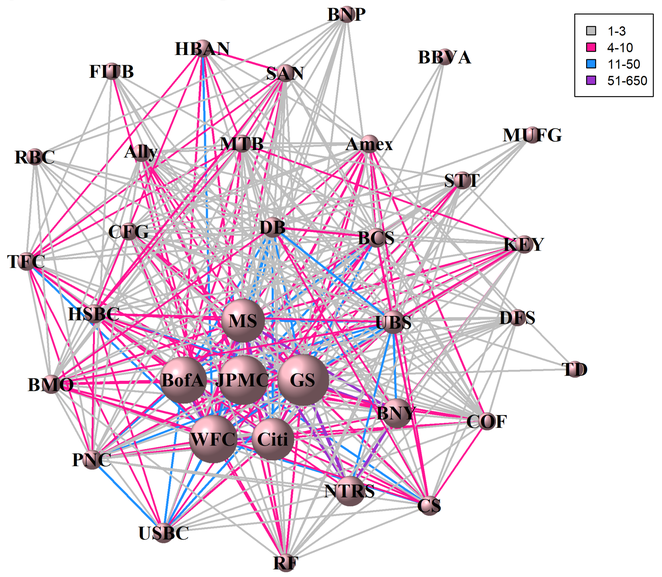
We classify banks by type: *Big 6 (largest Universals + Inv. Banks), Regionals, Trusts, Credit Card,* and *IHCs.*

We focus on earnings release weeks to achieve an apples-to-apples comparison of network topology pre vs during COVID-19. We compare earnings release weeks of January 2020 (pre-Crisis) to April 2020 (Crisis & peak of stress).

Data Analysis

Network Graphs

April 2020 Earnings Release Week:



Network Topology Comparison

Table 5. Summary statistics of January and April earnings network matrices
January Earnings is 13 - 19, 2020; April Earnings is 13 - 19, 2020. Connections is the number of links and co-occurrences is the number of co-mentions in articles. Clustering coefficient is calculated as the transitivity or connectivity of a network and average path length is the mean shortest path between two nodes.

	January Earnings	April Earnings	% Change
Number of Connections			
Within *Big 6*	12	12	0%
Within Non-*Big 6*	598	698	16.72%
Between *Big 6* and Non-*Big 6*	131	141	7.63 %
Number of Co-occurrences			
Within *Big 6*	3432	3788	10.37%
Within Non-*Big 6*	1556	1959	25.90%
Between *Big 6* and Non-*Big 6*	1069	1218	26.29 %
Other metrics			
Clustering Coefficient	0.69	0.76	
Average Path Length	1.50	1.41	

Results

- DFAST networks connectivity patterns are intuitive and exhibit core-periphery topology.
- Denser networks under stress, aligned with the literature, with increased connectivity mainly across bank types.
- Real time and more stable systemic risk rankings, than traditional measures, using text-based eigenvector centrality.

Ranking of Bank Systemic Risk:

Eigenvector Centrality (left) vs. SRISK (right)

Conclusion

We find a core-periphery topology in DFAST banks networks, with increased connectivity across clusters during peaks of stress. We capitalize on the fast-moving pace of news articles to uncover systemic risk implications of bank interconnectedness. Overall, text-based networks provide an alternative to traditional approaches in real time and with a narrative behind connections.

Disclaimer: The views expressed in this paper are those of the authors and do not necessarily reflect the views of the Federal Reserve Bank of Richmond or the Federal Reserve System.

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