



Variance decomposition networks: Potential pitfalls and a simple solution **Discussion**
Conference on Network Models and Stress Testing for Financial Stability



What is the paper about?

- The paper uses market information (returns) to infer the underlying network structure in a financial system
- The paper uses variance decomposition networks for quantifying and ranking individual institutions in terms of systemic risk.
 - The impact of one firm on the network, or its systemic importance, is proportional to its contribution to the generalized forecast error variance decomposition (GFEVD) of the other firms.
 - One edge measures the impact of the first firm on the GFEVD of the second firm, and the second edge measures the opposite.
- The paper proposes an improvement on the previous work by Diebold and Yilmaz (2015)
 - The contributions do not add to unity
 - This makes difficult to interpret the shocks to the system (errors are correlated)
 - How to assess systemic contribution over time? (total contribution changes over time and also individual contributions)
- The improvement comes from using the Lanne and Nyberg (2016) decomposition

Strenghts of the paper

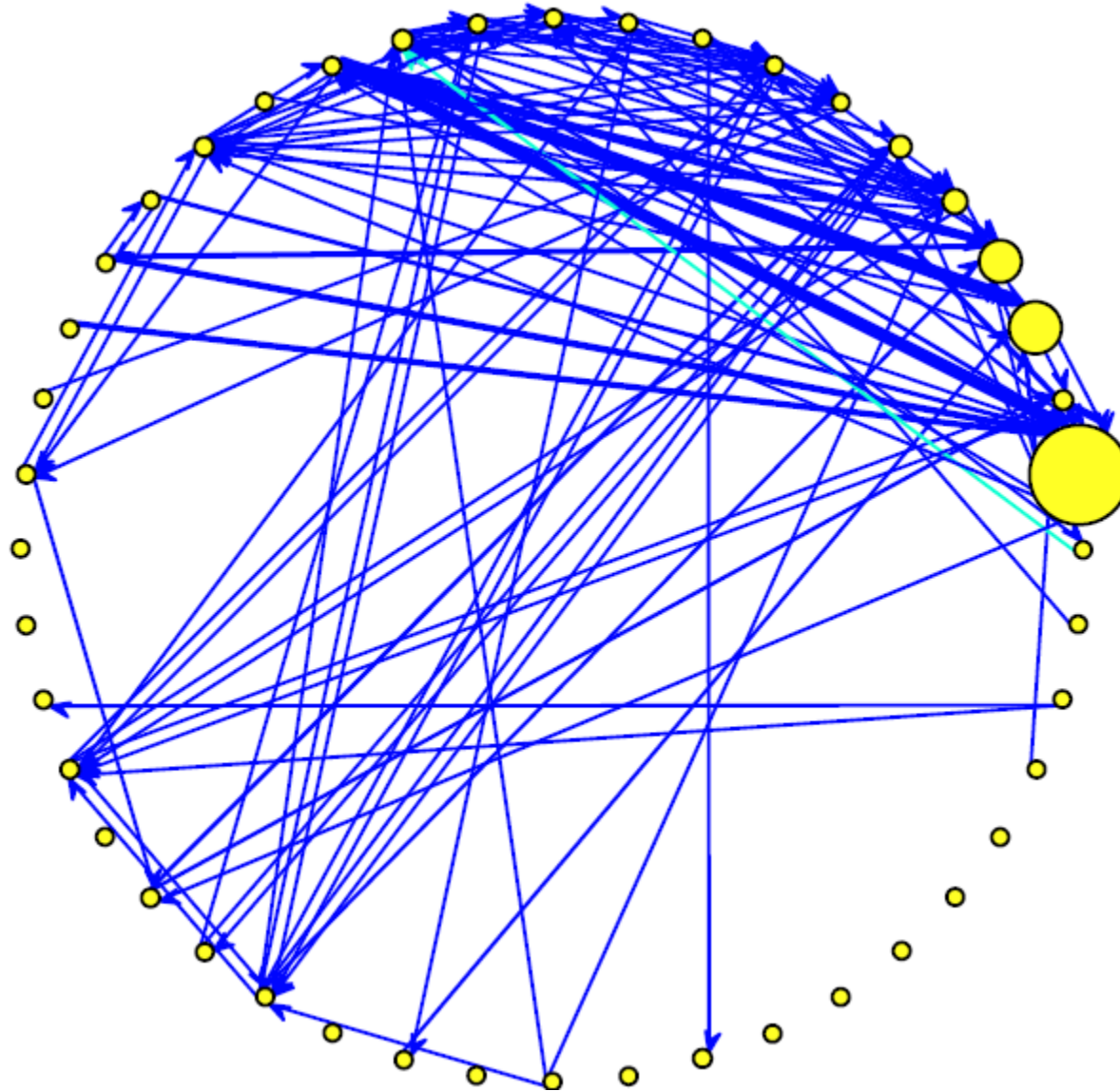
- The paper is very clear on its contribution
- The paper proposes a way in which an interesting application of variance decomposition networks for systemic risk purposes can be improved
- To use market information can help to overcome some data issues which are always present for non supervisory reseachers
- This opens a new line of research as we can study the complementarity between networks built with supervisory data and networks built with market information.

Comments

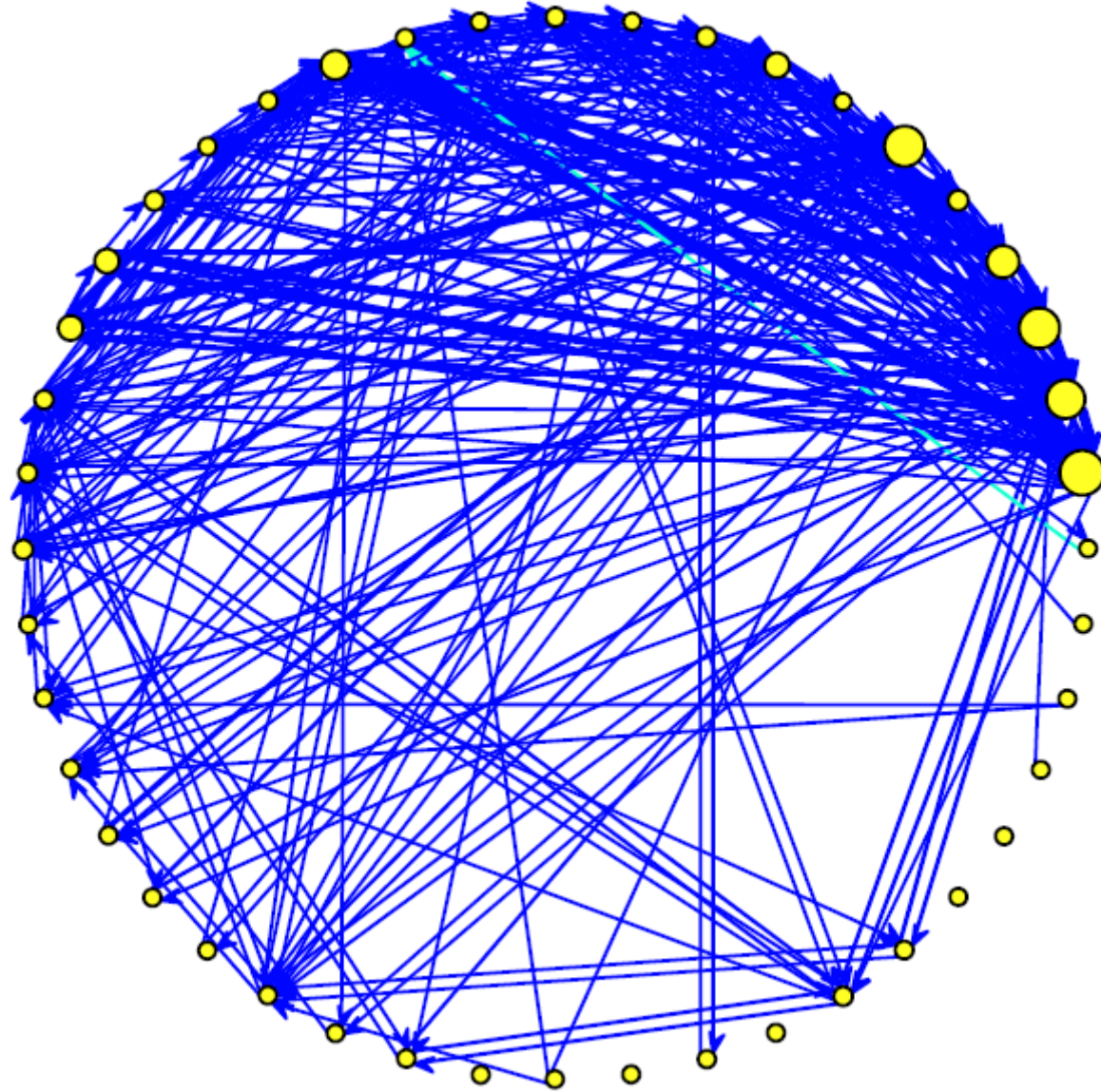
I have three main comments:

- Interconnectedness in the financial system depends a lot on the market that one uses; for example: call money, derivatives, securities, common assets, etc.
- A comparison is needed with other market based constructed networks or metrics
 - The classic ones (correlation networks) by resorting to centrality and then compare the rankings ranking
 - CoVaR network
 - ES, Engle et al.
- The proposed measure (if not used for the ranking) is difficult to interpret “economically” unlike DebtRank centrality for exposures networks.

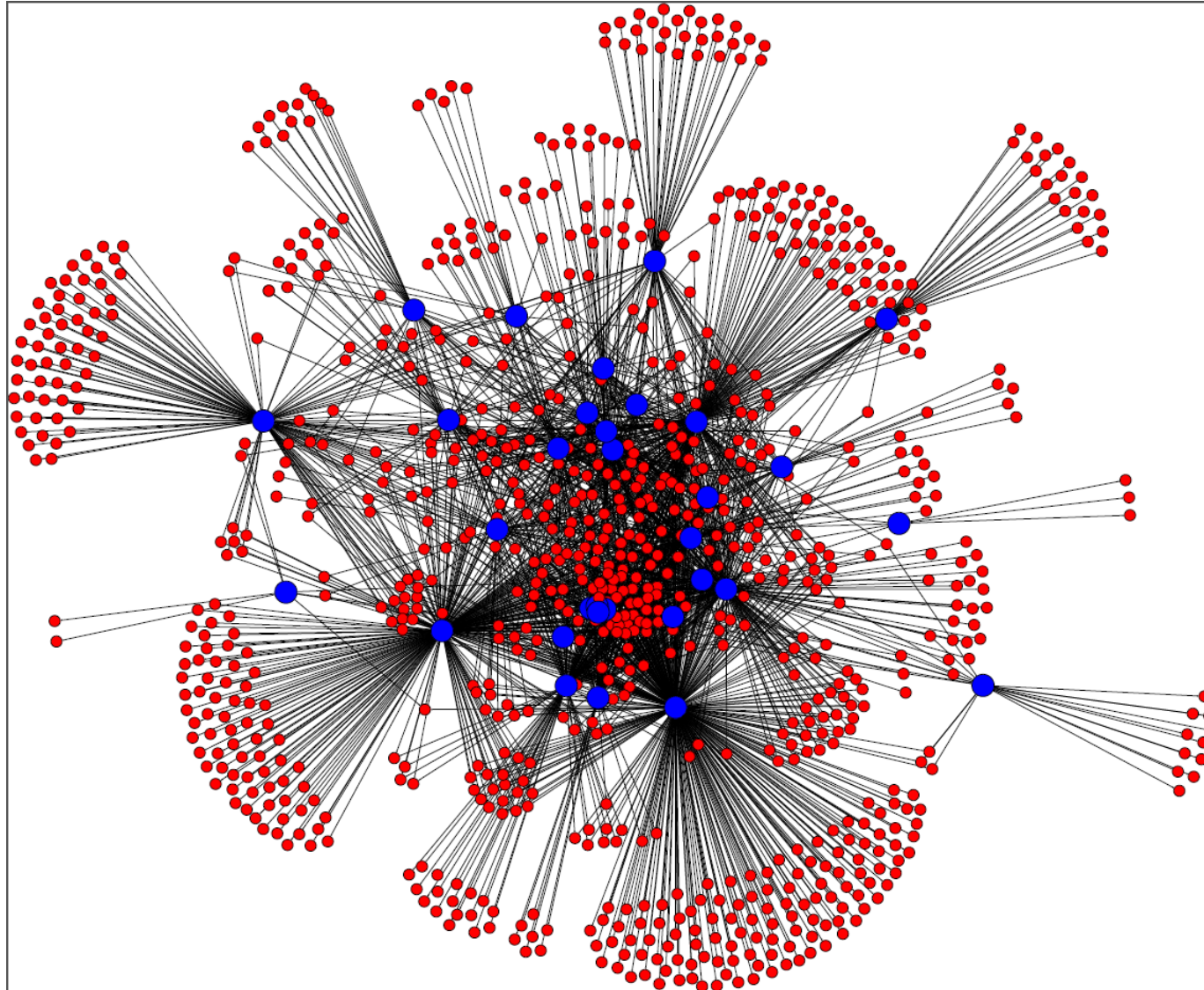
Interconnectedness I



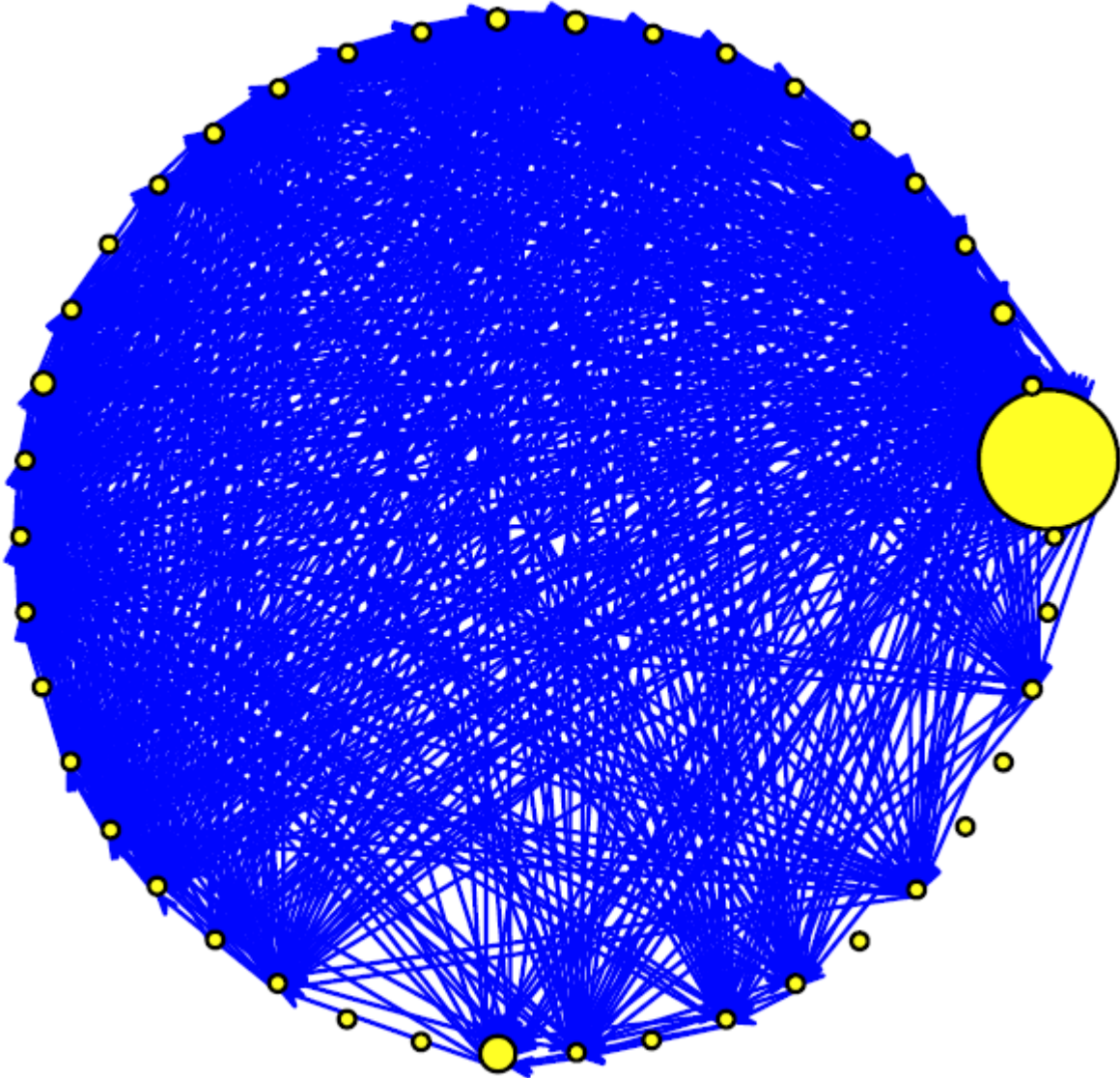
Interconnectedness II



Bipartite network



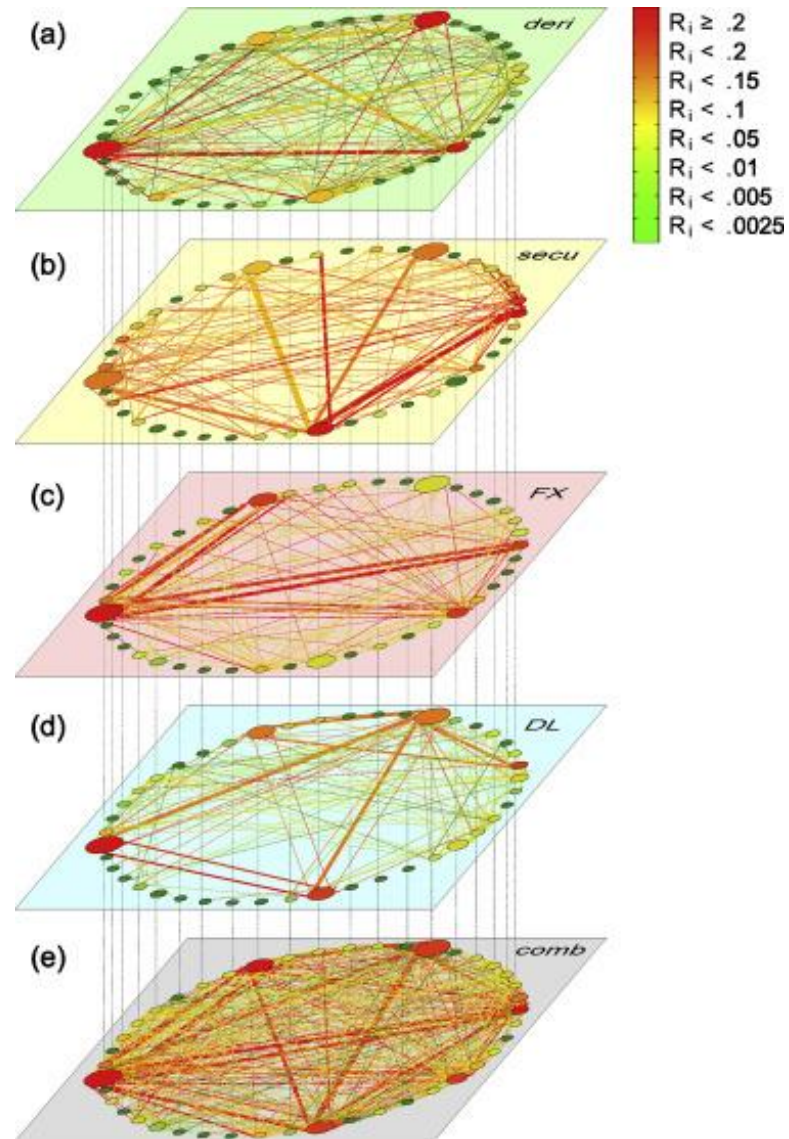
Interconnectedness III



Why multilayer networks?

- What about multiplex/multilayer networks?
 - You can use different correlations as is done in Musmeci et al (2017)
- I don't know (still)
- Why not?
- Because financial institutions interact in many markets and play different roles on each market.
- Because we have many channels and forms in which contagion can be transmitted.
- Because, we have contagion on the asset side of the balance sheet, contagion on the liability side and common assets contagion. This is very hard to disentangle with networks built on market data
- Contagion travels throught the network(s) in the form of prices, haircuts, funding withdraw, etc.

Multilayer network of exposures



Minor comments and a question

- Given that there are important differences on the two methods compared, we need a third opinion.
- I would like to really like to know how this method is compared to more standard mechanisms like Partial Correlation Networks or Granger Causality Networks.
- A topological description of the networks and their evolution is desirable (at least for me) in order to understand the object we are dealing with.
- Wouldn't be posible to use filtering techniques? This basically only to get rid of the noise.
 - Minimum Spaning Tree
 - PlanarMaximally Filtered Graph (PMFG). Starts from the fully connected graph and uses a greedy procedure to obtain a planar graph that connects all the nodes and has the largest sum of weights.



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