Multiplex network analysis of the UK OTC derivatives market
by Bardoscia, Bianconi & Ferrara
Discussion by

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November 16, 2018

Economics of Payments IX, Basel

Disclaimer: The views presented are mine and do not necessarily represent those of the Bank for International Settlements
Overview

- **[1] Data** Put together very granular data for the three largest derivatives markets (IRS, CDS, FX); study the properties of the resulting network/s
  - Financial multiplex networks (Poledna et al ‘15; Bargigli et al ‘15; Aldasoro & Alves ‘18; Montagna & Kok ‘18)
  - Trade repository data (Abad et al ‘16; El Omari et al ‘18)

- **[2] Centrality** Extend the Iacovacci et al ‘16 centrality measure to weighted networks (Functional Multiplex PageRank) and compare it to a competing measure

- **[3] Contagion** Extend the contagion mechanism of Paddrick et al ‘16 to study liquidity contagion after VM shocks (Eisenberg & Noe ‘01; Heath et al ‘16)
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- Breadth of the paper impressive (data, centrality, contagion)
- Well written, careful analysis
- Work with TR data: hats off!
- But ...
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Data - From Trade State Reports to usable data

- I was expecting *much* more detail on the data
  - TR data are a *diamond in the rough*
    ⇒ Unless you polish it (and document the polishing!) people might see a *stone* rather than a *jewel*

- How much of the raw data you have to discard and why?
- Quality issues? Quality checks using double reporting obligation for UK counterparties?
- Matching between TRs (critical for IRS, ie LCH)?
- Unit of observation: LEIs? Analysis at entity level or some consolidation done? Why/why not?
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- Not entirely clear how networks are constructed
- “aggregate net mark-to-market value of the outstanding contracts”
  - I have no reason to believe that you construct MTM yourself as Paddrick et al ‘16 do
  - How confident are you in the quality of data on MTM?
    ⇒ In Abad et al (2016), using a superset of your data as of Nov15, we find that about 20% of raw data useless on account of MTM alone
  - Net of what? Collateral? (if so big red flag; netting sets, quality of data especially before RTS/ITS in Nov17)
  - If position between \( i \) and \( j \) is ITM for \( i \) then it is OTM for \( j \), so matrices built from this are antisymmetric (against claim of directionality in the paper)
  - My guess: entry \((i, j)\) of any given matrix is given by \(\max\{0, MTM_{ij}\}\) (this also goes against directionality, and most importantly, the reader should not have to guess this!)
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Data - Descriptives

- Low clearing in CDS makes me suspicious (Aldasoro & Ehlers ‘18)

- Suggest to look at number rather than % of institutions active in 1/2/3 layers (Table 3; role of dealers and CM)
- Which type of institutions?
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Clearing rates on the rise, regardless of the measure used

In percentage points, end of period

Unadjusted vs adjusted based on notional amounts

Unadjusted clearing rates based on various measures

1 Calculated as TNAO vis-à-vis CCP/TNAO, where TNAO denotes total notional amounts outstanding.
2 Calculated as (TNAO vis-à-vis CCP/2) / (TNAO – (TNAO vis-à-vis CCP/2)).
3 Calculated as total gross market values vis-à-vis CCP/total gross market values.
4 Calculated as total net market value vis-à-vis CCP/total net market value.

Source: BIS derivatives statistics.

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Centrality

- Extends Functional Multiplex PageRank to weighted networks
- Shorten the discussion of eigenvector versus PR centrality (made extensively before)
- Suggest to ↑ the economics and ↓ the technicality
  - What makes FMP suitable in economics terms? Centrality usually reflects a process in the network; how does your measure reflect a meaningful economic process?
  - In other words, starting point should be: what is it that you want to capture that made you develop the measure? and, how well does the measure capture this?
  - How does interaction between PR in single layers, aggregated layer and “full multilink” layer add to our understanding?
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VM shocks drawn from N distribution (Heath et al ‘16)

Pre-default analysis (no waterfall)

But, ideally, include IM as in Paddrick et al ‘16

Why consider only network of CCPs and CM?
  ⇒ Key finding of Paddrick et al ‘16 is most problematic players are non-CM with highly unbalanced positions

Model seems designed for one CCP; how many do you have? how do you map model and data in this regard?
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- How does distress propagate from one layer to the other?
  - Systemic players as those that are key to this propagation?
  - Shock one layer at a time?
- Insights additional to market size? (deficiencies by market seem proportional to size, Fig8)
- “it is possible to show that (18) leads to the same aggregate payments that we would get if we aggregate all the VM payments across all layers from the start”
  - Value added of multiplex analysis?
  - Any non-linearities in aggregation of stress?
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  ▶ Shock one layer at a time?

Insights additional to market size? (deficiencies by market seem proportional to size, Fig8)

“it is possible to show that (18) leads to the same aggregate payments that we would get if we aggregate all the VM payments across all layers from the start”
→ Value added of multiplex analysis?
→ Any non-linearities in aggregation of stress?
THANK YOU FOR YOUR ATTENTION!

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