Network Contagion To-Dos and Comments

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July 11, 2018

To-Dos

- Read through paper and update anything deprecated (hasn't been done in a little while)

- Use new FOCUS reports data to refine our dealer nodes (at the very least, get specific β values for Goldman Sachs and Morgan Stanley, to eliminate the need for the aggregate dealer nodes).

- Improve the catch-all 'Other' category, or remove it entirely. We're convinced that the firms being selected as representative of that sector's default probability are not great representations.This will change the final NVI values quite a bit, as that category has the highest default probabilities now. Could start at flow of funds documentation and see where they get their data for some of the sectors we lump into 'Other'.

  - One idea that we discussed is to only assign the 'Other' category a magnitude of assets equaling the total assets of firms selected to fit that category from the KMV dataset. This will prevent us from assigning huge numbers of assets to a relatively small sample of firms (which is what we currently do).

- Address Joao's comments:

  - Do worst case scenario over whole sample (e.g., for each bank, pick worst prob of default over sample and assign that prob for the whole sample)
  - Do not speculate about mortgages becoming riskier as explanation
  - Must explain why a simple weighted average of prob of default does not tell the whole story – otherwise, why do we need the whole NVI and all the work? Maybe not even show that graph in main text since it invites these questions
  - Just like we plot a case with constant delta, can we plot a case where the effect of delta moving but nothing else moving is shown?

- The benchmark should be that non-insured deposits are outside the network, then do robustness (since most are corporate deposits)
- The small network example is good, keep using those numbers to illustrate throughout
- When we define δ_i, it is confusing (need to make clearer it is just due to shocks)
- When we introduce contagion index, must explain that it is equal to dollar amount of intranetwork liabilities; then explain why it is increasing in each of the three components (for example, why is the contagion index increasing in net worth? That doesn't seem to make sense unless you explain high net worth reduces contagion through lambda, but given lambda, it increases it due to size, but it cancels anyway)
- When we say "We define a frim's quarterly EDF measure to be the average of its daily measures over a given quarter.", it is confusing since it is not clear if it is quarterly prob of default or annual prob of default at quarterly frequency (and why pick annual EDF?)
- Maybe acknowledge that NVI does not predict rising vulnerability pre-crisis, or compare to how it does with other measures (like Co-VaR, srisk) [[Note: When I ran some cross-sectional predictive regressions for my fire-sale project and included the contagion index, it did really well, we should go back and look at those results]]
- When we show bank-specific plots, mention that acquiring a financial firm does increase outside assets if the acquired firm has outside assets
- How much does size matter? Measure seems to be all ratios (beta, NVI, etc are ratios). Most systemic risk measures boil down to size, but ours does not seem to do so, which is nice if we can document it
- Default is very binary: you either default and haircut liabilities, or you don't. In the real world, as prob of default increases, there are consequences/changes. Risk goes up. Value of liabilities goes down, even without default. Counterparties do not roll over debt. By the time you default, a lot of the action may have already happened, and the measure also misses all of it. Can we somehow incorporate that? Or think about that? [[Note: can use the glasserman "loss of confidence" case?]]
- What defines who's inside and outside the financial network in the model? How much does it matter both theoretically and empirically?
- Why do you break down Top 10 and Top 25 broker-dealers in the contribution by sector plot (or in the weighted avg of default)? They are all broker dealers after all

- Simulations

  - Decide where this all fits in the paper.

- Run and interpret simulation results with different bankruptcy costs.
- Run simulations that minimize the different between the NVI and the actual ratio of expected losses (as tight as we can get)
- Re-derive the gradient for the beta distribution where $\alpha = 2$. I was having some trouble making this work in closed-form.

Comments

What follows are comments and explanations of several of the more-nuanced data decisions made in the process of writing the paper, which may be difficult to glean solely from looking at the code. I would recommend reviewing this section before undertaking any major overhauls of the code, to at least see why things are set up their current way.

- The β^+ for the benchmark NVI is selected from a sample of 22 major system nodes - 20 belong to major BHCs in the FR-Y9C sample, and 2 are broker-dealer aggregate nodes compile from SIFMA aggregate FOCUS report data (Model_series_processing.do).

- We currently use KMV versions 9 default probability data. Using version 8 instead causes some substantial differences (Update_Data.do).

- Matching between the FR-Y9C to the KMV dataset has a number of steps. RSSID numbers for BHCs are taken from the FR-Y9C data from FI. An RSSID-Permco matching is taken from data posted online by FI. A Permco-CUSIP match is pulled from CRSP, which we access through WRDS. The CUSIP is provided in the KMV dataset, so this is merged to find the MKMVID (Match_RSSID_MKMVID.do).

- Early in the project, we had a problem where the quantity of uninsured deposits estimated in a BHC's commercial bank Call Report filings exceeded the value of domestic deposits in the parent BHC's FR-Y9C filings. This led to strange negative values of insured Y9C deposits. To fix this issue, we now take the estimate of insured deposits from the Call Report, then subtract that from the FR-Y9C domestic deposits numbers to obtain an estimate for uninsured deposits (CallDeposits.do and Analysis_Y9C.do).

- [Call Report matching]

- Analysis_Y9C.do

  - The KMV default probability data comes at a daily frequency, which must be aggregated to the quarterly level to use with our balance sheet data. We currently use the end-of-quarter value, but have used the mean in past iterations. (Analysis_Y9C.do)

- We remove KMV default probability data of firms that have filed for bankruptcy, according to Moody's drd database. If a firm in our sample files for bankrupcty at any time in our sample, then that firm is excluded for the rest of the sample. Bankrupt firms will remain in the sample for the quarter in which they file for bankruptcy, but their last quarterly value will equal their default probability on their last day before bankruptcy filing. (Analysis_Y9C.do)

- We currently do **not** filter out daily default probability data just because the probability exceeds some pre-defined threshold. We pursued this at one point, and decided that this would lead to removing too many legitimate default probabilities. (Analysis_Y9C.do)

- The current benchmark NVI excludes FDIC-insured deposits and foreign deposits from a firm's inside-system liabilities. (Analysis_Y9C.do)

- ffunds.do

  - The 'Other' category's assets are made up of the Flow of Funds assets for ABS issuers, credit unions, funding corporations, and finance companies (i.e. the remainder after we account for things we can easily see in KMV)

- compile_agg_sector_data.do

  - While this script includes some code for a potential "Mutual Fund" aggregate sector node, that node does not currently factor into the final NVI calculation. This was done earlier in our process, before we decided that those assets really ultimately belong to households, not the financial system. Code is kept around in case we change our mind, though.

  - Our classifications of financial firms are determined wholly from the mkmvind_name_desc variable.

  - In our aggregate sector node compilations, we include any companies incorporated in the US, Bermuda, or Cayman Islands (chartered?)

  - For some firms, total assets do not appear in the KMV dataset every quarter. In this case, we linearly interpolate between the quarters we have data.

  - Merrill Lynch has a strange duplicate firm in the KMV dataset with huge default probabilities and identical assets (MKMVID = N04946). This ghost firm is deleted in our analysis.

  - Merrill Lynch also seems to appear in the KMV database for a few quarters after their assets are assumed by Bank of America. Merrill is removed for the quarters when this seems to be the case.

  - The 'Other' category's probability of default is currently computed from the firms whose mkmvind_name_desc equals Investment Management, Finance NEC, or Finance Company.

– While the aggregate SIFMA dealers data is used for asset and liability breakdowns for the Top 10 and Top 11-25 dealer nodes, we still use KMV data to come up with those nodes' default probabilities. We compile those numbers based on the asset-weighted average default probabilites for "Security Brokers & Dealers" that are appropriately ranked per their assets, as recorded in the KMV balance sheet asset variable total_assets_current_amt. These values **include** firms that are also included in the FR-Y9C sample.

– For other aggregate sector nodes (Other, Insurance, REIT), firms that appear in the FR-Y9C sample are **excluded** from the calculation of that aggregate node's average default probability (i.e. their weight is set to zero). In theory, that firm's assets should also be removed from the total assets assigned to the aggregate node, although we are **not** doing that in the current iteration of the NVI.