On the Origin of Systemic Risk

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Interconnectedness and Systemic Risk

The notion of “interconnectedness” became very popular with the GFC.

Interconnectedness is important for regulation:

- Financial Stability Board → G-SIBs
- FSOC → designation of nonbank SIFIs

“Systemic Risk” also became popular with the GFC.

The paper uses several tools, including interconnectedness, to propose a new measure of systemic risk.
Several Contributions

- Definition of Systemic Risk
- Model
  - Trigger in the real economy
  - Banking sector
  - Interconnectedness and correlations
- Data

I like the paper → path forward
Comment 1: Defining Systemic Risk

Equation (4) \( SR = Pr \left( \frac{D_t}{N} > \bar{D}|_{t-\Delta t} \right) \)

\( SR \rightarrow \) how many banks are in distress (or fail)?

Assume two banks, \( j \) and \( i \), are connected. If bank \( j \) is experiencing large losses above a threshold \( s \), we have:

\( Pr \{ i > s | j > s \} > 0 \)

The conditional expected number of bank crashes given the collapse of at least one bank, can be written as

\[
E \left\{ \kappa | \kappa \geq 1 \right\} = \frac{Pr\{j>s\} + Pr\{i>s\}}{1 - Pr\{j\leq s, i\leq s\}}
\]
Comment 1 (cont’ed)

In other words, the conditional probability of both banks crashing given that at least one bank lost more than $s$, can be written as:

$$E\{\kappa | \kappa \geq 1\} = Pr\{i > s | j > s\} (+1)$$

Hartman et al. (2004) call the above equation the “extreme linkage indicator”

Is the concept of systemic event, $E_t$, similar to the extreme linkage indicator?

How does the SR definition in (4) relate to the extreme linkage indicator?
Comment 2: Sequencing of Events

Model has two components:

- shocks from the real economy
- multi-layer contagion in the banking sector that transmits and amplifies initial shocks

1. Losses are transmitted via long-term interbank linkages
2. Then, via short-term interbank linkages
3. Security sell-off (firesale)

Long-term exposures can be held until maturity
A bank in financial distress usually seeks oxygen in short-term funding markets
Comment 3: Network Dynamics

Four adjacency matrices:

1. $M_{lt}^t$: long-term interbank exposures network
2. $M_{st}^t$: short-term interbank exposures network
3. $M_{re}^t$: exposures of banks to real sector
4. $M_{sec}^t$: exposures to securities sold to get liquidity

In a systemic event, networks change. There is limited dynamics in the setup of the model. For example, $M_{st}^t$, exposures of distressed banks become zeros – no possibility for a bank to access the interbank market and/or the lending facility.
Comment 4: The Central Bank

Central bank interventions play an important role in crises

- Mitigating effects on all markets
- Reduce the number of banks in financial distress

There is no central bank in the model
Comment 5: Benchmark

Results are compared to

- the ECB Composite Index of Systemic Stress (CISS)
- average CDS spreads of EU banks

The motivation of the paper and of the Systemic Risk measure is to capture the percentage of distressed banks (Figure 1)!
Comment 5 (cont’ed)
Comment 6: Explaining the Results

Correlations seem to be an important source of systemic risk. The interesting question is WHY?

- Is it because of a lack of investment opportunities?
- Or is it because of regulation?
Comment 7: Policy Implications

It is unclear how the paper’s approach helps identifying new sources of systemic risk.

- Can it be used for warning about future (out of sample) crises?
- Would this approach have identified pre-crisis development of banks off-balance sheet ABCPs as contributing to systemic risk?
- Would this approach have identified pre-crisis development in the shadow banking sector as new source of systemic risk?

Can the proposed approach help policymakers keeping track of vulnerabilities?
Comment 8: Popcorns or Dominos

Are the failure in $SR$ an example of popcorns or dominos?

My intuition is that the proposed $SR$ is capturing both.

What is driving the popcorns?
What is driving the dominos?