Discussion of
"A Framework For Modelling System-Wide Stress Dynamics"
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Short Summary

- Banking stress-testing model: bottom-up, agent-based modeling

- Rich framework for analyzing interaction of 2nd round effects : substitute/complements?

- Types of financial institutions (FI):
  - heterogeneous banks (B),
  - hedge fund (HF),
  - asset manager (AM),
  - cash provider (CPr),

- Types of contracts between FIs:
  - collateralized debt (repo) ;
  - unsecured debt (interbank loans);

Short summary: modelling assumptions

- Markets:
  - Interbank loans (B → B)
  - Repo (B, CPr → B, HF)
  - Common assets (B, HF, AM)
- Scenario: shock to the value of sub-prime MBS (held by "universal bank")
- Behaviors of agents:
  - B maintain liquidity ratio, then leverage ratio :

    sell HQLA> reduce repo >reduce I/B lending>sell other assets;
  - HF maintain leverage ratio: sell assets proportionally;
  - CPr cut funding if leverage ratios of B drop (exog.)
  - AM sell assets proportionally if face redemptions, i.e. asset values drop sufficiently (exog.)

Short summary

- Amplification mechanisms:
  - fire sales
    - MTM accounting (B, HF, AM);
    - collateral de-valuation (B, HF);
  - collateral requirements
  - liquidity withdrawals
    - investors of AM,
    - depositors/repos/interbank loans of B

Short summary: main results

- Amplification mechanisms are non-linearly dependent on initial shock (min threshold)

- Shock propagates with different intensity: commercial bank is less affected than investment bank or asset manager (but not hedge fund)

- Asset managers amplify losses of investment banks

- Hedge funds amplify losses of commercial banks but shrink losses of investment banks

- Fire sales – necessary for propagation of losses

- Results are more sensitive to equity regulation rather than liquidity regulation.

Evaluation: implications for financial stability

- High importance for macro-prudential stress-testing

- *2007-09: Would it be the same crisis without shadow banking and market complexity?*
    - AIG, SIVs, rating agencies
    - instability of MMFs and maturity mismatch → run on repo and ABCP,
    - difference in regulation between investment banking and traditional banking (Bear Stearns and Lehman Brothers),
    - lack of high quality collateral;

- *2017: more non-bank FIs (regulatory arbitrage/fin. innovation) and more interconnected financial system*

Evaluation: implications for financial stability

- *Paper highlights importance of considering liquidity considerations*
  - Credit crunch of interbank and repo market --> core systemic risk implication
  - Repo market: need for high-quality collateral
    "Do I sell or do I repo?"
  - Impact of LCR on financial stability of banks and other FIs
  - Impact of MMF reform on overall systemic risk

Comments: nature of repo contracts

- This paper: _network approach_ =bilateral repo exposures are stable, agents make rollover decision similar to interbank loans

- Suggestion: use _market approach:_ less about relationships, more about supply/demand
  - Repo is mostly short-term → network is likely to change fast
  - Collateral reduces importance of long-term relationships (credit risk)
  - Can you observe stable repo network empirically?

- _Market liquidity and competition_ effects should be captured: institutions bid more aggressively to secure funding, lenders pull back liquidity from the market

Comments: nature of repo contracts

- Why do you need *banks to intermediate repo* contracts from CP to HF? BNYM and JPMC?

HEDGE FUND ← Provide repo funding to ← INVEST. BANK ← Provide repo funding to ← CASH PROVIDER

- *Re-hypothecation* – clarify the mechanism (operational risk if "fail to deliver")

- Motivation by "*tri-party repo*" is questionable: mostly stable margins and amount of funding during 2007-09*, different from "margin spirals" on bilateral repo market**

*Krishnamurthy, Nagel, and Orlov (2011), Copeland, Martin and Walker (2011)
**Gorton and Metrick (2012), Copeland, Martin and Walker (2011)

Comments: granularity of balance sheet

- This paper: introduction emphasizes benefits of using *individual contracts* relative to *aggregated exposures*; however simulation is lacking many b/sheet details

- Shed lights on benefits of very *granular data*? Is it realistic? Do we want to capture trend or a moment in time?

- *Flight-to-quality* is not captured
  - FIs should prefer borrowing using HQLAs
  - in real life, scarcity of high quality collateral drives margins up
  - to capture, need to abstract from fixed asset portfolio

- With more flexible balance sheets (*strategic fire sales*) → expect smaller losses

Comments: modelling incentives of FIs

- Model is very sensitive to calibration:
  - predictions are frightening: 10% loss in MBS → ~85% equity loss for three FIs
  - E.g. run-off rates should depend on the solvency of the borrower (currently funding rate, withdrawals and run-off rate are not consistent)
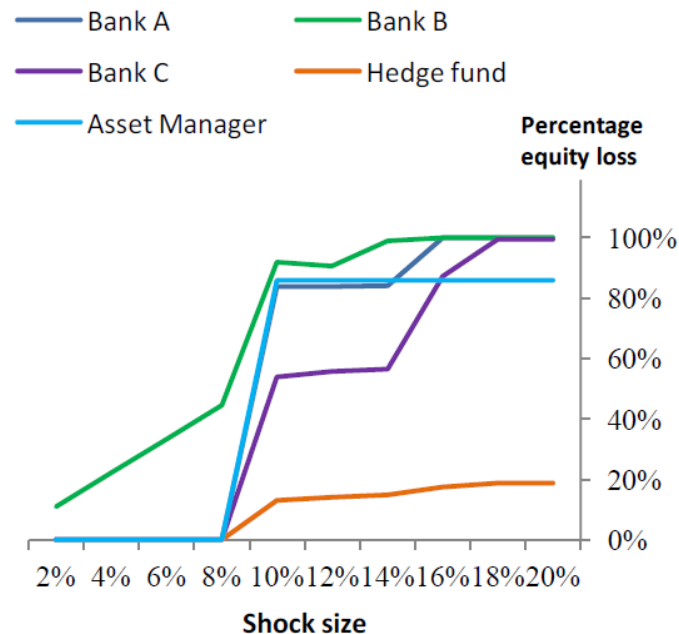
Comments: modelling incentives of FIs

- Keeping up with promises in the Introduction:
  - Why would someone buy discounted assets?
    - *profitability should drive behaviors* in addition to solvency and liquidity (now rates are not modelled)
  - *LCR requirement* should be well-specified
    - only cash outflows but not inflows are modelled
    - will a bank sell equities instead of gov. bonds to satisfy LCR?
    - weighted assets should be included

Other comments

- Emphasize role of information
  - Currently hedge fund experiences smaller impact than other FIs,
  - Currently fire sales drive the results,
- Propagation of shock between asset markets: equities are sold → bond prices are impacted
- More standard approach to networks
  - Eisenberg and Noe (2001) as an alternative to LGD=1→ smaller losses

Concluding remarks

- Agenda and framework for banking ST modelling

- Numerical example with different FIs and contracts

- Important contribution: model captures more market complexity than usual, accounts for different regulatory frameworks and business models of FIs

- Future work: reduce calibration error by modelling incentives more precisely, verify assumptions about relationships of FIs, be more specific about regulatory requirements

- Follow the long-term plan proposed by the authors

Thank you