Discussion of "High-Frequency Analysis of Financial Stability" by M. Gofman, S. Jafri and J. Chapman

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Overview (1)

- **Aim:**
  - Paper proposes **high-frequency** measures of financial (in)stability using data on payments and bilateral credit limits (BCLs) from the Canadian LVTS
  - Examines the impact of Lehman's failure on the Canadian LVTS

- **Canadian LVTS**:
  - Hybrid system with both RTGS (Tranche 1) and DNS (Tranche 2) functionalities
  - In DNS mode, banks specify BCLs which they can adjust intraday
  - Banks choose the settlement mode so the system can transition endogenously from a collateral-based to a credit-based equilibrium and vice versa

- **Proposed measures**:
  - Slack (i.e. available space) in the **collateral and credit** constraints
  - The fraction of uncollateralized (Tranche 2, i.e. DNS) transactions
  - Number and value of rejected payments due to binding **collateral and credit** constraints.
  - Volatility of intraday adjustments in BCLs

Overview (2)

- **Results (Financial crisis):**
  - On the two days after Lehman's default, several banks experience delays in their T1 & T2 outgoing payments due to collateral and credit constraints.
  - Due to counterparty risk, banks did not increase their BCLs to accommodate increased T2 volume
  - Temporary drop in the ratio of uncollateralized payments
  - The volume and value of rejected payments increases (peaks in 2007)…
  - …as does the volatility of intraday BCL adjustments

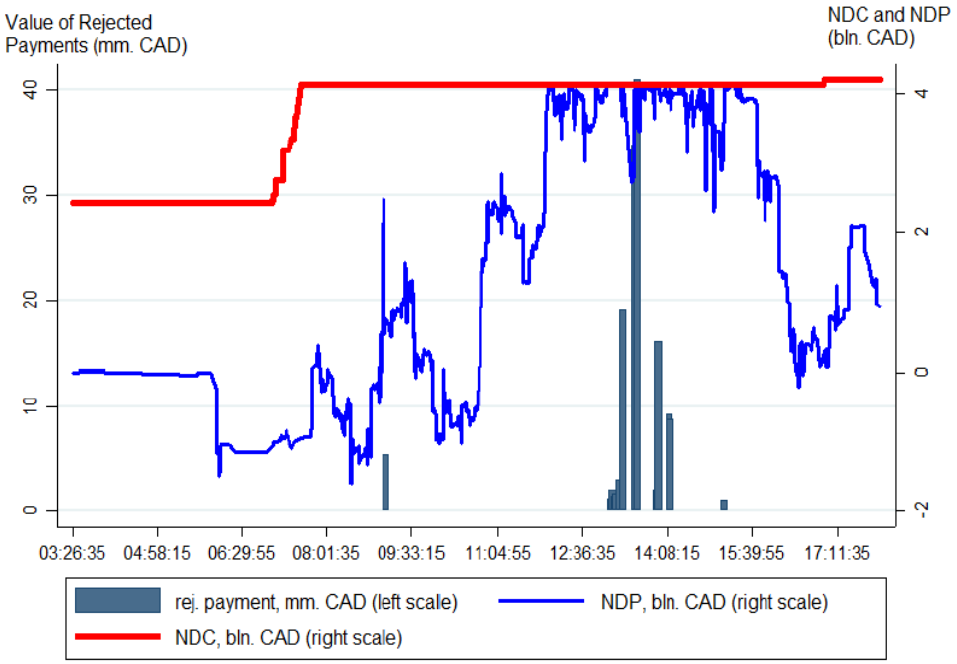
- **Results (Stressed bank incident – "Flash Crash"):**
  - A stressed bank decreased the BCLs to its counterparties so as to reduce its overall exposures
  - This led to T2 payments toward the stricken bank to be delayed or rejected
  - And was followed by reciprocal decreases of the BCLs extended to it by its counterparties
  - Two unaffected banks significantly increased their early T1 flow
  - An affected bank switched to T1 payments but significantly delayed them

First reaction

- Policy-relevant paper; the metrics the authors propose could be very useful for risk assessment & early detection of bank risk in stressful periods.
- Choice of settlement method makes the Canadian LVTS a unique testing ground for examining banks' responses to shocks
- Findings immediately give rise to interesting questions that I believe the reader would like to see explored
- The data gives plenty of scope to expand and deepen the analysis

Questions

Lehman default



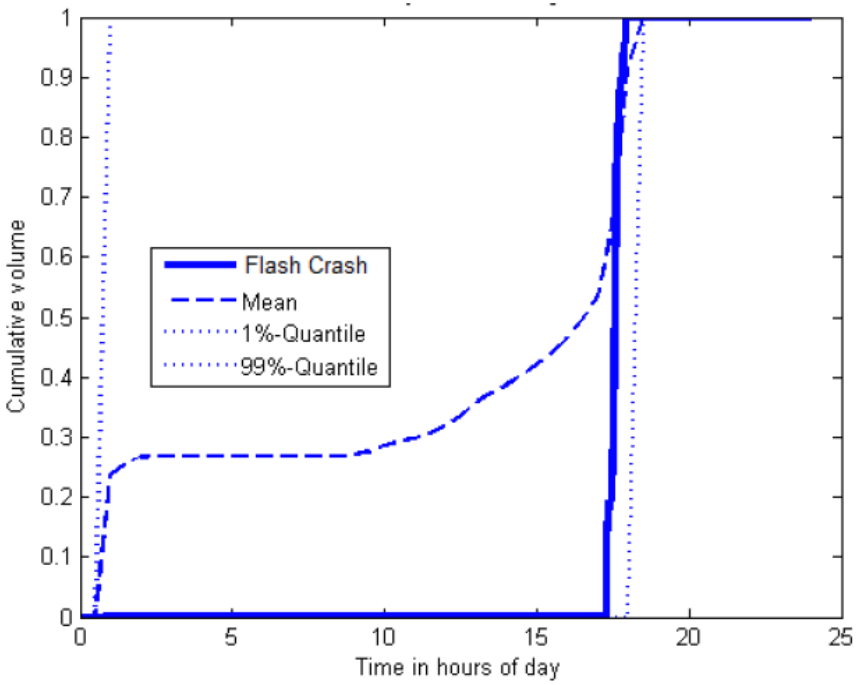
Blue line: Cumulative net outgoing T2 payments by bank B
Red line: Multilateral credit limit extended to bank B

September 16 credit constraints of "bank B":

- Why is it binding?
  - Did bank B increase its outgoing T2 pmt volume in response to own or counterparty risk?
  - Did receiving banks decrease their BCLs to B?
  - Or both?
- Why did Bank E increase its BCL to B?
- How pronounced was this across banks?

Questions

Flash Crash



CDF of T1 payments made

May 2008 activity of "bank H"

- Bank H saw its BCL to the stricken bank (B) decrease and switched to T1 pmts
  - Did bank H switch to T1 payments wrt all of its counterparties or just the stricken bank?
  - Why did Bank H delay its T1 payments?
  - Was the delay targeted at the stricken bank?

Some Suggestions

- Validate your risk measures in a more systematic way by statistically associating them with measures of bank credit risk and other controls

- Delve deeper into the economic effects:
  - How do banks respond to elevated credit risk of their counterparties?
  - How do banks respond to a deterioration of their own credit quality?
  - How well do your measures capture these responses?
  - Which constraints (collateral vs. credit) are more likely to bind and when?
  - Do rejected/delayed T1 payments to a bank make it more likely for the bank's collateral constraint to subsequently bind?
  - What is the impact of rejected/delayed payments on the receiving banks/the system as a whole?

Conceptual framework

- Good **(G)** and bad **(B)** banks make payments to/from each other
- **Normal times/G2G payments:**
  - Banks are happy to make collateralized (**T1**) payments to each other
  - Banks are happy to receive uncollateralized (**T2**) payments from each other
- **Stressed times or G2B/B2G/B2B payments :**
  - **Banks** want to **receive** collateralized (**T1**) payments from each other
    - **G** banks bc uncollateralized payments from **B** ones are risky
    - **B** banks bc they may be short on collateral or need to reduce exposures
    - *Stronger* effect as both banks can decrease the BCLs extended to the other
  - **Banks** want to **make** uncollateralized (**T2**) payments to each other
    - **G** banks bc they worry they may not receive reciprocal payments
    - **B** banks bc they may be short on collateral
    - *Weaker(?)* effect as it depends on a bank's BCL granted to it

Conceptual framework (cont.)

- **Stressed times or G2B/B2G/B2B payments :**
  - **Banks** want to **make** any collateralized (**T1**) payments with **delay**
    - **G** banks because they are concerned about counterparty risk (e.g. bank H in flash crash?)
    - **B** banks because they may be short on collateral

- Time/cross-sectional variation in **G2G** and **G2B**/**B2B** relationships offer scope for empirical tests

- Authors' metrics could be tested empirically (and thus be systematically validated) within such a conceptual framework

Testable hypotheses

- Credit constraint hypotheses:
  1. *Riskier banks should be granted, ceteris paribus, tighter **BCLs** from their counterparties*
  2. *Riskier banks should grant, ceteris paribus, tighter **BCLs** to their counterparties*
  3. ***Volatility of BCL adjustments** should be higher at times of stress*
  4. *Riskier banks should have, ceteris paribus, lower levels of credit slack (**T2Risk**) → because all their cps target them with lower BCLs*
  5. *The ratio of uncollateralized payments (**T2 ratio**) decreases with aggregate credit risk and particularly so for risky banks*
  6. *Risky banks should receive, ceteris paribus, any collateralized (T1) payments with a **time delay***

- Collateral constraint hypotheses
  1. *Riskier banks should have, ceteris paribus, lower levels of collateral slack (**T1Risk**) → because all their cps target them with lower/delayed T1 volumes*
  2. *Riskier banks should have, ceteris paribus, higher levels of own **delayed/rejected** payments*

Estimation

- Test hypotheses using panel and/or time-series models
- Estimate models over your entire sample period
- **Exploit cross-sectional dimension**:
  - Although your **measures** speak more to the time dimension, the cross-section can also be used to validate your measures e.g. while there may have been few (46) declines in BCLs from one day to the next, riskier banks may be faced with lower BCLs.
- Measures of credit risk:
  - Bank-specific: CDS spreads
  - Aggregate: Libor-OIS Spread, Intraday cost of capital (Jurgilas and Zikes, 2014)
- Control for reciprocity in setting BCLs

Some additional related literature

- Heijmans and Heuver, 2011
  - Uses data from the Dutch RTGS to construct an array of high-frequency metrics of bank risk. Metrics capture bank liquidity position, access to secured and unsecured intraday credit, collateral usage, etc.

- Jurgilas and Zikes, 2014
  - Estimates the intraday value of money which can be used as a payment system stress indicator. Intraday value of Sterling increased 10-fold during the crisis.

- Benos, Garratt, Zimmerman, 2014
  - In the wake of Lehman's default, riskier banks received payments with delay in the UK LVPS (CHAPS). Associated drop in turnover.

Thank you!