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"Determinants of Repo Haircut: Counterparty Risk and Collateral Risk"

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Discussion by Arvind Krishnamurthy, Stanford GSB, SIEPR, ABFER and NBER

Pledged repo = secured financing

“The repo buyer has possession of the collateral <u>but not ownership</u>, unless default occurs

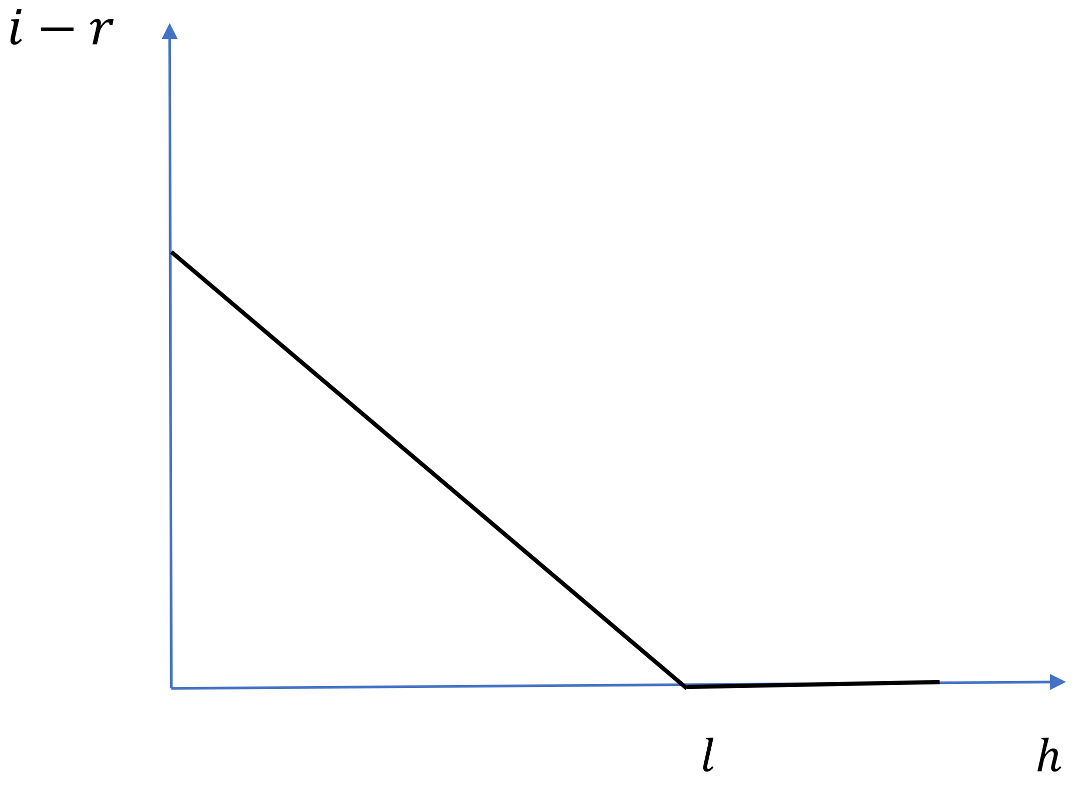
The pledged collateral is returned to the repo seller when all conditions of the repo agreement have been satisfied”

Lender pricing of secured financing

- p = probability of default/renege
- l = %loss on collateral in default
- r = required rate of return
- h = haircut; i = repo rate

Risk-neutral lender pricing:

$$i - r \approx p \min[h - l, 0]$$



Rate vs haircut; collateral risk

- p = probability of default
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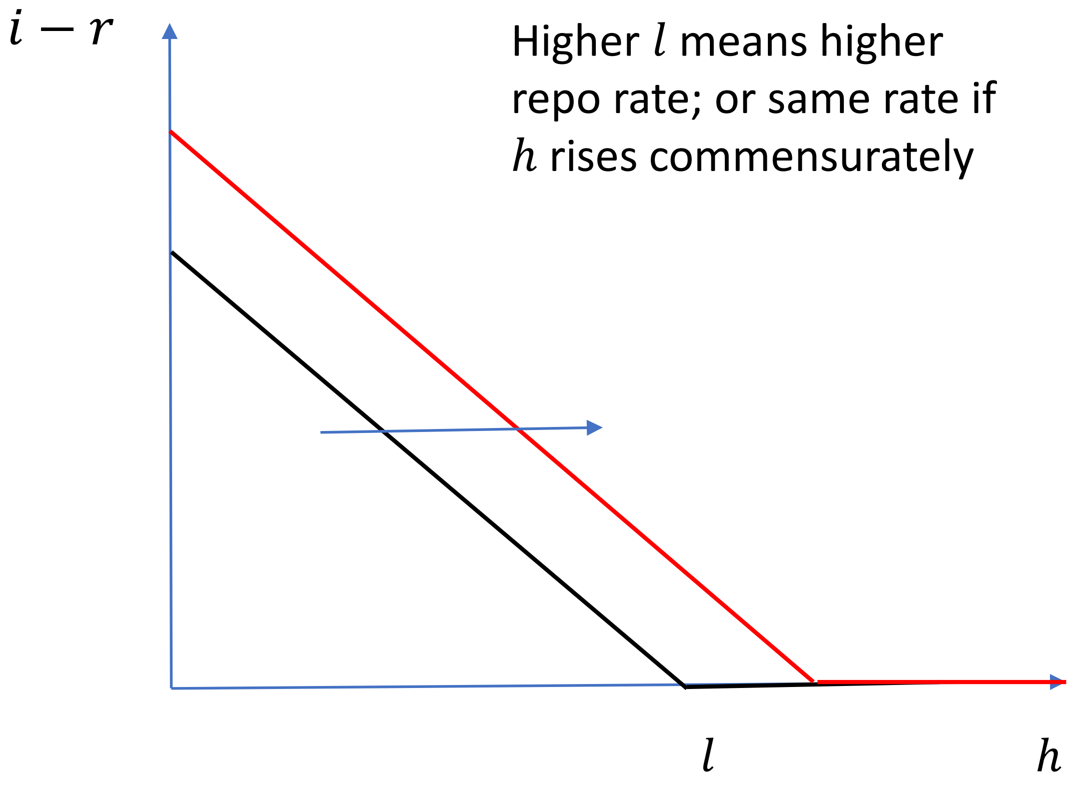
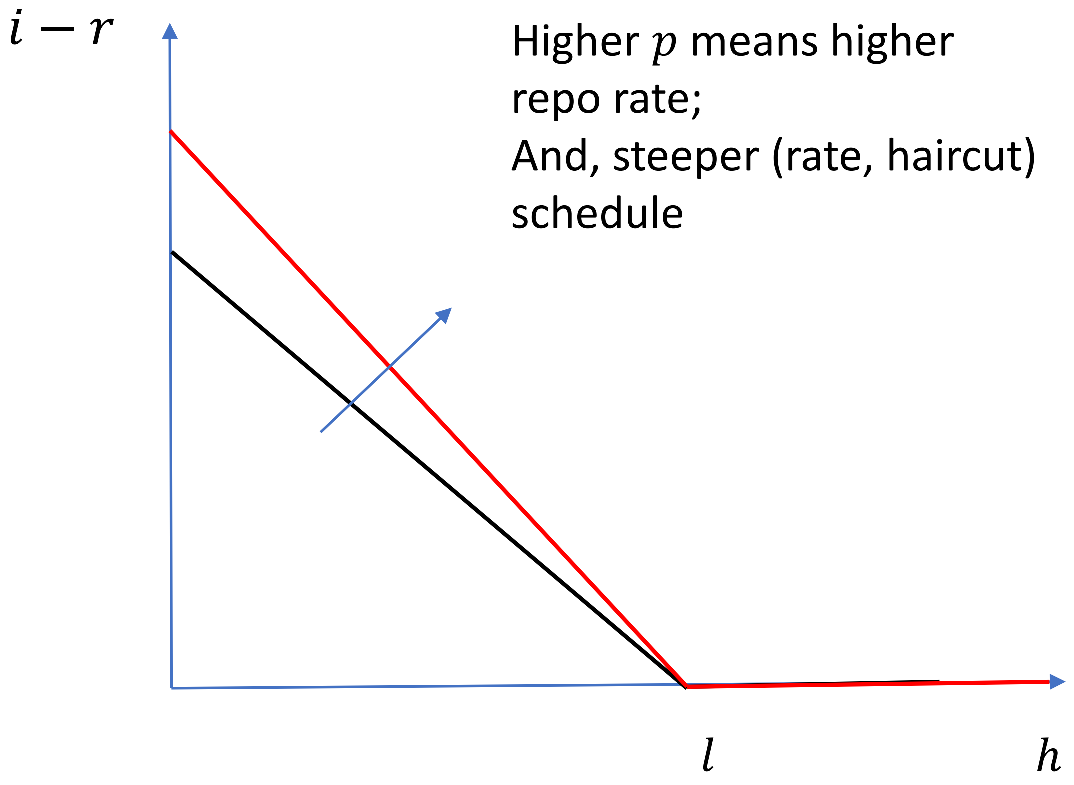


Rate vs haircut; counterparty risk

- p = probability of default
- l = %loss on collateral in default
- r = required rate of return
- h = haircut; i = repo rate

Risk-neutral lender pricing:

$$i - r \approx p \min[h - l, 0]$$

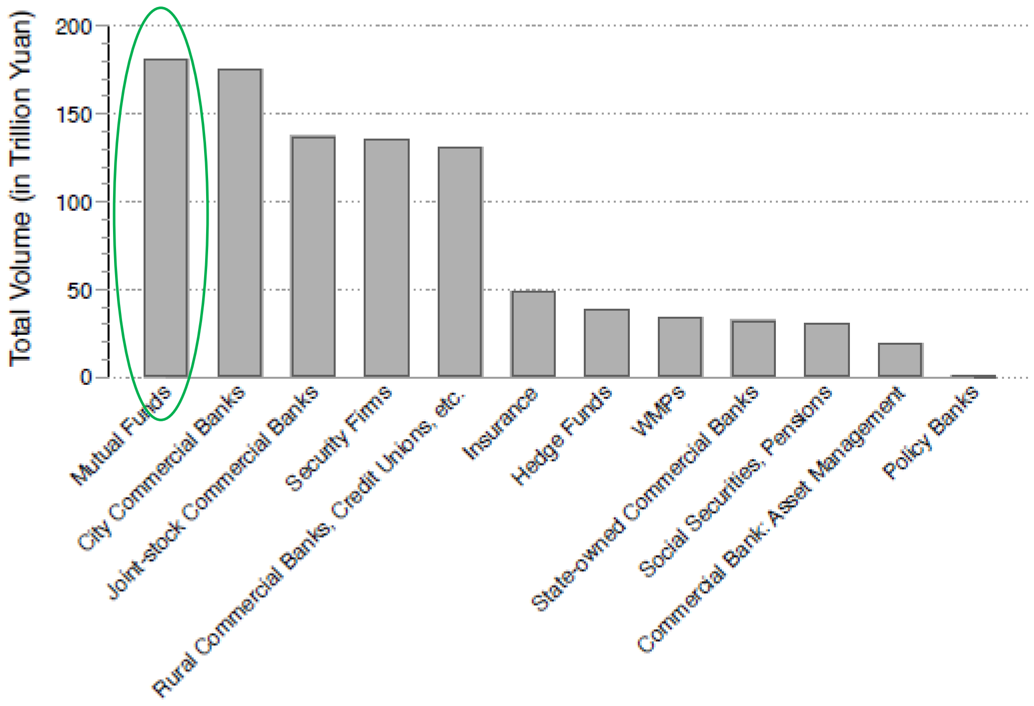


My discussion

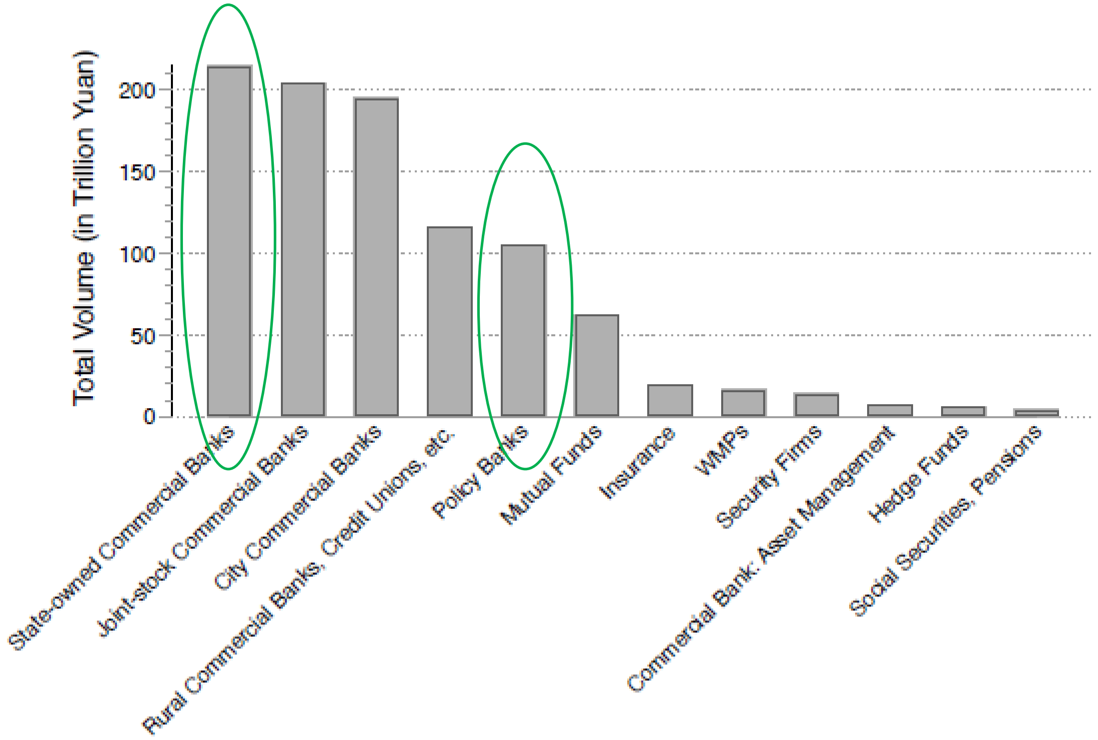
- Extremely rich data – hopefully many great papers come out of this
- I know the US repo market well, and will talk through a comparison of US and China repo markets
  - There are many interesting patterns that the authors document, and I will try to highlight some of them.

- Paper uses two events (Baoshang bank takeover, and COVID-19 shock) to try to disentangle counterparty risk and collateral risk
  - I am not persuaded that this is possible (they are entangled)

Leverage, interbank market, cash deposits



(b) Total volume by borrower type

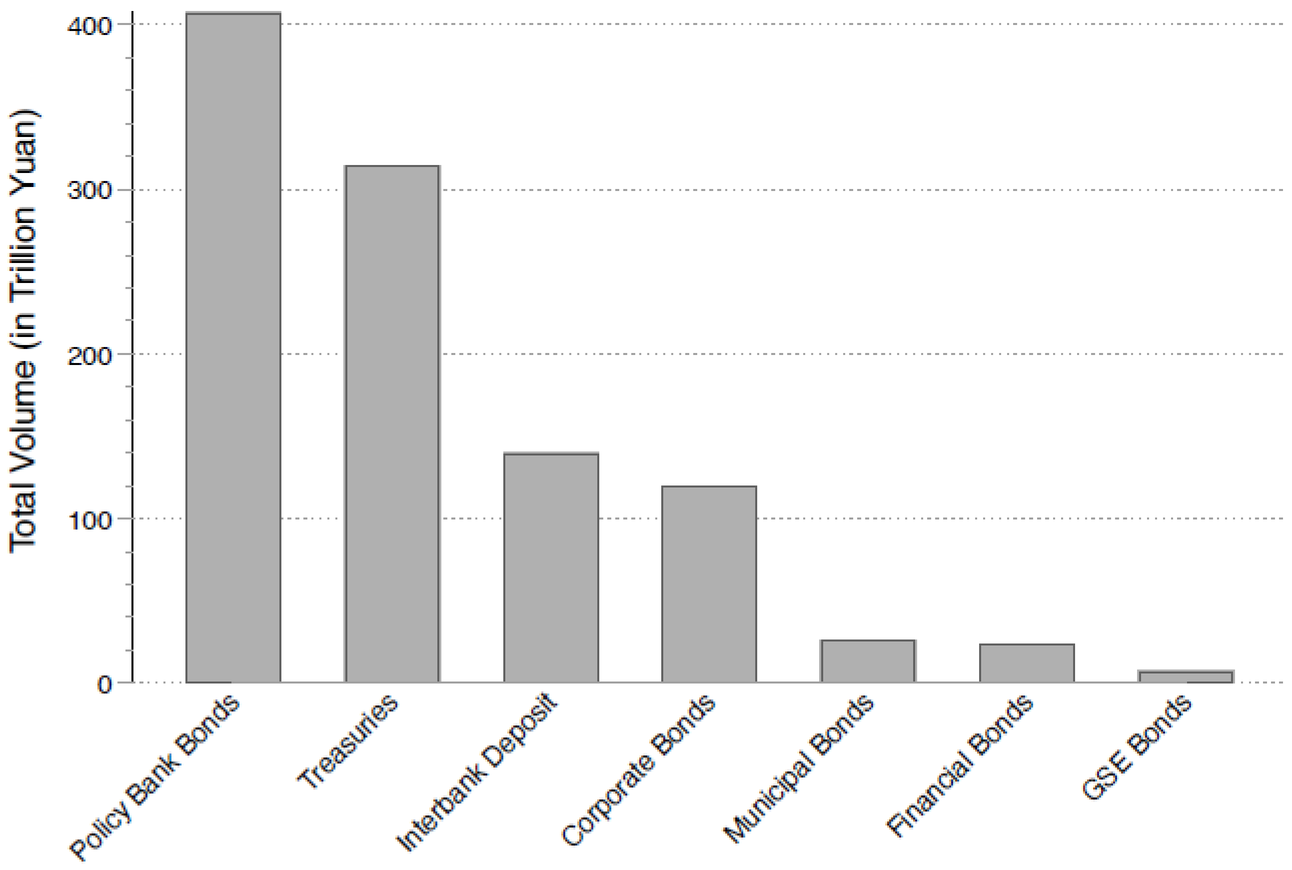


(a) Total volume by lender type

US Triparty repo market is largely cash-rich money market funds lending to securities firms and banks

Collateral

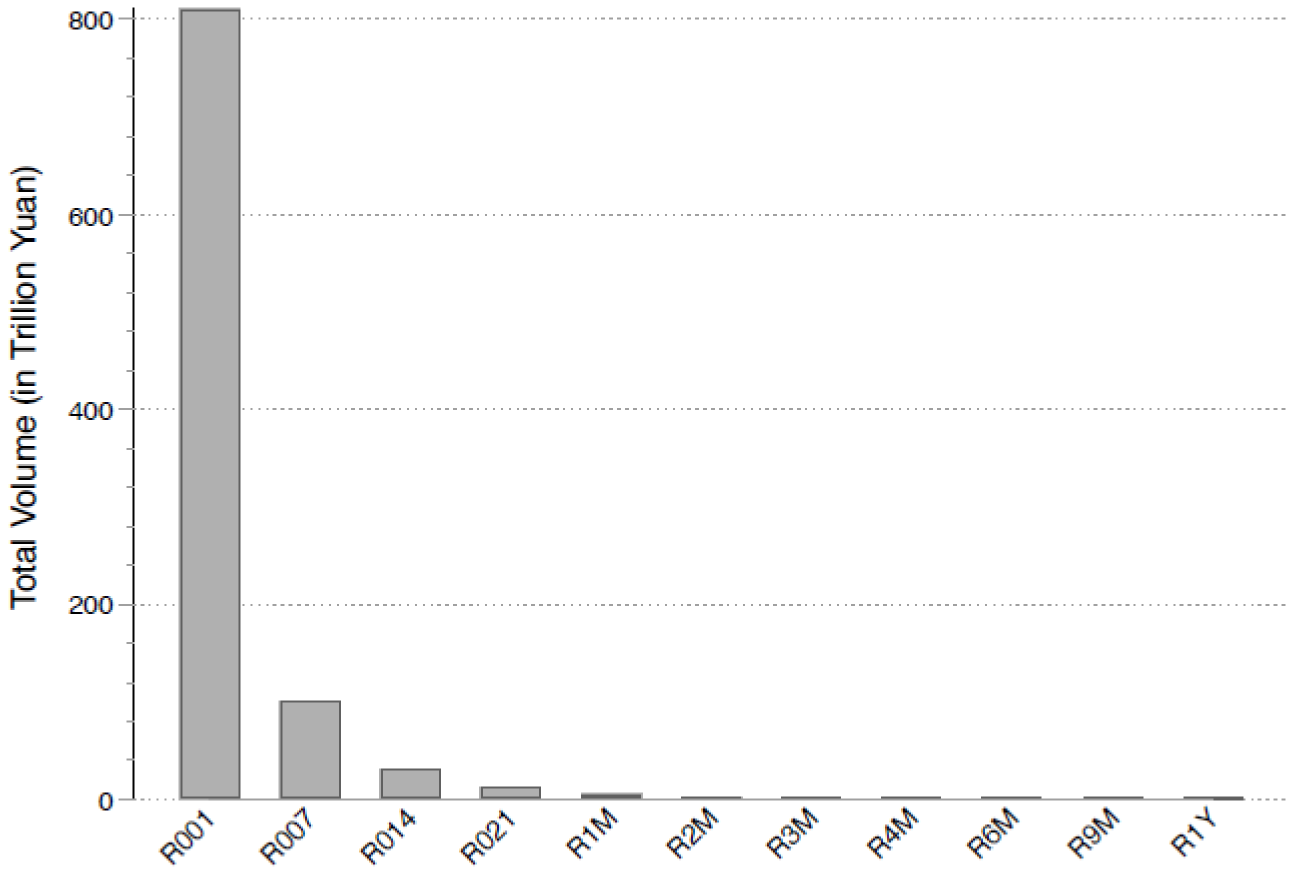
Figure 4: Total Collateral Value by Bond Type: 2019.1.1-2020.4.30



US repo market is mostly government bonds (Treasuries + Agencies)

Maturities

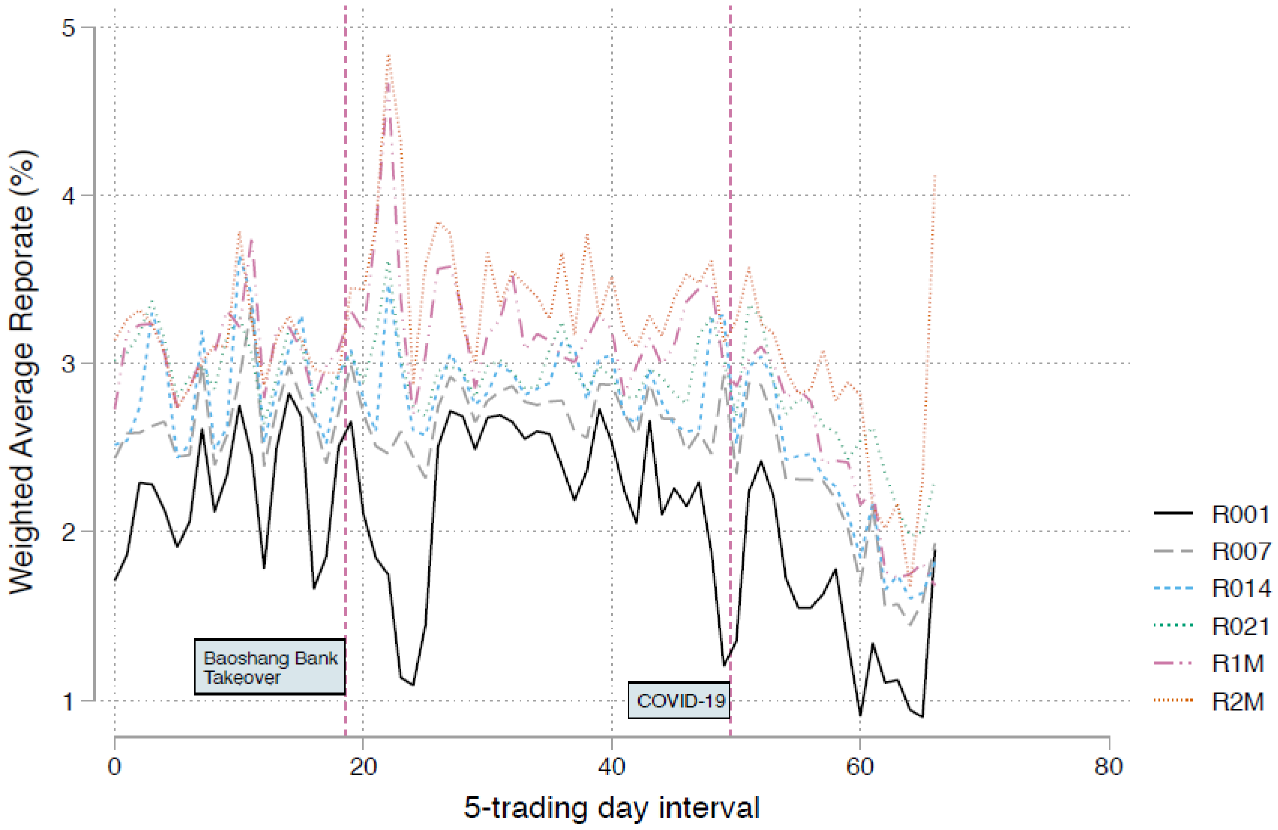
Figure 6: Total Trading Volume by Repo Term: 2019.1.1-2020.3.30



US repo market is similar: mostly overnight to 1 week

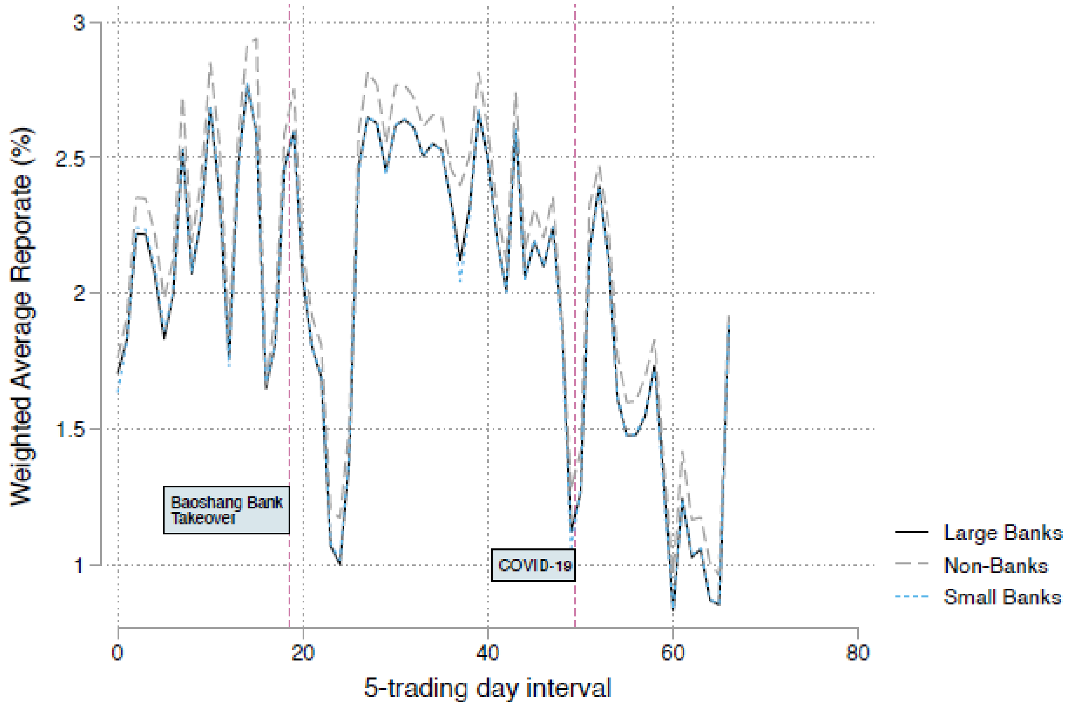
Overnight repo is <u>much</u> cheaper… and the term premium widens after Baoshang

Figure 7: Repo Rate By Repo Term

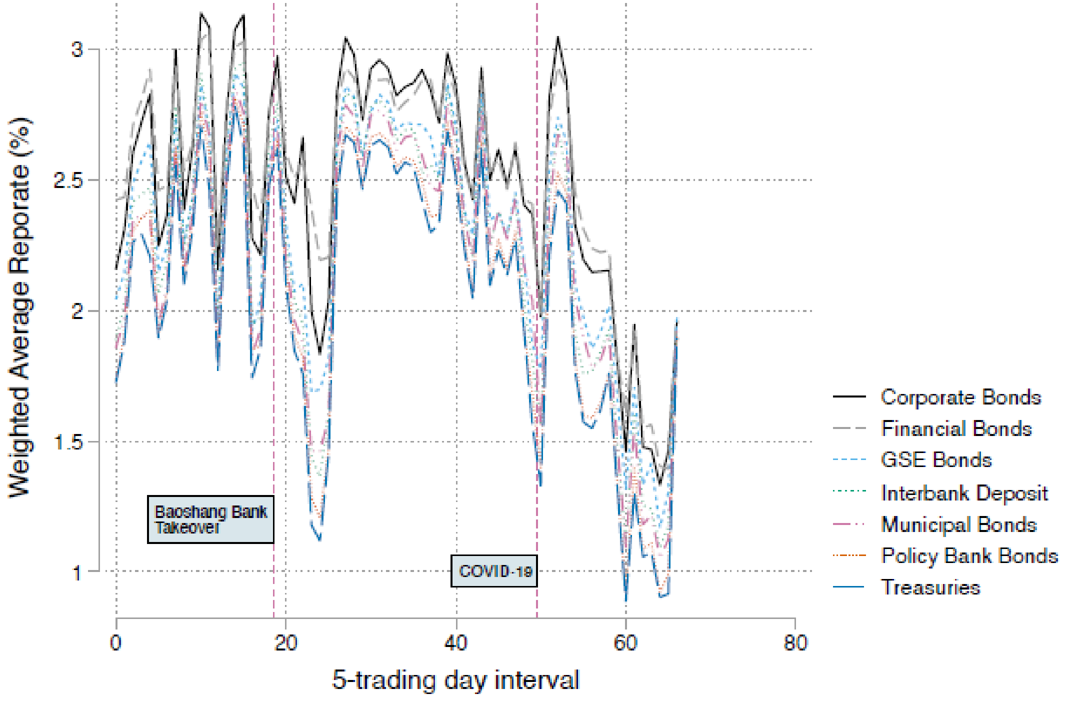


A term premium shows up in the US only in the fall of 2008

Repo rate variation: bond, not borrower



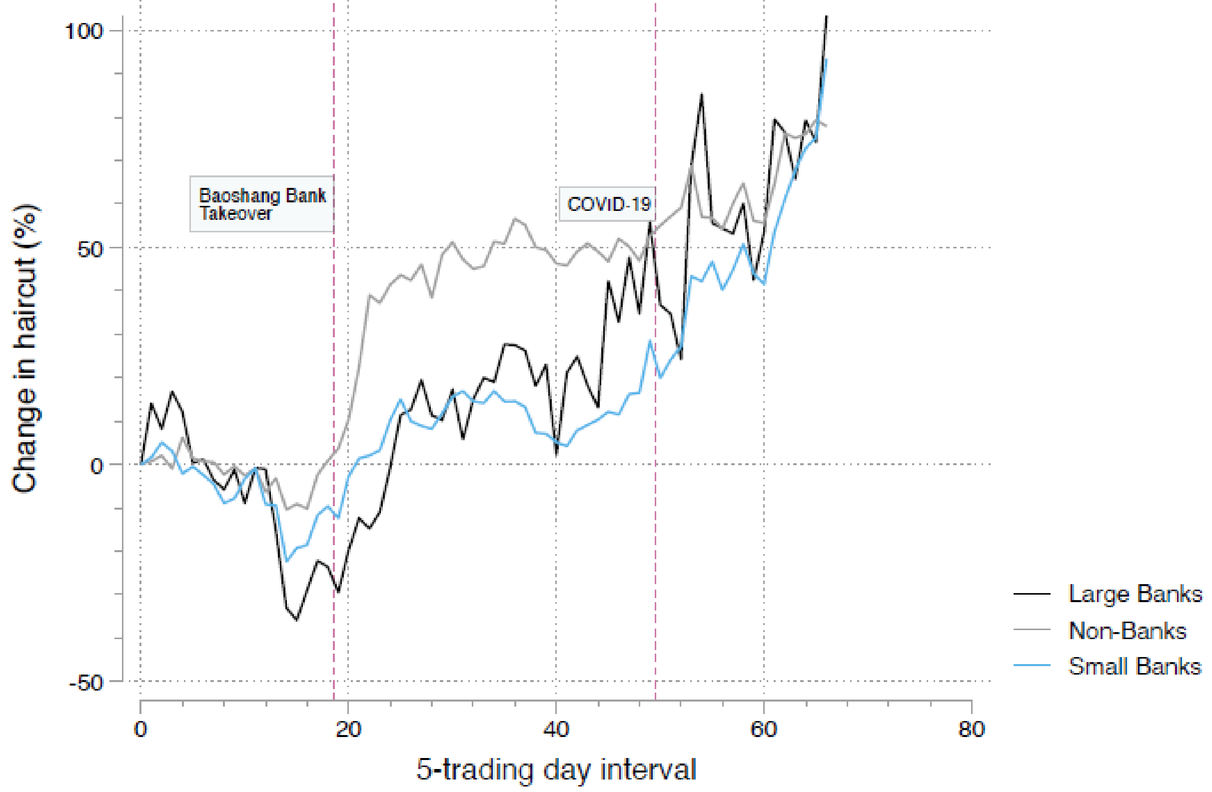
(a) by borrower type



(c) by bond type

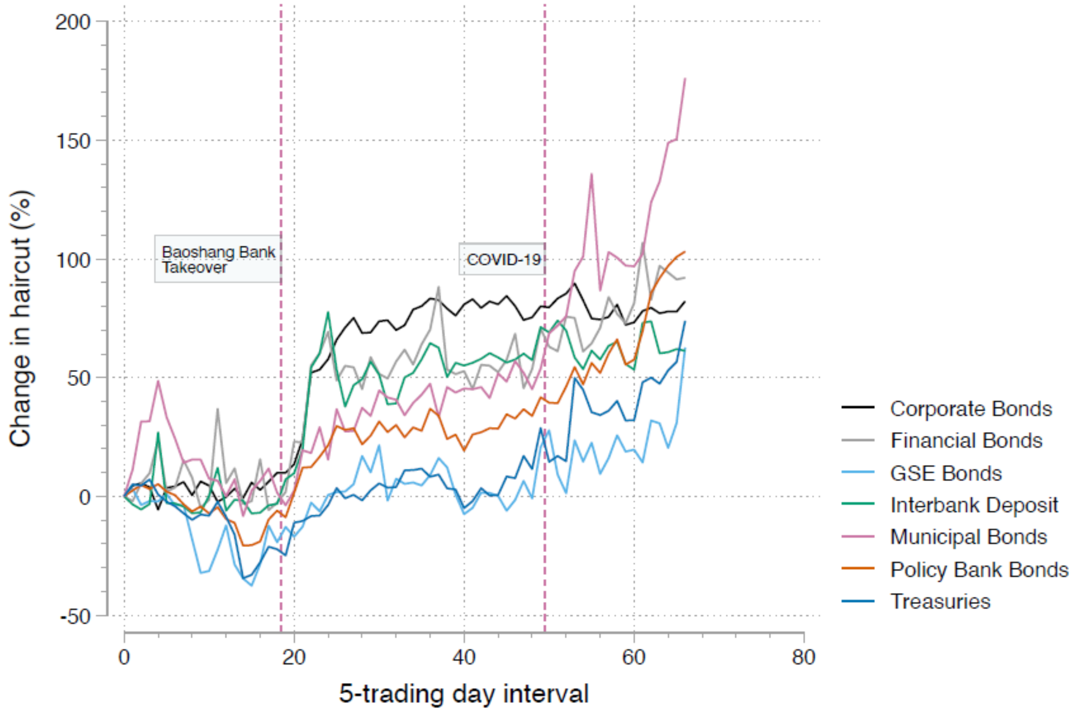
US repo market exhibits preferenced repo pricing for Treasuries as well…

Haircut changes from week 0 (not levels)



(a) by borrower type

Figure 12: Change in Haircut by Bond Type



Total volumes over time

Figure 17: Total Transaction Volume in Repo Market: 2019.1.1-2020.4.30

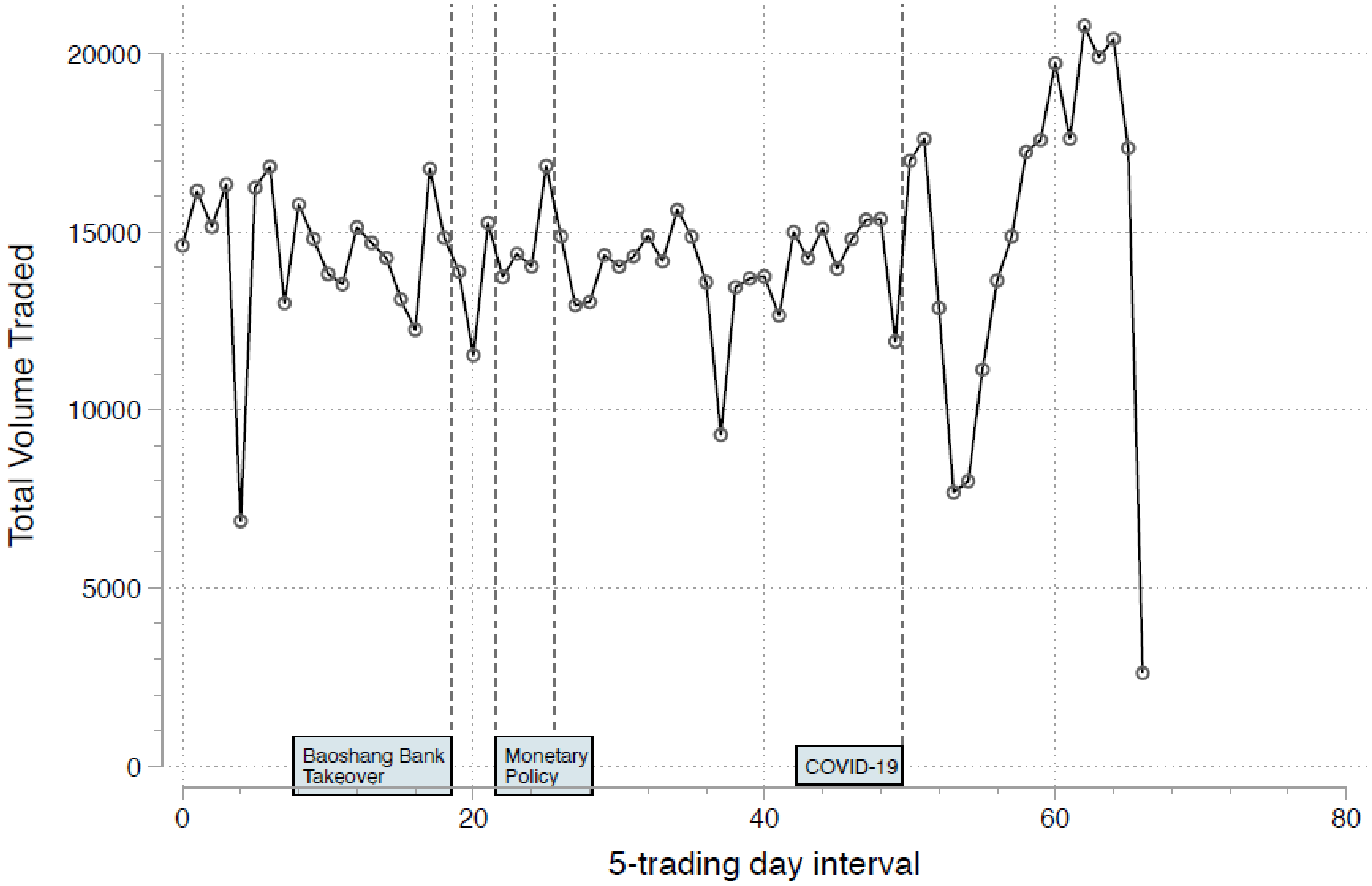
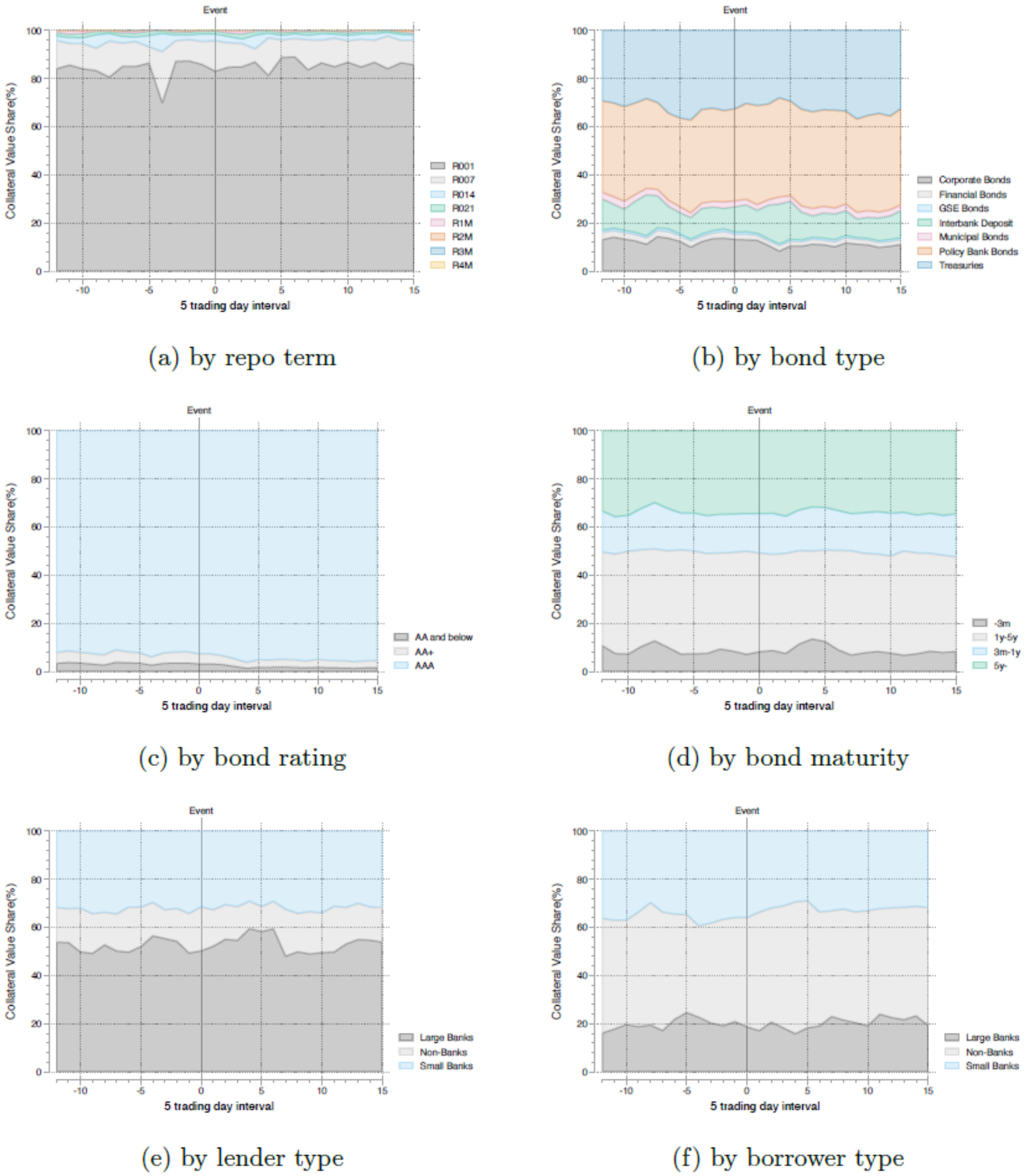


Figure 18: Collateral Composition Before and After Baoshang Bank Takeover



(a) by repo term

(b) by bond type

(c) by bond rating

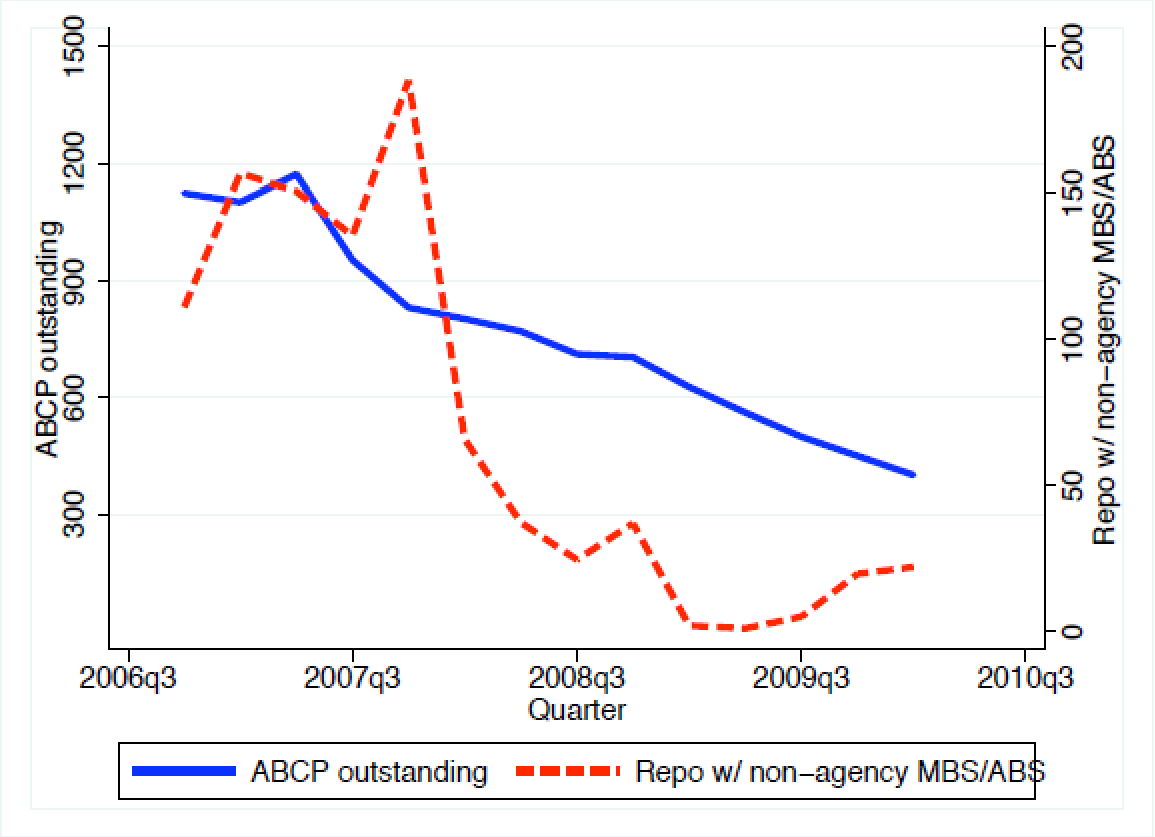
(d) by bond maturity

(e) by lender type

(f) by borrower type

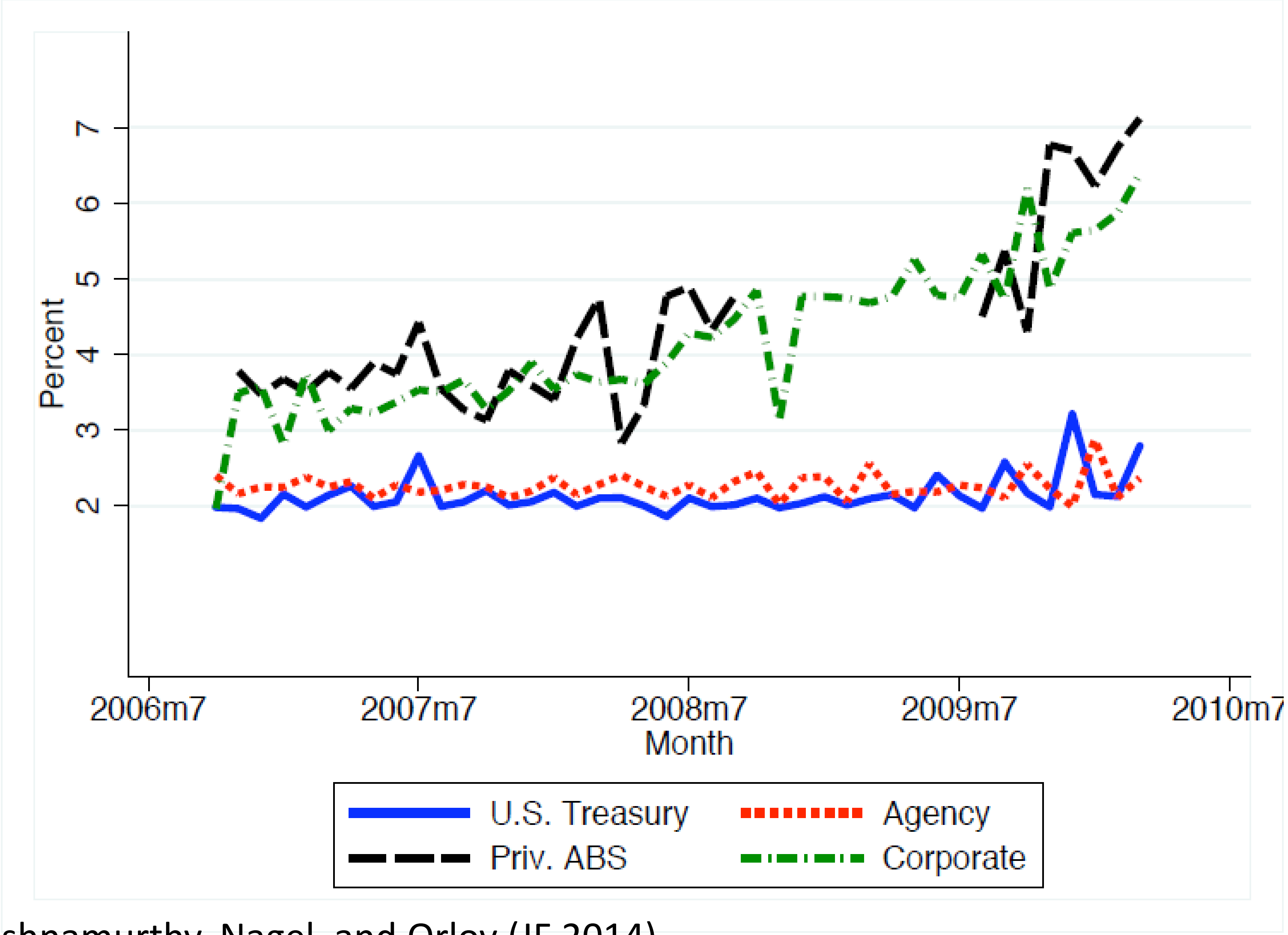
Rates adjust, haircuts adjust, but transaction volumes are stable

US repo market dynamics in GFC (volumes)



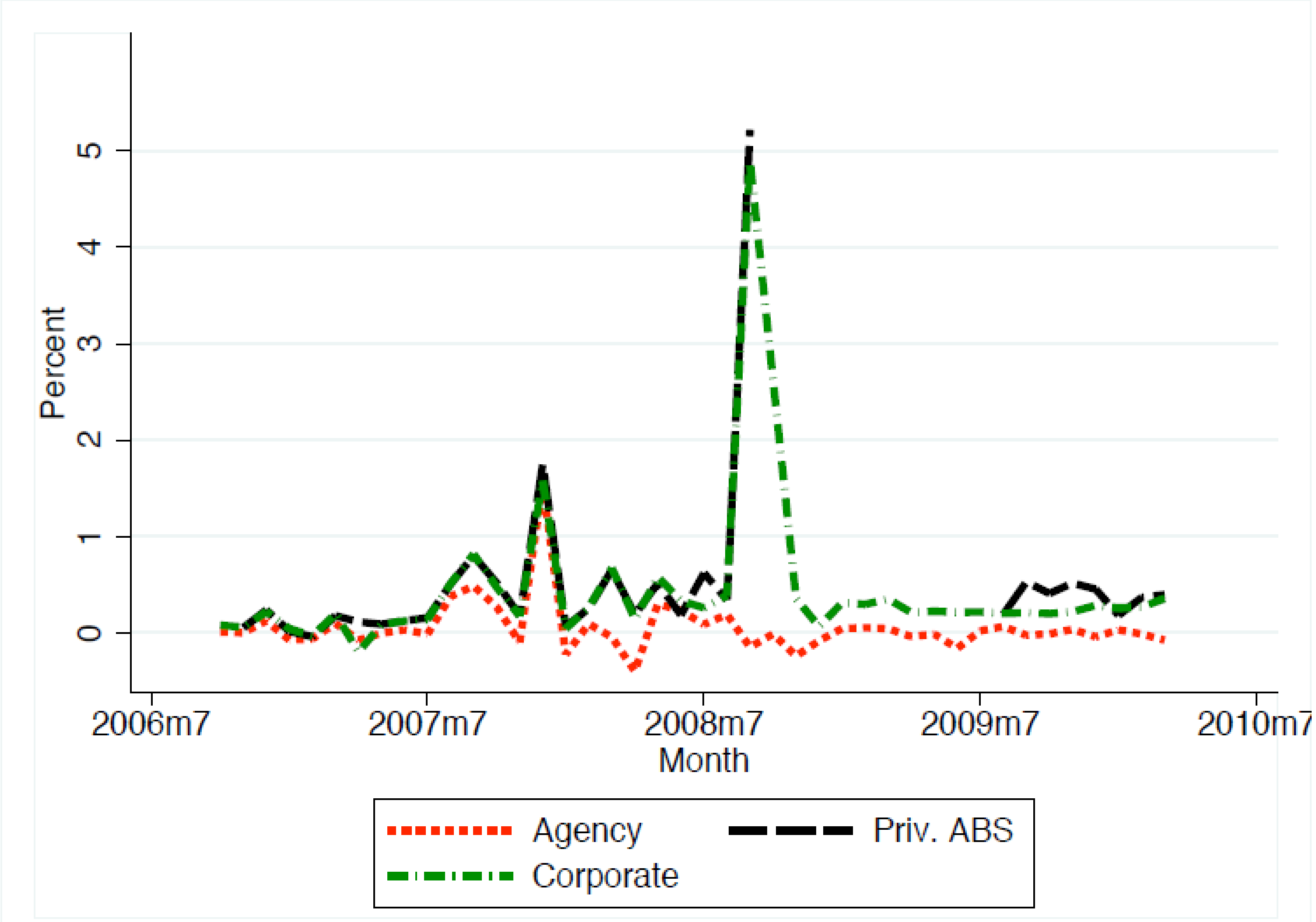
Source: Krishnamurthy, Nagel, and Orlov (JF 2014)

US repo market dynamics in GFC (Haircuts)



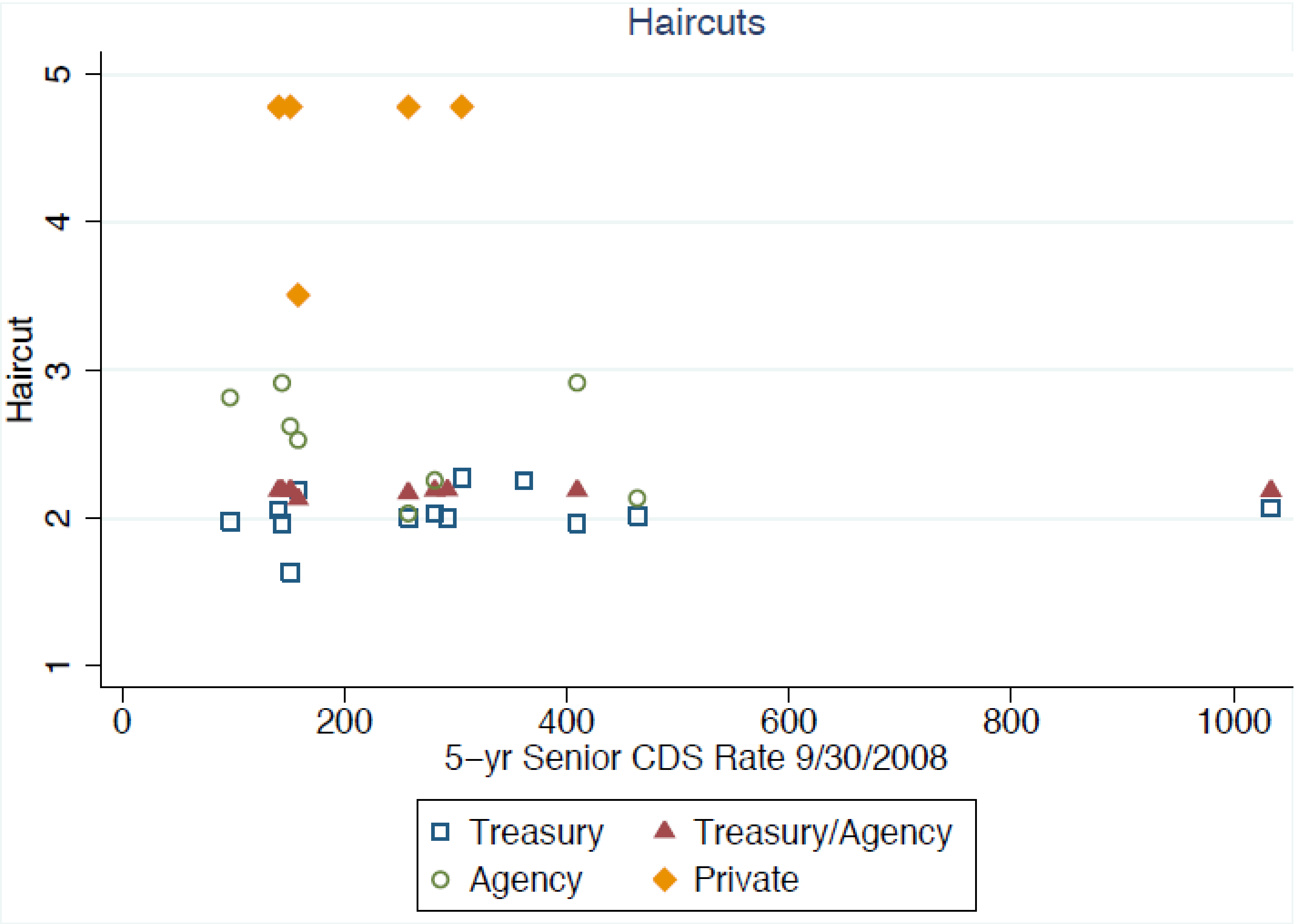
Source: Krishnamurthy, Nagel, and Orlov (JF 2014)

US repo market dynamics in GFC (repo rate)



Source: Krishnamurthy, Nagel, and Orlov (JF 2014)

US repo market haircuts by cpty; fall 2008



Source: Krishnamurthy, Nagel, and Orlov (JF 2014)

Lehman failure

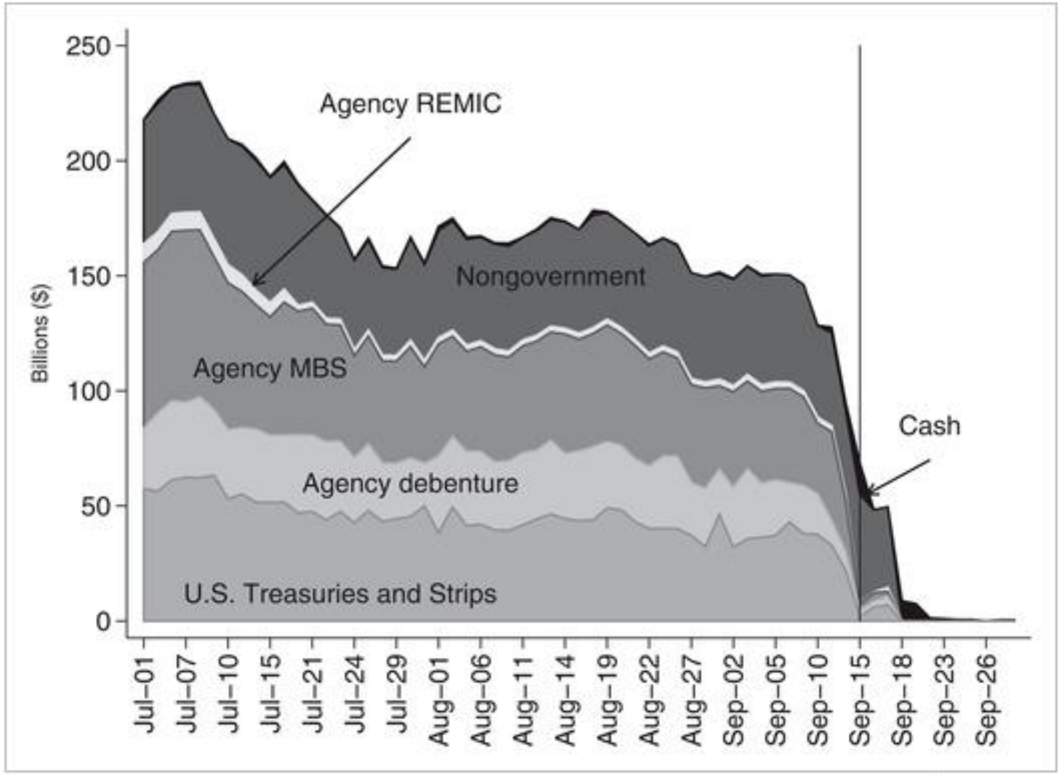


Figure 6 Open in figure viewer | PowerPoint

Collateral posted by Lehman Brothers in tri-party repo. This figure presents the composition of collateral

Source: Copeland, Martin and Walker (JF 2014)

Summary

- My take on the US repo market: Its about the lenders
  - Market for informationally insensitive assets (Dang, Gorton, Holmstrom)
  - Lenders (cash providers) are very skittish about risk
    - Adjust haircut to offset collateral risk, but only to a point…
    - Rather not lend than lend at a higher repo rate
    - Questionable borrowers are shut out of market to begin with

- China looks different
  - Volumes, composition stable;
  - Lots of participants with widely different credit risk;
  - Many forms of collateral
  - Significant repo rate variation across collateral

Suggestion

- Think more about the <u>borrowers</u> as making a corporate financing decision
- Tradeoffs on choosing (rate, haircut, collateral, quantity):
  - Secured financing … vs alternatives (unsecured, equity, long-term debt…)
    - As a borrower, do you want to encumber an asset? (Donaldson, Gromb, Piacentino, JFE 2020)
    - *Would be useful to understand alternative financing options*
  - Is collateral helping with commitment (DeMarzo and He, 2019)?
    - *What are the firm's investment opportunities?*
    - *What else can the firm do with cash (payout to equity-holders?)*
- … the term premium observation is puzzling to me (why such a strong lender preference for overnight lending?)