

# Discussion: Derivatives Markets and Financial Stability

Eren: *Intermediary Funding Liquidity and Rehypothecation... Repo Haircuts and Rates*

Siriwardane: *Concentrated Capital Losses and Pricing of Corporate Credit Risk*

Shan, Tang, and Yan: *Did CDSs Make Banks Riskier?*

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# Trip through Liquidity

- Might seem like only two of these papers are connected.
- However, not so: they are a nice trip through liquidity.
- Eren: how repo dealers acquire funding liquidity.
- Siriwardane: funding liq, concentration affects market liq.
- Shan/Tang/Yan: how CDSs affect bank funding, lending.

# Eren: Intermediary Funding Liquidity and Rehypothecation

Idea of paper:

- Two-period theoretical model of repo haircuts and rates.
- 3 agent types: asset managers, dealers, cash investors.
- Asset managers, dealers: fund projects with returns  $R^H, R^B > 1$ .
- $t = 1$ : Dealer sets repo terms; asset managers accept/not;  
If so: cash (investor→dealer→asset manager), collateral switch.
- $t = 2$ : Dealer may go bankrupt; gains realized; end of repo.
- Dealer may be cash constrained; sets haircut, repo rate.
- Dealer collects spread: asset manager vs cash investor haircut.
- Dealer rehypothecates some of asset mgr bonds to cash investors.
- Extension: Dealer may engage in a fire sale.

## Eren: Findings

- Haircuts are low, no bankruptcy concerns if high liquidity.
- Haircuts are high, bankruptcy risk if low liquidity.
- Case I (Cash to return  $\geq$  collateral):  
Asset manager outside option, project return  $\implies$  repo rate.
- Case II (Cash to return  $<$  collateral):  
P(Dealer failure) also affects repo rate.
- For mildly illiquid assets, dealer may choose fire sales.
- Very illiquid assets: high haircuts preferred to fire sales.
- 2002–2014, 5 banks<sup>2</sup>: rehypothecation, assets in line w/model.

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<sup>2</sup>Not sure why Citi, JPM omitted.

# Eren: Importance

- Repo: historically a major source of funding liquidity.
- Therefore, how haircuts and rate are set is important.
- Cash constraints may bind on the dealer: very nice.
- Funding liquidity is crucial, endogenous w/market liquidity.
  - Brunnermeier & Pedersen (2009): virtuous, vicious cycles.
  - Boudt, Paulus, and Rosenthal (2014): 1st evidence of both cycles.
- May explain decline in assets and repo during crisis.<sup>3</sup>
- Unfortunately, we don't answer the biggest repo question:  
Why are repo markets dying in the US lately?

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<sup>3</sup>Hold that thought. . . .

## Eren: Setup Issues

- Model claims three types of agents:
  - “Hedge Funds”: cannot fail, repo is only funding source.
  - Dealer(s): Can fail, including randomly; can hold fire sale.
  - Cash investors: blindly offer all cash for collateral.
- Cash investors  $\neq$  agents; equivalent: dealer w/more capital.
- Terminology: these are asset managers, not “hedge funds.”
  - “Hedge funds” sounds cool, but is not close to reality.
  - No-risk hedge funds, riskier dealers? Sounds like asset managers.
  - Hedge funds: many more options than repo (e.g. basket swaps).
  - Hedge funds do not have more bonds than money markets have cash.
- Dealer bankrupt if  $E(\text{cash}_2) < 0$ ? Similar: OOM options = worthless.
- Define variables clearly<sup>4</sup>, annotate equations, more *English*.
- Clean up and number statements of agents’ optimizations.

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<sup>4</sup>e.g.  $\bar{U}_H \stackrel{?}{=} \text{outside option hurdle rate.}$

## Eren: Ugly Reality

- We build models to explore reality and for careful experiments.
- Dealer banks don't have all bargaining power; repo is a market.
- Typically, haircuts adjust slowly while rates adjust quickly.<sup>5</sup>
- Constant bond value, risk: unlikely, and thus no B&P effects.
- Projects returns  $R_B, R_H$  also not affected when cash-constrained.
- Claims empirical section supports model, but ignores:
  - PDCF: 20080317–20100201, repo risky securities to Fed.
  - MMIFF: 20081021–20091030, Fed support for money mkt funds.
  - TAF: 20071212–20100308, Fed auctions term funds to dealers.
  - TARP: Oct 2008 infusion of cash from US Treasury.
  - Seems these need to be accounted for before comparing to model.

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<sup>5</sup>BIS FSB: *Securities Lending and Repos*, 2012.

# Eren: Oddments

- Strange agents: continuum of asset managers, dealers; but. . .  
 . . . location on  $[0, 1]$  continuum unrelated to holdings  $b_i$ .
- So we allow weird things, e.g. for *any* bounded function  $g$ :

$$b_i = \begin{cases} g(i) & i \in \mathbb{Q} \\ 0 & i \in \mathbb{R} \setminus \mathbb{Q} \end{cases} \implies \int_0^1 b_i di = 0. \quad (1)$$

- Easier: have  $A$  asset managers,  $D$  dealers,  $K$  cash investors.
- Unclear: is asset manager outside option  $U_H$  common knowledge?



## Eren: Conclusion

- It may sound like I am very negative; I'm not. I am hopeful!
- In many markets, repo rates+haircuts are not so transparent.
- Thus work like this can be very useful... if setup right.
- Also useful: could help inform non-standard policy tools.
- I suspect cleaning up many of these things will be easy:
  - Terminology: "asset managers" makes assumptions palatable.
  - Switch to finite number of agents: easy and more intuitive.
  - Sticky haircuts: allow for probability  $h_t = h_{t-1}$ .
  - Allow bonds, projects to possibly decline in value.
- Eager to see if this replicates repo rates in "peacetime."

# Siriwardane: Concentrated Losses & Pricing Corp Credit

## Idea of paper:

- First look at exposures and trades in US CDS market!
- Documents concentration of market, esp. for CDS sellers.
- Seller capital fluctuations explain 11% of CDS spread changes.
  - Nearly as important as macro+firm variables (17%  $R^2$ ).
  - Evidence that concentration yields fragility (contagion).
- Shocks in one market may affect other (unrelated) markets.
- Natural experiment: 2011 Great East Japan Earthquake.
- Thus shows level and distribution of capital matters.

# Siriwardane: Importance and Setup

- CDS markets have become crucial for hedging credit, esp in US:
  - US corporate CDS market: 15%–20% of US corp bond market.
  - 5700 reference entities; \$1.3–\$2 Tn *net* exposure.
  - 1700 counterparties, 5 sellers=half market; 640 mn positions.
  - Would be great to see a table of these stats by year.
- Risk-shifting generally increases social welfare (Arrow-Debreu).
  - Credit shocks have real effects (Gilchrist and Zakrajsek, 2012).
- Post-crisis, CDSs marked-to-market daily (even pre-Dodd-Frank).
  - Dodd-Frank: CDSs → central clearing, swap exec facilities.
  - Thus this work should help with studies of SEF-traded CDSs.

# Siriwardane: What is Missing

- We're talking about CDS market liquidity and funding liquidity.
- Brunnermeier & Pedersen very relevant; why no mention?
- Using B&P, BPR could help sharpen the analysis:
  - We find evidence of both cycles — and a state variable: TED.
  - TED spread  $> 50$  bp is threshold for times of stress.
  - Right now, effects from unstressed/stressed times are mixed.
  - Interact w/ $I(TED > 50 \text{ bp})$  may reveal bigger, cleaner effects.
- Similarly: do macro/firm,  $\Delta$ capital  $R^2$ 's vary w/time, TED?
- Also must watch endogeneity. (Japan experiment is superb.)
- Check: different credit pricing for public/optionable firms?

# Siriwardane: Concentration, Fragility, Counterparty Risk

- Also look at gross exposures to get at counterparty risk?
- Looking at effect of sellers helps get at concentration.
  - Cleaner/nice check: put Herfindahl indices in model?
- Why concentration matters: Zawadowski (2014); Rosenthal (2014).
  - Well-connected bilateral markets have greater price swings.
  - Hoped to estimate size of effects due to OTC network. (Soon!)
- Transaction-based analysis is more tentative:
  - Bias in entities w/enough variation to estimate  $RB_{it}^S$ ?
  - Risk-bearing may be negatively correlated with spreads:  
Spreads widen during stress = when less risk-bearing capacity.
  - Also not sure cpty risk negatively correlated w/spreads;  
Spreads, protection demand likely increase w/overall cpty risk.

# Siriwardane: Questions and Suggestions

- Many plots have strange jumps; why?
  - Quarterly drops in net exposure: CDSs expiring, or...?
  - Feb 2012 transfer of shorts: Dealers→HFs. London whale?
- Concentration effect on volatility: best as Proposition+proof.
  - Also note: you assume no correlation of sellers'  $\Delta$ capital.
  - If  $\text{corr} > 1$  (likely), effect shown is a conservative estimate.
- Herfindahl indices related to  $\chi^2$ ; use this for tests.<sup>6</sup>
- Effect on price of credit risk, but not CDS-bond basis is key:
  - Thus sellers'  $\Delta$ capital affects firms' cost of capital.
  - Might help explain real effects of credit shocks.
- Similarly: use  $t$ -tests to determine when Japan effect dies out.
- Should note option-implied CDS spreads are *forward-looking*.

<sup>6</sup>If  $H_0$ =equal market,  $H_t^S n - 1 \sim \chi_{n-1}^2$ .

## Siriwardane: Conclusion

- If not obvious: I *really* like this work.
- Shines a light where needed; more evidence of theorized effects.
- CDS-equity ratio data... shocking. Need large trader reports?
- Does more market transparency explain rise of HFs in market?
- Not sure I see clear argument here for bailouts:
  - Maybe foolish banks should die so smart banks thrive?
  - Need externalities: distress volatility, contagion, real effects.
- Excited to see what this yields; whole new world to explore.

# Shan/Tang/Yan: Did CDSs Make Banks Riskier?

## Idea of paper:

- Look at CDS-active banks and regulatory capital ratios.
- Use 1994–2009 data from Fed for bank holding companies.
- With IV: Find lower reg capital ratios at CDS-active banks.
- Also: lower quality of capital for CDS-active banks.
- More aggressive lending by CDS-active banks.
- Firms referenced by CDSs get bigger loans at higher spread.
- Net result is riskier banking.
- Banks are riskier when they lend to CDS ref entities.
- But, CDS-active banks: better performance during “peacetime.”



# Shan/Tang/Yan: Data

- 1994–2009 Fed BHC filings; includes SwapCos in London?
- Matching on names may wrongly include captives/SPVs.
- Financial crisis is laboratory to study CDSs? Both are related.
- If reg capital ratio can be gamed, why are we looking at it?
  - Basel II pushes VaR, but that is deeply flawed and gameable.
  - So why are we not looking at a better measure of risk?
- Why are 2/3 of syndicated loans eliminated from analysis?
  - Are stats for eliminated loans comparable?
- Should limit data to S&P 500 due to endogeneity of CDS use.
- If NYC bank clients atypical, is dist(NYC) a good instrument?
- Maybe: instrument I(CDS-active) with lagged capital ratio.

# Shan/Tang/Yan: Analysis Specifics

- Lower capital quality for CDS-active banks: to be expected.
  - CDSs shift risk, enable lending to lower credits.
  - Or: banks become CDS-active when loan portfolio gets riskier.
- CDS ref entity loan spread: 78 bp (13 bp, Table VI) lower.
  - But CDS-active banks charge 15.5 bp more *on average*.
  - $\implies$  wider lending base, not charge more to CDS firms.
- CDS-active banks: Tier I cap ratio 0.032 lower? Or 0.085 (IV)?
  - Why not report 0.085 figure in text?
- CDS-active banks: more C&I loans, more loss provision.
  - What loss provision would be implied by more C&I loans?

# Shan/Tang/Yan: Analysis

- If dist(NYC) OK: reg cap ratio lower for CDS-active banks.
  - Should show stats on NYC-bank borrowers vs others.
- Reverse causality: Do riskier banks hedge more aggressively?
- CDS-active banks: more C&I loans, more loss provision.
  - Perhaps CDSs reduce loss provision conditional on loan type.
- Results crisis-driven? Table XI  $\implies$  maybe. Separate crisis?
- Compare public, private banks to get at gaming of Basel?

## Shan/Tang/Yan: Miscellaneous

- A rogue trader doesn't imply a market is harmful; rogues abound.
- ISDA doesn't organize CDS market, sets contract standards.
- Careful: Volcker Rule was about much more than just CDSs.
- Crisis effects: likely due to market structure, not CDS per se.
- Consolidate discussions of Basel II/III into appendix.
- Lending less, raising capital: due to CDS or AIG/Lehman fears?
- Where are real effects? Highlight effect on economy better.
- Don't banks maximizing profits via CDSs improve social welfare?
  - If not: what is the externality?
- Is bank stability all we care about? Why not outlaw risk?
- Biased language makes me skeptical (e.g. "duplicitous").

# Shan/Tang/Yan: Conclusion

- Part of me is skeptical: shifting risk should improve welfare.
- Were Arrow-Debreu and Friedman wrong in encouraging hedging?
- Some bias in the writing makes me even more skeptical.
- However, if results are correct: very important
- Need to be careful about counterfactuals and instruments.
  - Use forward-looking measures to disentangle causality?
  - What would loss provision be for more C&I loans w/o CDS?
  - Look at private banks: less inclined to game regulations?
- CDS-active banks better performance in peacetime:
  - Is it worth in-crisis effects? Is this just B&P yet again?
- Very interested to see answers – because this is a big claim.