Concentrated Capital Losses and the Pricing of Corporate Credit Risk

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Disclaimer: The views in this presentation are not necessarily a reflection of the Depository Trust and Clearing Corporation (DTCC), the U.S. Treasury, or the Office of Financial Research (OFR)

Objective

Limited Investment Capital and Asset Prices

Q1: **Does the level of capital impact premiums?**

- Limits to arbitrage; Slow moving capital; Intermediary asset pricing
- Level of risk premium depends on total level of investment capital

Q2: **Does the distribution of capital matter?**

- Why should we care if there is concentration?

This paper: *Empirical* answers to both questions

Limited Investment Capital and the CDS Market

- Credit default swap (CDS) definition/terminology:
  - Insurance on default of an underlying reference entity, r
  - Seller covers a notional amount, N
  - Buyer pays a premium, the CDS spread
- Capital fluctuations $\approx$ profits and losses (P&L) of CDS desk
  - Many reasons why desk wealth is the right state variable
- My analysis uses a proprietary dataset on CDS positions

Detailed Data on CDS Positions

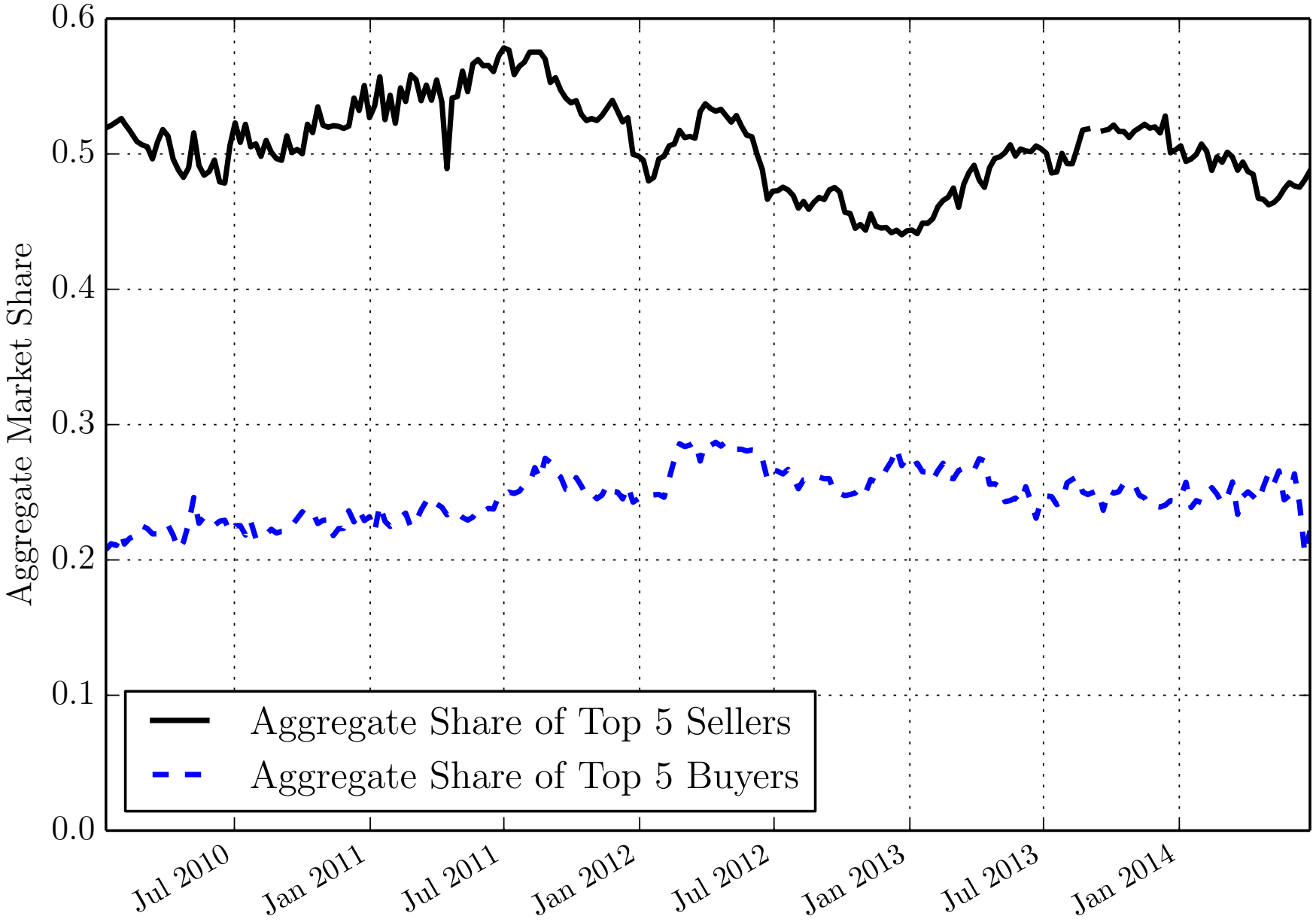
- Live data from the Depository Trust & Clearing Corp (DTCC)
  - Starting in 2010, transactions (flows) and positions (stocks)
  - Over 640 million positions
  - 5700 reference entities, 900 indices, 1700 counterparties
- Full information on every transaction if:
  1. One of counterparties is U.S. registered, OR
  2. Underlying reference entity is U.S registered
- One major contribution = map of the entire U.S. CDS market
- I also mark every position to market

Computing True Net Exposures

What is my net exposure to GE?

- Major CDS sub-products:
  - Single name
  - Index swaps
- Index swap market at least as large as single name market
- "Disaggregate" index exposures, then net against single names
  - 40 million index swap positions
  - 600 million single name positions
- Delivers **true economic exposure** to each reference entity

High Concentration, Especially Net Sellers



CDS Pricing and the Total Level of Investment Capital

Capital Fluctuations And Prices

Framing the Question

- Top five sellers/buyers = mega-sellers or mega-buyers
- Start by looking at how their capital impacts CDS pricing
  1. Representative of the whole market
  2. Sets the stage for how concentration impacts pricing
- Main focus is sellers, but also consider buyers
- Simplest way to ask question:
  - How do CDS spreads change with capital fluctuations?

Addressing Identification

- Concern: do changes in capital impact prices or vice versa?
- Avoid reverse causality using OCF variables:
  - "**O**utside **C**apital **F**luctuations" for mega-players
  - Change in capital on positions taken outside of r's industry
- OCF^s_{rt} = mega-sellers
- OCF^b_{rt} = mega-buyers

Panel Regression Test

- (Weekly) Panel regression with 5-year CDS spreads:

$$\Delta \log(CDS_{rt}) = a_r + \beta_1' \Delta \mathbf{Z}_{rt} + \beta_2' \Delta \mathbf{M}_t + \zeta_s OCF_{rt}^s + \zeta_b OCF_{rt}^b + \varepsilon_{rt}$$

- Reference entity controls, a_r and $\mathbf{Z}_{rt}$:
  - Firm Fixed Effect
  - Moody's 5 year EDF and Markit's LGD
  - Option-implied CDS spread
- Macro-Controls, $\mathbf{M}_t$:
  - A lot (from theory/literature)
  - Or just use a time fixed effect

Results: Capital Fluctuations and Prices

Dep. Variable	$\Delta \log(CDS_{rt})$			
	(1)	(2)	(3)	(4)
OCF^s_{rt}		-0.027	-0.028	-0.028
		(-12.5)**	(-11.2)**	(-8.39)**
OCF^b_{rt}		.003	-0.001	-.000
		(1.93)*	(-0.55)	(-0.14)
Macro Variables	Yes	Yes	No	No
Time FE	No	No	Yes	Yes
Option-Implied CDS	No	No	No	Yes
Within R^2	**16.4**	27.5	33.2	39.0
N	65,272	61,869	62,459	29,412

Observable Firm/Macro Variables Explain Only 16.4% of Spread Variation

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Capital Fluctuations for Five Sellers Account for 1/9 of Spread Variation

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One Standard Deviation Mega-Seller Loss Increases Spread Levels by 2.7%

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Unlikely to be contaminated by omitted variables

Takeaways

- Capital of five sellers accounts for one-ninth of spread fluctuations
- Depressed capital increases default risk premiums
- Non-linearities are important (in paper):
  - Losses matter more than gains
- Reminder: these results are about total capital, not concentration
  - Five sellers account for large portion of capital
  - At this point, not clear whether five is important

CDS Volatility and the Distribution of Capital

Why Does Concentration Matter?

- If all that matters is total capital, who cares how it is distributed?
- Concentration creates added *fragility*
- An idiosyncratic shock to a mega-seller does not "wash out"
- End result = higher volatility in risk premiums

The Price of Credit Risk

A Simple Methodology

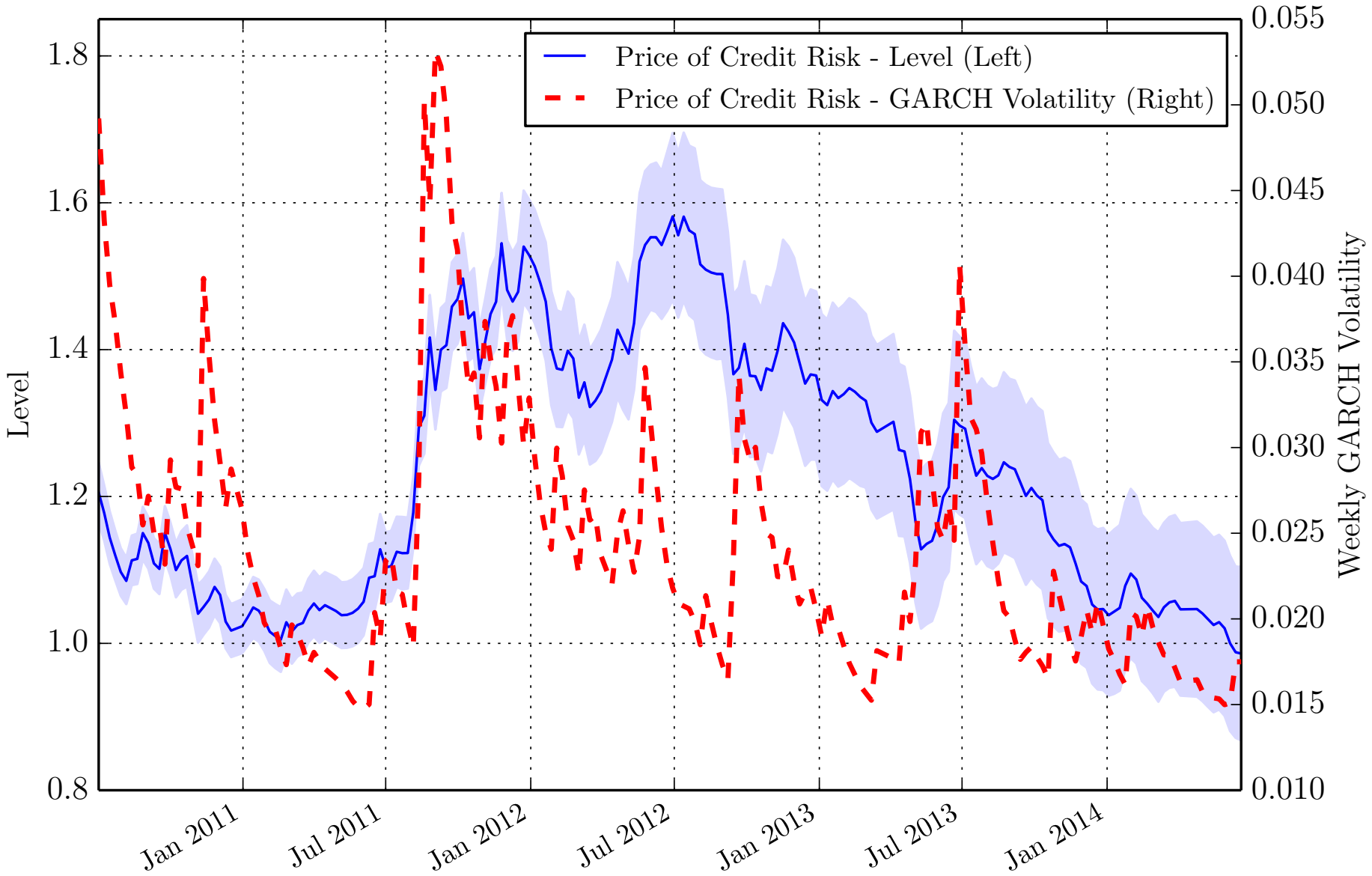
- Estimate the "price of credit risk" from a panel of CDS spreads:

$$\log(CDS_{rt}) = a_r + \boldsymbol{\beta}' \mathbf{Z}_{rt} + \pi_t + \varepsilon_{rt}$$

  where π_t is a time fixed effect

- $\Pi_t := \exp(\pi_t)$ interpreted as the price of credit risk
- Average portion of spreads not captured by fundamental default risk
- Gilchrist and Zakrajsek (2012) call this the "excess bond premium"

Price of Credit Risk (Blue) and Its Volatility (Red)



Volatility and Concentration

Framing the Question

- σ_t^π is a GARCH estimate of the volatility of Π_t
- H_t^S is aggregate seller Herfindahl
- H_t^B is aggregate buyer Herfindahl
- Estimate OLS regression:

$$\log\left(\sigma_{t+1}^\pi\right) = c + \rho \log\left(\sigma_t^\pi\right) + \gamma_S H_t^S + \gamma_B H_t^B + \varepsilon_{t+1}$$

Volatility Increases with Seller Concentration

Dep. Variable	$\log\left(\sigma^{\pi}_{t+1}\right)$ (1)
$\log\left(\sigma^{\pi}_{t}\right)$	0.87
	(28.1)
H^{S}_{t}	0.019
	(2.10)**
H^{B}_{t}	0.014
	(1.45)
Adj. R^2	83.0
N	198

- One standard deviation increase in $H^{S}_{t} \Rightarrow \sigma^{\pi}_{t+1}$ rises by 2%
- The "vol of vol" is only 1.1%.

Final Thoughts

What Else Is In the Paper?

1. More Facts
   - Net credit risk transferred by CDS ≈ \$1.7 trillion
   - Mega-buyers = dealers, some HFs
   - Mega-sellers = dealers (2010-2012) and HFs (2012-now)

What Else Is In the Paper?

2. Natural Experiment: 2011 Japanese Tsunami as an exogenous shock
   - Mega-sellers, not buyers, transmit the shock to the U.S.
   - Spreads rise for U.S. firms whose sellers were exposed to Japan
   - Show concentration is important in this context as well

Big Picture Takeaway

- Level of seller risk bearing capital $\Rightarrow$ Level of CDS spreads
- Distribution of capital $\Rightarrow$ Volatility of risk premiums
- Need *both* to accurately capture price dynamics

Policy Implications and Outstanding Questions

- Likely means the distribution of bailouts is important
- Post-crisis regulation:
  - Anything to say about mega-sellers?
  - Where are we pushing credit risk?
- What exact friction connects losses to risk bearing capacity? Why is capital slow moving?
- Why such limited participation? Is it socially optimal?