Clear(ed) decision: The effect of central clearing on firms' financing decision

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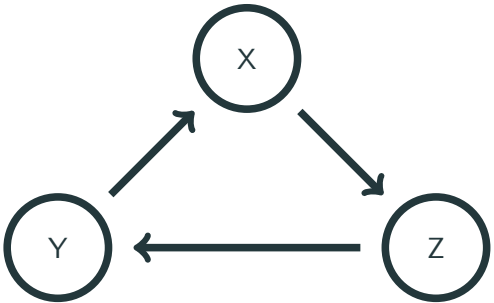
Research question(s)

(How) does credit derivative regulation affect the real economy?

1. Does central clearing of a Credit Default Swap (CDS) affect the company against whose default the contract insures?
2. What channels are responsible for the effects?

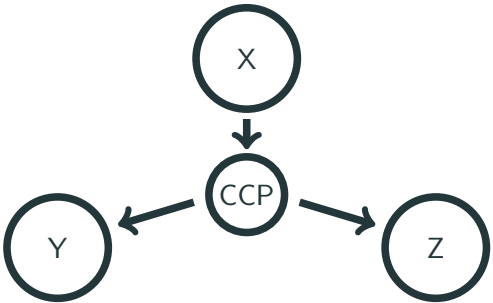
Institutional setting - what is central clearing?

Over-the-counter derivative market



Note: Arrows indicate exposures, e.g. X is owing payments to Z.

Centrally cleared derivative market



Note: Arrows indicate exposures, e.g. X is owing payments to the CCP.

New market environment is safer (less risk) but more expensive (collateral, fees)!

Institutional setting - two channels

1. **Arbitrage channel**
   - Increased attractiveness of CDS over bond trading after central clearing (lower risk)
     $\Rightarrow$ Investors shift capital from bond markets to CDS markets
     $\Rightarrow$ Predictions: bond demand down, CDS demand up (*Substitute*)
2. **Hedging channel**
   - Central clearing increases CDS trading costs and thereby cost of hedging
     $\Rightarrow$ Investors reduce hedging activity (CDS market)
     $\Rightarrow$ Predictions: bond demand ambiguous, CDS demand down (*Complement*)

Empirical setting and data - setup

- Under Dodd-Frank (January 1st 2013), no mandatory clearing requirement for single-name CDS, but strong regulatory incentives
- Clearing entities determine which firms are eligible for clearing (details soon)
- Single-name CDS clearing highly concentrated with only one player (ICE Clearing)
- Firms do not become eligible at the same time $\rightarrow$ staggered introduction to CC

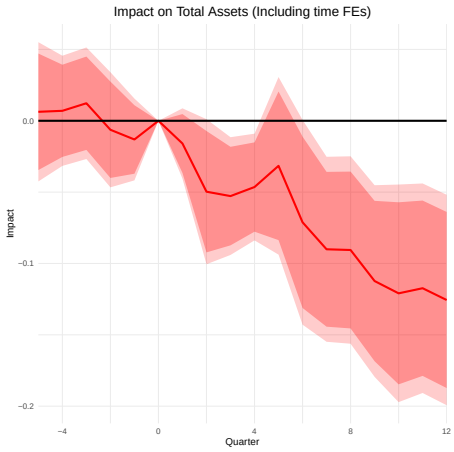
Empirical setting and data - exogeneity

- There is identifying variation from the staggered introduction. But, we want to add variation using a never-treated group!

- Potential problem: Clearing entities decide based on CDS trading volume $\Rightarrow$ Are average cleared firms different from average control firms?
  $\rightarrow$ Run logit to predict eligibility decision
  $\rightarrow$ Propensity score matching
  $\rightarrow$ Matched sample consists of 50 cleared firms + 50 firms from the S&P1000 with a traded CDS from Q1-2012 until Q2-2019*

* some cleared firms do not have sufficient data, others cannot be matched properly; these 50 firms are a representative sample of the cleared firms

Empirical setting and data - exogeneity (with controls)



joint F-test: $p = 0.91$

joint F-test: $p = 0.83$

No pre-treatment divergence between treatment and control group!

Relevance of central clearing - diff-in-diff design

- Estimate regression model of the following form:

$$y_{i,t} = \theta \mathbf{1}(t \geq \textit{Eligibility}_i) + \beta \mathbf{x}_{i,t-1} + y_{i,t-1} + \alpha_i + z_t + u_{i,t}$$

  - $\mathbf{1}(t \geq \textit{Eligibility}_i)$ equals one after firm i becomes eligible for clearing in period t
  - $x_{i,t-1}$: (log of) total assets, revenue, cash, capex, return on assets and leverage
  - α_i (z_t): firm (time) fixed effects
- Heterogeneity of treatment effects? De Chaisemartin and d'Haultfoeuille (2020) methodology suggests not

Relevance of central clearing - diff-in-diff results

	(1) Total debt	(2) Long-term debt	(3) Total assets
$Eligibility_i$	-0.027***	-0.029***	-0.016**
	(0.011)	(0.012)	(0.007)
Matched sample	Yes	Yes	Yes
Firm controls	Yes	Yes	Yes
Firm FEs	Yes	Yes	Yes
Time FEs	Yes	Yes	Yes
N	3000	3000	3000
adj. R^2 (within)	0.81	0.81	0.88

Clustered standard errors in parentheses.

Firms decrease (long-term) debt and assets after central clearing eligibility! ▸ Event Study

Channel analysis - results

	(1) Outstanding bonds	(2) Bond issuance	(3) Bond yield	(4) CDS notional	(5) CDS spread
$Eligibility_i$	-0.022**	-0.020*	0.300	-0.024	19.54**
	(0.009)	(0.010)	(0.291)	(0.043)	(7.95)
Matched sample	Yes	Yes	Yes	Yes	Yes
Time FEs	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
N	2363	2000	2455	1134	1813
adj. R^2 (within)	0.93	0.23	0.43	0.27	0.79

Clustered standard errors in parentheses.

Bond quantity down, yields stable $\rightarrow$ Bond demand down

CDS quantity stable, prices up $\rightarrow$ CDS demand up

$\Rightarrow$ Arbitrage channel dominates

Real effects - results

	(1) Gross PPE	(2) Net PPE	(3) Employment	(4) ROA	(5) Stock price
$Eligibility_i$	-0.015***	-0.014**	-0.036	-0.0023*	-0.033*
	(0.006)	(0.006)	(0.021)	(0.0013)	(0.018)
Matched sample	Yes	Yes	Yes	Yes	Yes
Firm controls	Yes	Yes	Yes	Yes	Yes
Firm FEs	Yes	Yes	Yes	Yes	Yes
Time FEs	Yes	Yes	Yes	Yes	Yes
N	2278	3000	552	3000	2913
adj. R^2 (within)	0.87	0.87	0.65	0.00	0.68

Investment, profitability, and stock prices down $\rightarrow$ adverse real effects

Connection to Literature

1. **CCPs:** CCP has asset pricing implications (Du et al. (2019); Loon and Zhong (2014)), but financial stability effect unclear (Biais et al. (2012); Biais et al. (2016); Duffie and Zhu (2011))
   $\Rightarrow$ Our contribution: CCPs also questionable from real economic perspective
2. **CDS and corporate finance:** Existence of CDS market good for firms (Duffee and Zhou (2001); Saretto and Tookes (2013)); interaction with corporate debt markets complex (Oehmke and Zawadowski (2015); Che and Sethi (2014))
   $\Rightarrow$ Our contribution: CCPs give new impetus to this link as a more attractive CDS market is *bad* for firms
3. **Financial regulation and the real economy:** Impact of financial regulation on real economic outcomes non-trivial (Fraisse et al. (2020); Buss et al. (2016); Kaldorf and Wicknig (2021))
   $\Rightarrow$ Our contribution: CCPs have consequences beyond financial markets, too

Conclusion

- Firms decrease debt and assets after central clearing eligibility $\Rightarrow$ investment and profitability drop
- Arbitrage channel (risk reduction) dominates
- More results in paper: stock prices decline around clearing announcement, firms increase bank loan demand

$\Rightarrow$ Clearing reform of credit derivatives has adverse real economic spillovers

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