Mandatory Central Clearing and Financial Risk Exposure

Natalie Kessler
European University Institute and De Nederlandsche Bank

Paper Overview

OTC Derivatives:
- Bilateral contracts over future transfers, given (future) realized state of an underlying asset.
- Buyers use them to hedge risky assets.

Market Risk Exposure:
- Holding derivatives exposes buyers to seller default risk.

Central counterparties (CCPs) offer counterparty default insurance.

Mandatory Central Clearing:
- Post financial crisis, insurance became mandatory for some derivatives classes.
- Significant increase in share of insured OTC derivatives and collateral.
- Smaller buyers reported difficulties to access the market.

Market Risk Hedging:
- Large firms, hedge funds, investment funds and pension funds hold risky assets.
- They buy OTC derivatives from banks or broker-dealers to hedge their asset risk.

Credit Risk Exposure:
- Sellers can and do default on OTC transfers, e.g. Lehman Brothers.
- Due to OTC derivatives, or more likely, other business losses.

Central Clearing:
- For-profit central counterparties (CCPs) provide counterparty default insurance.
- Upon default they manage and ensure contracted payments.

Market Microstructure

Risk-Averse Buyers:
- Have mean-variance utility
- Endowed with heterogeneous number of risky assets
- Matched with one seller and switching to other sellers is costly.

Risk-Neutral Sellers:
- Protected by limited liability allowing for strategic default.
- Endowed with risky profits from other business lines.
- Matched with a single buyer, but compete over all buyers.
- Choose between two business models:
  - Clearing members can access the CCP services (costly).
  - Non-clearing members can only sell derivatives (cost free).

Monopolistic For-Profit CCP:
- Decides whether to enter the market.
- Upon entry, sets a two-part tariff system:
  - Fixed clearing membership fee
  - Variable insurance fee.
- Insures buyers against clearing member defaults.

Theoretical Analysis

Model Environment

Risk-Averse Buyers:
- Have mean-variance utility
- Endowed with heterogeneous number of risky assets
- Matched with one seller and switching to other sellers is costly.

Risk-Neutral Sellers:
- Protected by limited liability allowing for strategic default.
- Endowed with risky profits from other business lines.
- Matched with a single buyer, but compete over all buyers.
- Choose between two business models:
  - Clearing members can access the CCP services (costly).
  - Non-clearing members can only sell derivatives (cost free).

Monopolistic For-Profit CCP:
- Decides whether to enter the market.
- Upon entry, sets a two-part tariff system:
  - Fixed clearing membership fee
  - Variable insurance fee.
- Insures buyers against clearing member defaults.

SPNE with Incomplete Information

Voluntary Insurance

1. i CCP sets fees and collateral; sellers become clearing members.
2. i Buyer chooses whether and from which seller to purchase derivatives.
3. j Transfers given buyer allocation, seller default and product choices.

Mandatory Insurance

Buyer chooses whether and from which seller to purchase derivatives.
Buyer decides whether and from which seller to purchase the bundle of derivative and default insurance.

Theoretical Results

- Mandatory insurance empowers the monopolistic for-profit CCP to set higher prices.
- Therefore, smaller buyers and sellers exit the market.
- Larger buyers and sellers insure more of their derivatives.
- Decreased credit risk.
→ Buyer size distribution determines the aggregate effect of mandatory insurance.

Calibration and Evaluation

Calibration

- Parameterize the model for EuroDollar FX OTC derivatives.
- Here, insurance is still voluntary.

Theoretical Results

- Decompose the VAR into market risk (MR) and credit risk (CR):
  \[ \Delta V A R = \Delta M R + \Delta C R \] (1)
- Compare average buyer's exposure to market and credit risk.

Credit Risk Externality

- No uninsured and more insured sales lowers seller default.
- Compare the average seller's default risk improvements:
  \[ \Delta D = -0.0009 \] (2)

Calibration Results

- The EuroDollar FX Market is populated by many small buyers.
- Insurance provides little additional value even to large buyers.
→ Mandatory insurance for EuroDollar FX derivatives would result in a substantial increase in financial risk exposure.