Clearing, Counterparty Risk and Aggregate Risk

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Motivation

- Counterparty risk as an important concern
  - Lehman, AIG
- Centralized Clearing Platforms (CCP) to mitigate this risk
  - feature prominently in post-crisis regulation design
- Issues…
  - how exactly does clearing improve the allocation of risk?
  - decentralized or centralized (CCP)?
  - is full insurance desirable?
  - can clearing create new risk?
  - how should CCPs be financed, governed, or regulated?
What do we do

- Study optimal clearing arrangements when:
  - risk-sharing contracts between protection buyers and protection sellers are subject to counterparty risk
  - finding creditworthy counterparties requires costly effort (due diligence)
  - third party can insure against risk of counterparty default (centralized or decentralized)
What do we find

- Without asymmetric information and aggregate risk
  - clearing via CCP achieves first-best (through mutualization)

- Aggregate risk requires finding viable counterparties to bring in risk-bearing capacity
  - protection sellers provide full insurance against the hedged risk
  - CCP provides full insurance against counterparty risk

- Unobservable search effort
  - CCP provides only partial insurance against counterparty risk to encourage finding viable counterparties (constrained efficiency)
Literature

- CCP to prevent non-exclusive contracting
  - Acharya & Bisin (2010)

- Netting efficiency of CCPs
  - Duffie & Zhou (2009)

- CCPs and asymmetric information
  - Pirrong (2009)

- Endogenous counterparty risk (seller moral-hazard)
  - Thompson (2010); Biais, Heider & Hoerova (2010)

- Asymmetric information about counterparty risk leads to illiquidity in markets
  - Heider, Hoerova & Holthausen (2010)
Protection buyers

- Risk averse protection buyer $j$ endowed with illiquid risky asset

$\gamma=0 \rightarrow$ only idiosyncratic risk; $\gamma=\frac{1}{2} \rightarrow$ only aggregate risk
Finding good protection sellers

- Protection sellers are risk-neutral and endowed with risky illiquid asset
  - independent of buyer risk, limited liability
- Finding good protection sellers requires costly effort from buyer (possibly unobservable)

\[
egin{align*}
\text{search effort} & \quad \text{match with a good seller} & \text{match with a bad seller} \\
\text{no effort} & \\
& \quad \begin{cases}
p & R_i \\
1 - p & 0
\end{cases} & \\
& \quad \begin{cases}
p - \delta & R_i \\
1 - p + \delta & 0
\end{cases}
\end{align*}
\]
Optimal contracting and clearing arrangements
Timeline

-t=0: Clearing structure in place
-t=¼: Search effort e
-t=½: Matching; Contracting
-t=¾: Macro-shock
-t=1: Realization of buyer and seller shocks; Final pay-offs
No-clearing and decentralized clearing

- Bi-lateral trade
  - full insurance conditional on seller survival
  - exposure to counterparty risk
  - search effort desirable if high risk aversion, large difference across seller types, low cost of effort

- Decentralized clearing
  - opportunity cost of setting aside cash to pay insurance → partial insurance against counterparty risk
  - the fee for clearing is higher if search effort not expended
Centralized clearing

- Centralized clearing (mutualization)
  - law of large numbers → no opportunity cost
  - full insurance against counterparty risk
  - search effort redundant

- Aggregate risk
  - mutualization is not sufficient
  - effort to ensure additional risk-bearing capacity necessary
  - together, CCP and protection sellers achieve full insurance

- Moral-hazard
  - full counterparty risk insurance undermines incentives to find good counterparties → higher aggregate default rates
  - to incentivize search effort → only partial insurance
Governance of CCPs

- Consider a for-profit CCP
  - could offer full insurance
  - buyers do not exert search effort
  - in good state, CCP collects large fees
  - in bad state, CCP defaults (limited liability)
  - systemic event $\rightarrow$ bail-out
  - confirms expectation of full insurance

- CCPs are natural monopolies
  - exclusivity needed to maintain constrained efficiency

- CCP should be a cooperative or tightly regulated
Conclusion

- Counterparty risk is an important concern
- It can be mitigated by
  - self-insurance (setting aside safe assets)
  - self-protection (search for good counterparties)
  - mutualization (CCP)
- Appropriately designed CCP implements constrained efficient outcome, but
  - self-protection required to enhance risk-bearing capacity in the presence of aggregate shocks
  - hence, CCP should not offer full insurance