The CCP-bank nexus

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Motivation

- Central clearing became key feature of derivatives markets
  - after the financial crisis (Lehman failure)
  - (in part) due to regulatory reform agenda of G20

- Strong interlinkages between banks and CCPs

- We need to understand how central counterparties (CCPs) and (systematically important) banks interact through these interlinkages

- CCP-bank nexus: understanding stress scenarios
  
  Faruqui, Huang and Takats: The CCP-bank nexus, BIS Quarterly Review, 2018 December
Roadmap

1. The market of central clearing

2. CCPs in derivatives clearing: balance sheet dynamics

3. CCPs are special: Understanding the waterfall
   a) Case studies: CCPs at risk

4. CCP-bank nexus under stress
   a) Medium stress: initial margin-at-risk
   b) High stress: default fund-at-risk
   c) Extreme stress: committed funds-at-risk

5. Conclusion
The market of central clearing: large exposures

Banks and central counterparties (CCPs) have large exposures to each other

Graph 1

Central clearing rates in OTC derivatives markets

Banks’ outstanding notional cleared by CCPs

US banks’ OTC derivatives cleared by CCPs

Per cent

USD trn

USD trn

09 10 11 12 13 14 15 16 17 18

0 20 40 60 80

IRD

CDS

IRD (lhs)

CDS (rhs)

JPMorgan
Citibank
Bank of America
Goldman Sachs
HSBC
Wells Fargo Bank
Other

24
18
12
6
0
The market of central clearing: concentration

Central counterparties (CCPs) and clearing members are concentrated

Graph 2

Concentration of CCPs in OTC derivative markets\(^1,2\)

Concentration of CCPs in individual products\(^1,3\)

Contribution to CCP prefunded resources of top 5 clearing members\(^2\)
CCPs are more profitable than banks

High profitability of CCPs is consistent with high concentration

Graph 3

CCP ROE

Bank ROE

Average = 36

Average = 3
CCPs in derivatives clearing: balance sheet dynamics (1)

At trade initiation (t=0)
CCPs in derivatives clearing: balance sheet dynamics (2)

After market price move (t=1)
Default waterfall

- Initial margin of defaulting member(s)
- Default fund contribution of defaulting member(s)
- CCP capital at risk ("skin-in-the-game")
- Default fund contribution of non-defaulting members
- Committed resources by non-defaulting members (e.g., cash calls and VMGH)
Material risks remain

- CCP performed well during the financial crisis
  - Lehman bankruptcy clear up

- Yet, there is a (short) history of clearinghouse failures
  - Caisse de Liquidation des Affaires et Marchandises (1974)
  - Hong Kong Futures Guarantee Corporation (1987)

- And near failures
  - Chicago Mercantile Exchange (1987)
  - Options Clearing Corporation (1987)
  - BM&F CCP (Brazil) (1999)

- And severe stress even under benign conditions
  - Korean CCP (2013)
  - Nasdaq AG (2018 September)
CCP-bank nexus under stress

- Medium stress: initial margin-at-risk
- High stress: default fund-at-risk
- Extreme stress: committed funds-at-risk
Medium stress: initial margin-at-risk

- Small losses, with high probability
- Big losses, with low probability
- Extremely large losses, with very low probability

1. Initial margin of defaulting member(s)
2. Default fund contribution of defaulting member(s)
3. CCP capital at risk (“skin-in-the-game”)
4. Default fund contribution of non-defaulting members
5. Committed resources by non-defaulting members (e.g., cash calls and VMGH)
Medium stress: initial margin-at-risk

Bank A
- Asset
  - Illiquid assets
  - IM
  - IM call
  - DF
- Liability
  - Debt
  - Equity

Fire sale

Bank

CCP
- Asset
  - Liquid assets
- Liability
  - IM A
  - IM call A
  - IM call B
  - IM B
  - SITG
  - DF A
  - DF B

Margin calls
High stress: default fund-at-risk

- Small losses, with high probability
- Big losses, with low probability
- Extremely large losses, with very low probability

1. Initial margin of defaulting member(s)
2. Default fund contribution of defaulting member(s)
3. CCP capital at risk ("skin-in-the-game")
4. Default fund contribution of non-defaulting members
5. Committed resources by non-defaulting members (e.g., cash calls and VMGH)
High stress: default fund-at-risk
Extremely large losses, with very low probability

Initial margin of defaulting member(s)

Default fund contribution of defaulting member(s)

CCP capital at risk (“skin-in-the-game”)¹

Default fund contribution of non-defaulting members

Committed resources by non-defaulting members (eg cash calls and VMGH)

Small losses, with high probability

Big losses, with low probability

Probability
Extreme stress: committed funds-at-risk
Conclusion

● Potential destabilising feedback loop between banks and CCPs

● Need to think about bank and CCP risk jointly, rather than in isolation

● Risk is dynamic and endogenous, not static and exogenous

● There is some awareness of these issues in regulation, but full incorporation is demanding

● We hope this article is helpful for policymakers, regulators, the financial industry and academics interested in central clearing