CCP resilience and clearing membership

Angela Armakola* 
Jean-Paul Laurent**

*Université Paris 1 Panthéon – Sorbonne, PRISM

**Université Paris 1 Panthéon – Sorbonne, PRISM & Labex Réfi

1st June 2015

32nd Spring International Conference of the French Finance Association
CCP resilience and clearing membership

1. CCP systemic risk: a major concern for financial stability

2. CCP: a system to reallocate losses among clearing members
   a) Mutualisation according to CCP rule books (default waterfall)
   b) Recovery versus resolution (extra burden to clearing members?)

3. Creditworthiness of clearing members for EU and US CCPs
   a) Ability to face liquidity calls under normal and stressed scenarios
   b) Diverging CCP member bases: average credit quality, heterogeneity

4. Enhancing CCP resilience
   a) membership eligibility, waterfall design, resolution regimes…
CCPs and systemic risk as seen from EU and US regulators

• “Mandatory clearing will turn CCPs into systemic nodes in the financial system, with unknown, but possibly far-reaching, consequences.” (ESRB, 2013)


CCPs and systemic risk as seen from the Fed

• “CCP recovery strategy...is premised on imposing losses on...CCP members...will likely be suffering losses and facing liquidity demands of their own...uncertainty is increased by the difficulty of estimating with any precision the extent of potential liability of...complicating...efforts by the official sector to assess system-wide capital and liquidity availability...” (Tarullo, 2015)

• “... since the default of two large counterparties would almost surely be accompanied by significant market disruption...it is important to ensure a consistent, robust implementation of the cover 2 standard...” (Tarullo, 2015)

CCP and clearing members: loss allocation rules

Initial Margin of defaulting CM
Default Fund contribution of defaulting CM
% of CCP capital (skin in the game)

Defaulter’s resources
Pre-funded resources

Pre-funded default fund contributions of non-defaulting CMs
Additional funds provided by non-defaulting CMs (recovery tools)
Remaining CCP capital and equity

Mutualised resources
Unfunded resources

Pre-funded loss-sharing mechanism
Unfunded loss-sharing mechanism

Order of assessment

Losses not covered by defaulted member margin are supported by surviving clearing members
Resources mutualised among clearing members

- Default fund contributions
  - Basel III capital charge for default fund exposures (2012): not risk sensitive

- Recovery tools: cash calls, haircuts
  - Replenishment of the default fund
    - Surviving members are compelled to replenish the depleted DF
    - To ensure continuity of CCP (instead of resolution)
    - Creating extra exposures to good quality participant not assessed under current regulations
  - Margin haircutting
    - Variation margin haircutting caps the post-default profits of CMs
    - Initial margin haircutting dramatically increases CMs counterparty risk
Rules for CCP resolution magnify clearing membership issues

• International rules for recovery and resolution are in the making
  • UK already set its own rules.

• Being in good company is a key aspect of monitoring credit risk exposures to CCPs, as…
  • FSB (2014) and CPSS-IOSCO (2014) favour continuity (recovery) over resolution…
  • **Bail-ins are to be privileged** and CCP capital amounts are quite low….
    • Only surviving participants’ resources will be available
    • Need to consider surviving participants ability to raise funds in times of crisis
    • **Depends on financial strength of member base**
Empirical analysis of member bases across EU and US CCPs

- **Topical issue**
  - Compulsory stress testing exercises: Bailey, 2014; Powell, 2014; Tarullo, 2015
  - Ability of CCPs to face default of two CMs (cover 2 standard)? Murphy and Nahai-Williamson, 2014

- **Risk distribution of member bases: assessment of CCP resilience**
  - 13 major CCPs operating in the EU and the US
  - Normal market conditions
  - Stressed scenario with two defaulted participants

- **Member base typology**
  - Average credit quality (high/low), heterogeneity (high/low)
Empirical investigation: 13 major CCPs operating in the EU and the US

- Credit ratings of clearing members as a proxy of financial strength

<table>
<thead>
<tr>
<th>CCP</th>
<th>CMs Total</th>
<th>Not-rated CMs</th>
<th>Rated CMS</th>
<th>Percentage of not-rated CMs</th>
</tr>
</thead>
<tbody>
<tr>
<td>CME Clearing US</td>
<td>68</td>
<td>24</td>
<td>44</td>
<td>35.29%</td>
</tr>
<tr>
<td>CME Clearing EU</td>
<td>21</td>
<td>2</td>
<td>19</td>
<td>9.52%</td>
</tr>
<tr>
<td>Eurex</td>
<td>174</td>
<td>34</td>
<td>140</td>
<td>19.54%</td>
</tr>
<tr>
<td>ICE Clear Credit</td>
<td>28</td>
<td>0</td>
<td>28</td>
<td>0.00%</td>
</tr>
<tr>
<td>ICE Clear Europe</td>
<td>80</td>
<td>19</td>
<td>61</td>
<td>23.75%</td>
</tr>
<tr>
<td>ICE Clear US</td>
<td>37</td>
<td>13</td>
<td>24</td>
<td>35.14%</td>
</tr>
<tr>
<td>The Clearing Corporation</td>
<td>12</td>
<td>1</td>
<td>11</td>
<td>8.33%</td>
</tr>
<tr>
<td>LCH.Clearnet LLC</td>
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<td>16</td>
<td>0.00%</td>
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<tr>
<td>LCH.Clearnet LTD</td>
<td>156</td>
<td>11</td>
<td>145</td>
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<tr>
<td>LCH.Clearnet SA</td>
<td>103</td>
<td>18</td>
<td>85</td>
<td>17.48%</td>
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<tr>
<td>CC&amp;G</td>
<td>80</td>
<td>25</td>
<td>55</td>
<td>31.25%</td>
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<tr>
<td>EuroCCP</td>
<td>48</td>
<td>11</td>
<td>37</td>
<td>22.92%</td>
</tr>
<tr>
<td>ECC</td>
<td>21</td>
<td>2</td>
<td>19</td>
<td>9.52%</td>
</tr>
</tbody>
</table>

Standard & Poor’s Rating Traffic lights

- AAA
- AA
- A
- BBB
- BB
- B
- CCC
Creditworthiness of clearing members under normal market conditions – US CCPs (average quality, CM heterogeneity)

<table>
<thead>
<tr>
<th>S&amp;P Rating grade</th>
<th>Basel III DRW (in %)</th>
<th>DP (in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAA</td>
<td>0.05</td>
<td>0.01</td>
</tr>
<tr>
<td>AA</td>
<td>2</td>
<td>0.05</td>
</tr>
<tr>
<td>A</td>
<td>3</td>
<td>0.09</td>
</tr>
<tr>
<td>BBB</td>
<td>6</td>
<td>0.23</td>
</tr>
<tr>
<td>BB</td>
<td>15</td>
<td>1.16</td>
</tr>
</tbody>
</table>
Creditworthiness of clearing members under normal market conditions – EU CCPs (average quality, CM heterogeneity)

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<td>0.23</td>
</tr>
<tr>
<td>BB</td>
<td>15</td>
<td>1.16</td>
</tr>
<tr>
<td>B</td>
<td>30</td>
<td>5.44</td>
</tr>
</tbody>
</table>
Creditworthiness of clearing members under stressed market conditions – US CCPs (average quality, CM heterogeneity)

High default probabilities of clearing members under a stressed scenario jeopardize the ability to replenish the default fund.
Creditworthiness of clearing members under stressed market conditions – EU CCPs (average quality, CM heterogeneity)

Conditional default probabilities (DP) of clearing members under cover 2 approach

High default probabilities of clearing members under a stressed scenario jeopardize the ability to replenish the default fund
Creditworthiness of clearing members under stressed market conditions – (average quality, CM heterogeneity)

- High default probabilities of clearing members under a stressed scenario jeopardize the ability to replenish the default fund
  - Without public subsidies (bail out)…
  - Or without using Initial Margin of non defaulted clearing members …
    - Enhancing systemic risk: interconnectedness between clearing members

- Computation of conditional default probabilities
  - Mapping of default probabilities onto ratings
    - Tasche (2013) and Gordy and Lütkebohmert (2013), Basel III (2014)
  - Conditional default probabilities computed under Basel II & III frameworks
    - Banking book correlations are low
    - Trading book/market implied correlations would magnify default probabilities
## Comparing CCP member bases: average credit quality (high/low), heterogeneity (high/low)

<table>
<thead>
<tr>
<th>Member base</th>
<th>Member base</th>
</tr>
</thead>
<tbody>
<tr>
<td>consists only of good quality</td>
<td>majority is of good quality, small proportion of low quality CMs</td>
</tr>
<tr>
<td>majority is of low quality, only a small proportion of good quality CMs</td>
<td>majority is of good quality, but significant proportion of low quality CMs</td>
</tr>
</tbody>
</table>

| • LCH.CLEARNET LLC | • ECC |
| • ICE CLEAR CREDIT | • CME CLEARING EU |
| • LCH.CLEARNET LTD | • TCC |
| • TCC | • EUREX |

| • CC&G | • ICE CLEAR US |
| • ICE CLEARING US | • EUROCCP |
| • EUROCCP | • LCH.CLEARNET SA |
| • ICE CLEAR EU | • LCH.CLEARNET LTD |
Challenges depend upon member base structure: average credit quality (high/low), heterogeneity (high/low)

<table>
<thead>
<tr>
<th>Member base consists only of good quality</th>
<th>Member base majority is of good quality, but significant proportion of low quality CMs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Member base majority is of good quality, small proportion of low quality CMs</td>
<td>Only good quality Clearing Members</td>
</tr>
</tbody>
</table>

- Restricted membership
- Adverse selection
- Increased bail-out risk
- Runs
Conclusion: CCP design, clearing membership and regulation

- Ability of a number of CCPs to face a stress scenario without public funding is questionable
  - Systemic risk difficult to conceal
- Strength of member base structure is a key factor
  - Membership eligibility criteria should be strengthened
  - Qualifying criteria (ESMA, CFTC) should be revisited
- Waterfall design must be thought accordingly
  - Risk sensitive default fund contributions might mitigate bad incentives
  - Capped unfunded contributions help monitoring counterparty default risk
  - Increase ratio of IM to DF? Defaulter’s pay approach underestimates interconnectedness
  - Clarify the status of IM under resolution regimes (especially in the US)
Literature

- **CCP vs OTC**
  Cont and Kokholm (2014), Duffie and Zhu (2011), Singh (2011), ...

- **Contagion and interconnection risks**
  Wendt (2015), Pirrong (2014), Yellen (2013), ...

- **CCP resilience and risk management**

- **Prudence of regulatory default fund standard**
  Murphy and Nahai-Williamson (2014)

- **CCP resolution vs. CCP recovery**
# Description of the dataset - CCPs

<table>
<thead>
<tr>
<th>Group</th>
<th>CCP</th>
<th>Geography</th>
<th>Company structure</th>
<th>Ownership structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>CME Group</td>
<td>CME Clearing</td>
<td>US</td>
<td>For-profit entity</td>
<td>Exchange: 100%</td>
</tr>
<tr>
<td></td>
<td>CME Clearing Europe</td>
<td>EU</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ECC</td>
<td>EU</td>
<td>For-profit entity</td>
<td>Exchange: 100%</td>
</tr>
<tr>
<td></td>
<td>EuroCCP</td>
<td>EU</td>
<td>For-profit entity</td>
<td></td>
</tr>
<tr>
<td>Deutsche Börse Group</td>
<td>EUREX Clearing</td>
<td>EU</td>
<td>For-profit entity</td>
<td>Exchange: 100%</td>
</tr>
<tr>
<td>ICE Inc.</td>
<td>ICE Clear Credit</td>
<td>US</td>
<td>For-profit entity</td>
<td>Exchange: 100%</td>
</tr>
<tr>
<td></td>
<td>ICE Clear Europe</td>
<td>EU</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ICE Clear Europe</td>
<td>US</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The Clearing Corporation</td>
<td>US</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LSEG</td>
<td>CC&amp;G</td>
<td>EU</td>
<td>For-profit entity</td>
<td>Exchange: 100%</td>
</tr>
<tr>
<td>LCH.Clearnet Group</td>
<td>LCH.Clearnet LLC</td>
<td>US</td>
<td>For-profit entity</td>
<td>Exchange: 60% Other: 40%</td>
</tr>
<tr>
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<tr>
<td></td>
<td>LCH.Clearnet SA</td>
<td>EU</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
References

European Commission (2012). Consultation on a possible recovery and resolution framework for financial institutions other than banks.
FSB (2011). Key attributes of effective resolution regimes for financial institutions.
FSB (2014). Key attributes of effective resolution regimes for financial institutions.
References