CCP resilience and clearing membership

Angela Armakola* Jean-Paul Laurent**

*Université Paris 1 Panthéon – Sorbonne, PRISM

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

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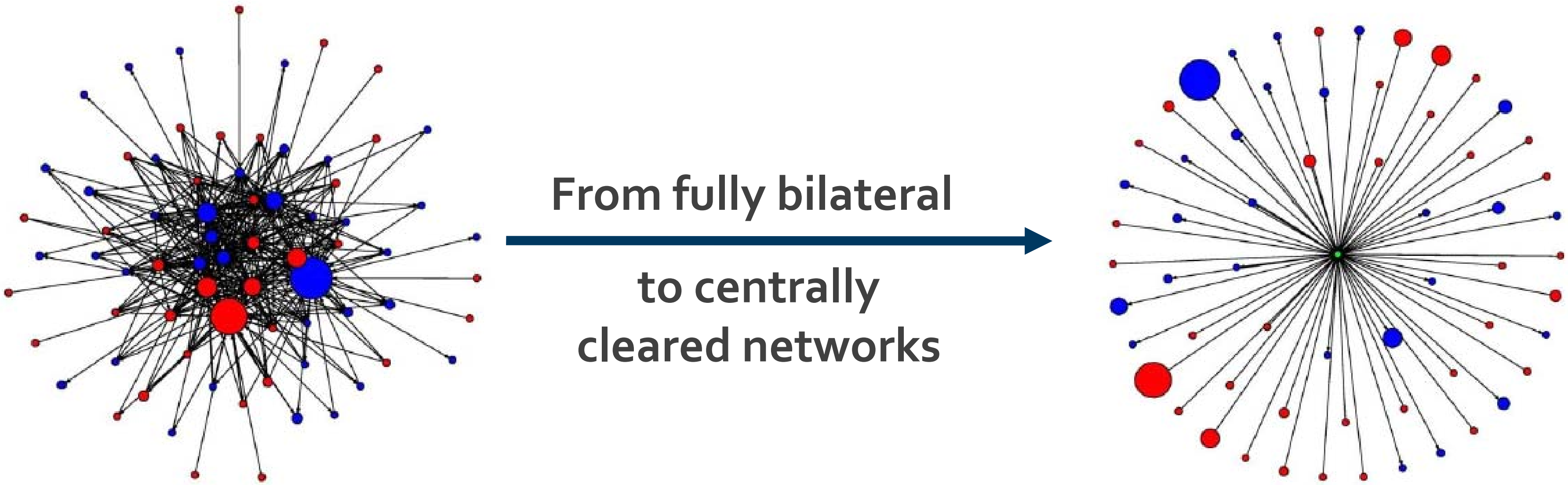
CCP resilience and clearing membership

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)

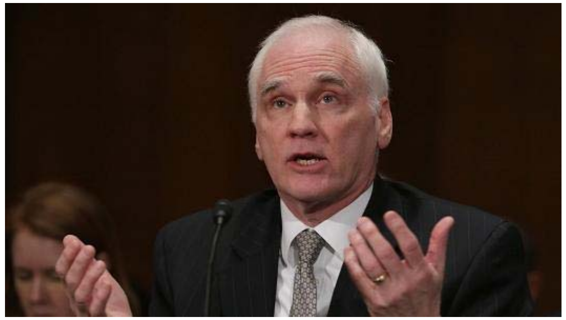


- From “Interconnectedness and Systemic Risk: Lessons from the Financial Crisis and Policy Implications”, Remarks by Janet L. Yellen, American Economic / American Finance Association Luncheon http://www.federalreserve.gov/newsevents/speech/yellen20130104a.htm

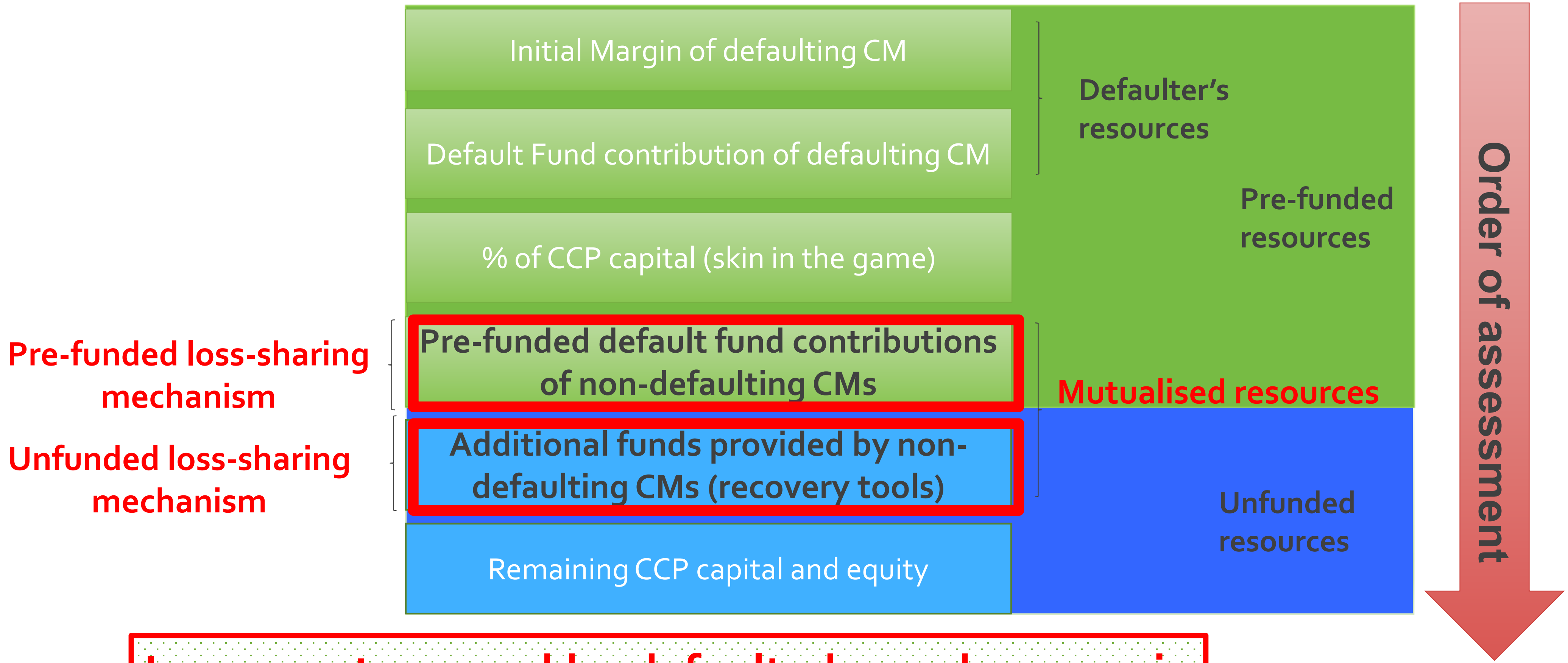
CCPs and systemic risk as seen from the Fed

- “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)
- http://www.federalreserve.gov/newsevents/speech/tarullo20150130a.htm

Board of Governors of the Federal Reserve System



CCP and clearing members: loss allocation rules



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**
  - FSB, 2011, 2014; European Commission, 2012; CPSS-IOSCO, 2013, 2014
  - 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)

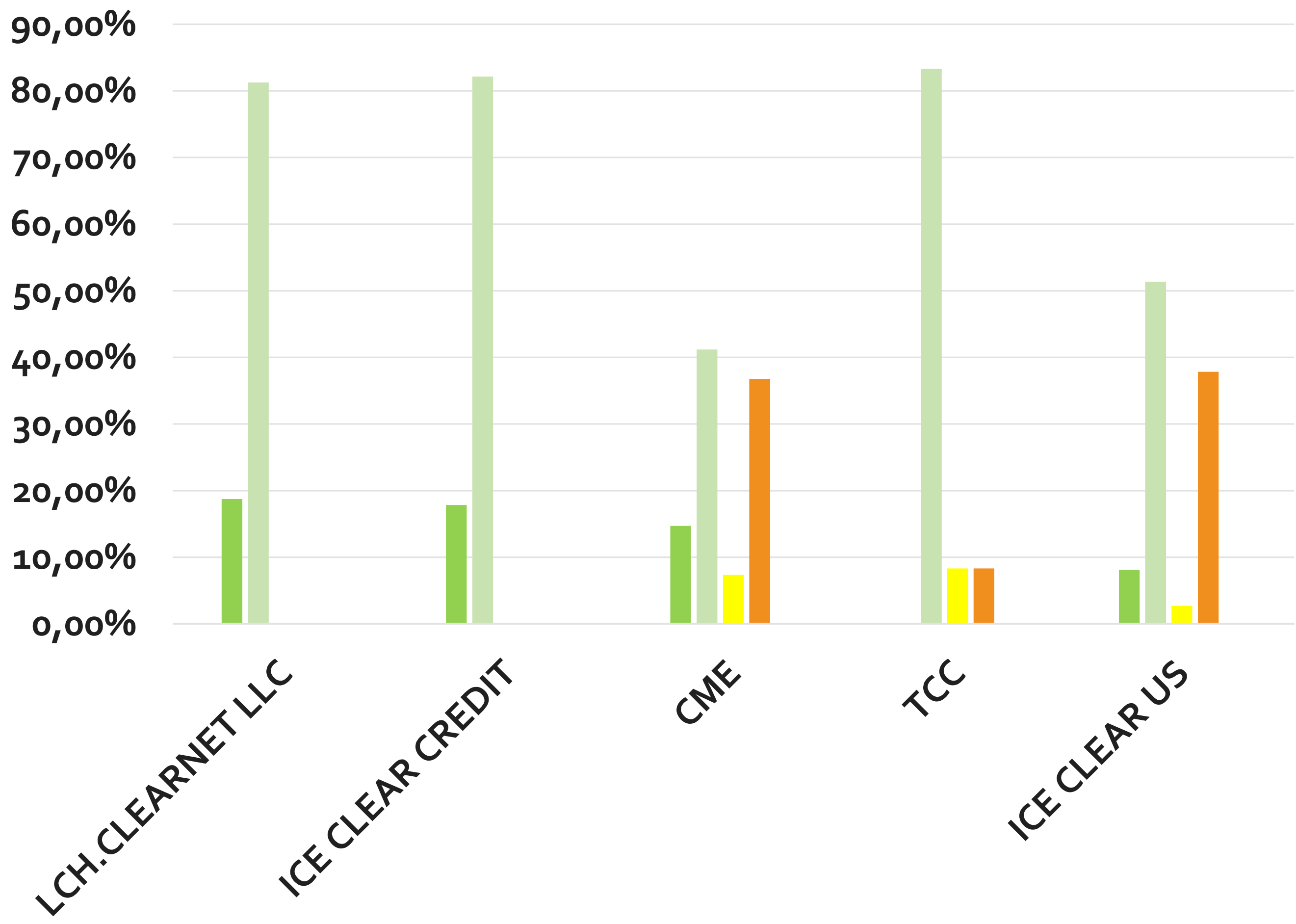
Empirical investigation: 13 major CCPs operating in the EU and the US

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

CCP	CMs Total	Not-rated CMs	Rated CMS	Percentage of not-rated CMs
CME Clearing US	68	24	44	35.29%
CME Clearing EU	21	2	19	9.52%
Eurex	174	34	140	19.54%
ICE Clear Credit	28	0	28	0.00%
ICE Clear Europe	80	19	61	23.75%
ICE Clear US	37	13	24	35.14%
The Clearing Corporation	12	1	11	8.33%
LCH.Clearnet LLC	16	0	16	0.00%
LCH.Clearnet LTD	156	11	145	7.05%
LCH.Clearnet SA	103	18	85	17.48%
CC&G	80	25	55	31.25%
EuroCCP	48	11	37	22.92%
ECC	21	2	19	9.52%

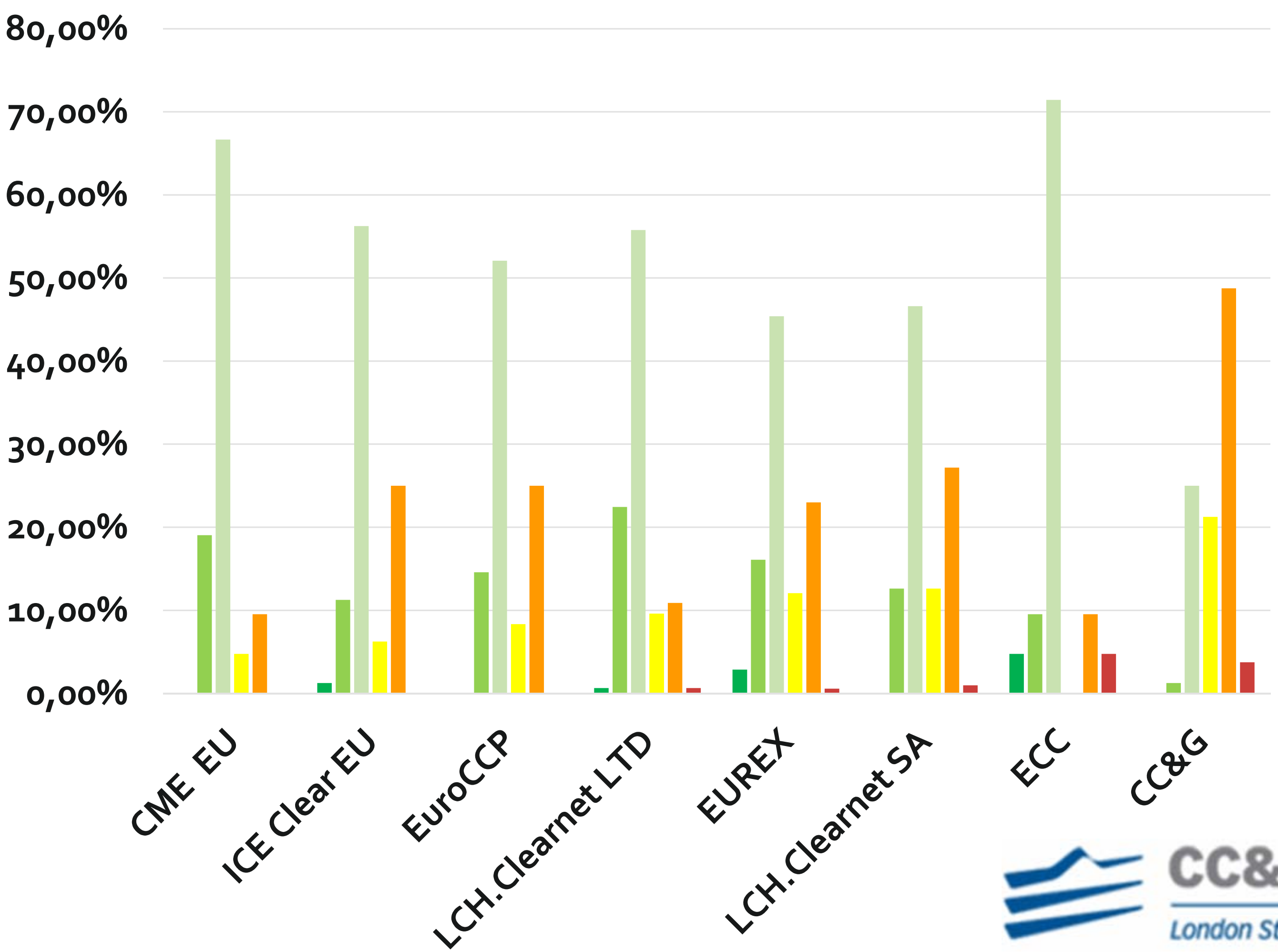
Standard & Poor's Rating Traffic lights
AAA
AA
A
BBB
BB
B
CCC

Creditworthiness of clearing members under normal market conditions – US CCPs (average quality, CM heterogeneity)



S&P Rating grade	Basel III DRW (in %)	DP (in %)
AAA	0.05	0.01
AA	2	0.05
A	3	0.09
BBB	6	0.23
BB	15	1.16

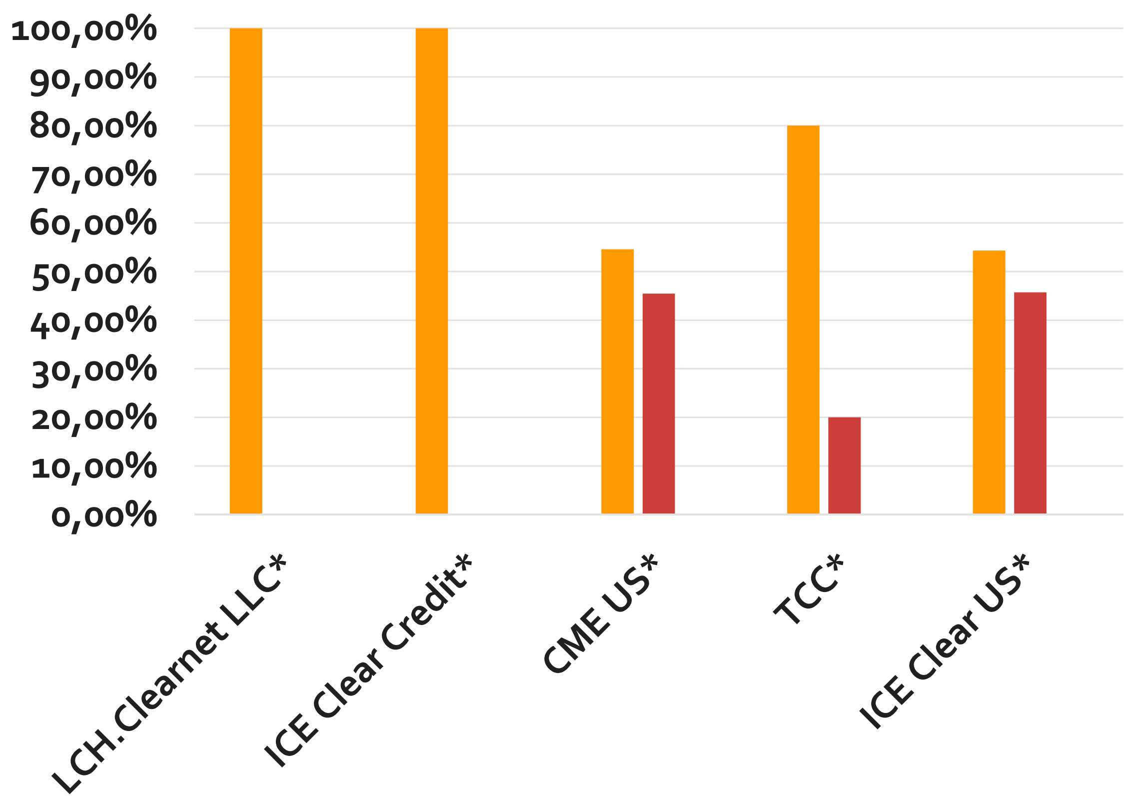
Creditworthiness of clearing members under normal market conditions – EU CCPs (average quality, CM heterogeneity)



S&P Rating grade	Basel III DRW (in %)	DP (in %)
AAA	0.05	0.01
AA	2	0.05
A	3	0.09
BBB	6	0.23
BB	15	1.16
B	30	5.44

ECC European Commodity Clearing
EuroCCP Make a difference
CME Group
ice
eurex clearing
CC&G London Stock Exchange Group
LCH.CLEARNET

Creditworthiness of clearing members under stressed market conditions – US CCPs (average quality, CM heterogeneity)

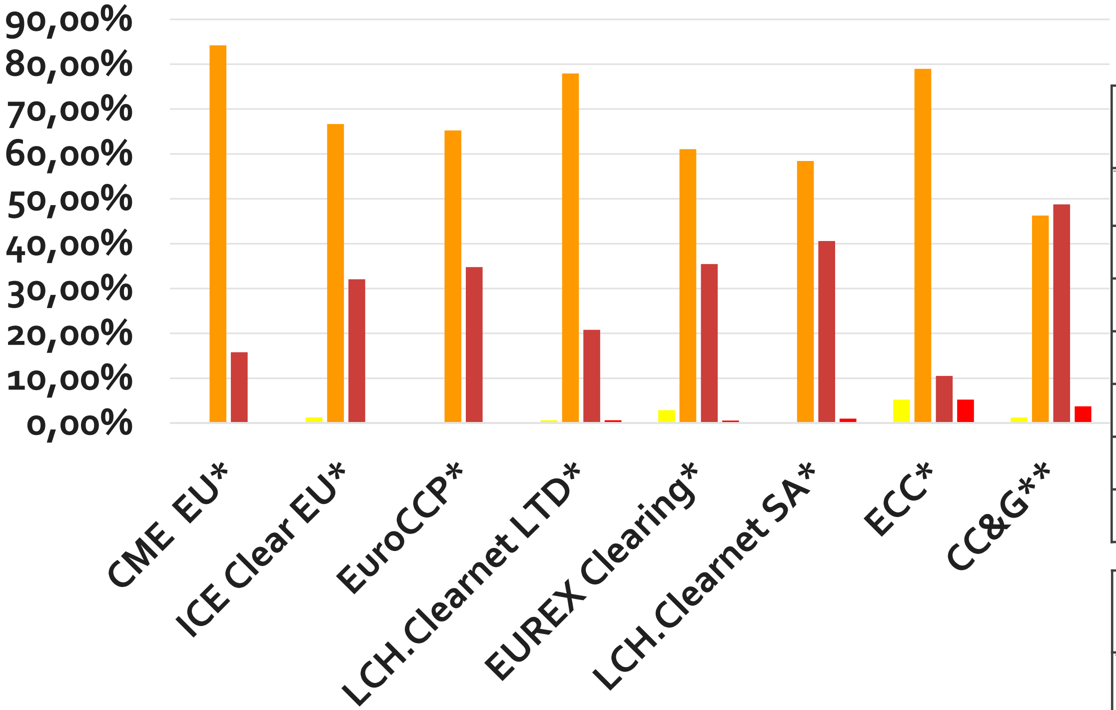


Conditional default probabilities (DP) of clearing members under cover 2 approach

CM PD conditional on the default of two average CMs (in %)		
PD of average CMs / CM PD	0.09%	S&P Rating Category
0.05 %	1.83	BB
0.09 %	2.97	
0.23 %	5.84	B
1.16 %	12.28	

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)



High default probabilities of clearing members under a stressed scenario jeopardize the ability to replenish the default fund

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

CM PD conditional on the default of two average CMs (in %)

CM PD \ PD of average CMs	0.09%	S&P Rating Category
0.01 %	0.45	BBB
0.05 %	1.83	BB
0.09 %	2.97	
0.23 %	5.84	B
1.16 %	12.28	
5.44 %	25.94	CCC

CM PD conditional on the default of two average CMs (in %)

CM PD \ PD of average CMs	1.16%	S&P Rating Category
0.05 %	0.75	BBB
0.09 %	1.19	BB
0.23 %	2.42	
1.16 %	7.12	B
5.44 %	17.79	CCC

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)

Member base consists only of good quality	Member base majority is of good quality, small proportion of low quality CMs
Member base majority is of low quality, only a small proportion of good quality CMs	Member base majority is of good quality, but significant proportion of low quality CMs

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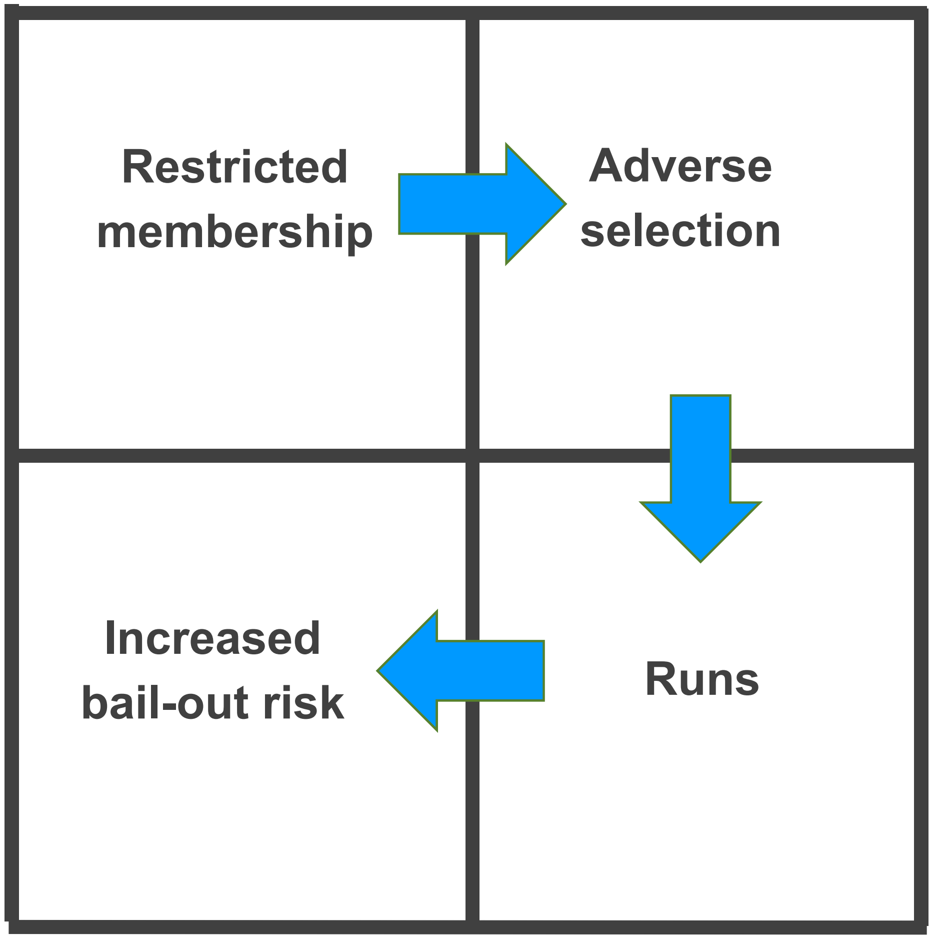
• CC&G	• ICE CLEAR US • CME CLEARING US • EUROCCP • LCH.CLEARNET SA • ICE CLEAR EU

Challenges depend upon member base structure: average credit quality (high/low), heterogeneity (high/low)

Member base consists only of good quality	**Member base majority is of good quality, but significant proportion of low quality CMs**
Member base majority is of good quality, small proportion of low quality CMs	**Only good quality Clearing Members**



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**

  Ghamami (2015), Menkveld (2015), Lin and Surti (2015), Budding and Murphy (2014), Cruz Lopez et al. (2014), Murphy and Nahai-Williamson (2014), Pirrong (2014), Nahai-Williamson et al. (2013), …

- **Prudence of regulatory default fund standard**

  Murphy and Nahai-Williamson (2014)

- **CCP resolution vs. CCP recovery**

  Duffie (2014), Lubben (2014), Singh (2014), Tucker (2014), Duffie and Skeel (2012),...

Description of the dataset - CCPs

<table>
<tr><th>Group</th><th>CCP</th><th>Geography</th><th>Company structure</th><th>Ownership structure</th></tr>
<tr><td rowspan="2">CME Group</td><td>CME Clearing</td><td>US</td><td rowspan="2">For-profit entity</td><td rowspan="2">Exchange: 100%</td></tr>
<tr><td>CME Clearing Europe</td><td>EU</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>User: 25%
Exchange: 50%
Other: 25%</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 rowspan="4">ICE Inc.</td><td>ICE Clear Credit</td><td>US</td><td rowspan="4">For-profit entity</td><td rowspan="4">Exchange: 100%</td></tr>
<tr><td>ICE Clear Europe</td><td>EU</td></tr>
<tr><td>ICE Clear Europe</td><td>US</td></tr>
<tr><td>The Clearing Corporation</td><td>US</td></tr>
<tr><td>LSEG</td><td>CC&G</td><td>EU</td><td>For-profit entity</td><td>Exchange: 100%</td></tr>
<tr><td rowspan="3">LCH.Clearnet Group</td><td>LCH.Clearnet LLC</td><td>US</td><td rowspan="3">For-profit entity</td><td rowspan="3">Exchange: 60%
Other: 40%</td></tr>
<tr><td>LCH.Clearnet LTD</td><td>EU</td></tr>
<tr><td>LCH.Clearnet SA</td><td>EU</td></tr>
</table>

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