

TRAN BAO CAO

CENTRAL CLEARING AND CREDIT DEFAULT SWAPS

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Contents

ABSTRACT.....	5
<i>I INTRODUCTION</i>	<i>7</i>
<i>A Research Question</i>	<i>7</i>
<i>B Scope of Research Paper</i>	<i>7</i>
<i>C Research Outcomes.....</i>	<i>8</i>
<i>D Structure of the Research Paper</i>	<i>8</i>
<i>II CREDIT DEFAULT SWAPS AND COUNTERPARTY RISK.....</i>	<i>9</i>
<i>A Pre-crisis Operation of the Credit Default Swap Market</i>	<i>9</i>
<i>B Pre-Financial Crisis Collateral Practices.....</i>	<i>11</i>
<i>1 Arbitrary waiver of collateral requirement.....</i>	<i>12</i>
<i>2 Inadequate collateral.....</i>	<i>13</i>
<i>3 No segregation between collateral and working capital</i>	<i>13</i>
<i>III RATIONALE BEHIND IMPOSING CENTRAL CLEARING ON CREDIT DEFAULT SWAPS... 14</i>	
<i>A Proposed Solutions to Counterparty Risk.....</i>	<i>14</i>
<i>B Alternative Clearing Structures</i>	<i>15</i>
<i>1 Clearing concept</i>	<i>15</i>
<i>2 Bilateral clearing</i>	<i>16</i>
<i>3 Ring clearing.....</i>	<i>16</i>
<i>4 Central clearing.....</i>	<i>18</i>
<i>5 Distributed ledger technology.....</i>	<i>19</i>
<i>C How Central Counterparties Cleared Credit Default Swaps in Lehman Brothers' Bankruptcy</i> 21	
<i>1 Exchange traded and OTC positions which were centrally cleared.....</i>	<i>22</i>
<i>2 OTC positions that were not centrally cleared</i>	<i>23</i>

D	<i>Regulatory Development in Support of the Central Clearing Regime</i>	24
IV	<i>CENTRAL CLEARING AND COUNTERPARTY RISK REDUCTION</i>	25
A	<i>Multilateral Netting</i>	25
B	<i>Collateralisation of Residual Net Exposures</i>	27
C	<i>Segregation and Portability</i>	29
D	<i>Loss Mutualisation</i>	30
1	<i>Defaulting member’s prefunded resources</i>	31
2	<i>CCP and surviving members’ prefunded resources</i>	31
3	<i>Pre-agreed unfunded resources</i>	31
4	<i>Application of waterfall structure in practice</i>	32
5	<i>How CCP uses the funds under the waterfall</i>	33
V	<i>CENTRAL CLEARING AND SYSTEMIC RISK CONCENTRATION</i>	34
A	<i>Risk Concentration and “Too Important to Fail” Central Counterparties</i>	34
B	<i>Historical Record of Central Counterparties’ Failures</i>	36
C	<i>Implication of CCP’s Risk Concentration on the Promotion of Central Clearing</i>	37
VI	<i>RISK MANAGEMENT AND MITIGATION MEASURES</i>	38
A	<i>Regulatory Overview</i>	39
B	<i>Risk Management</i>	40
1	<i>Governance and Incentives</i>	40
2	<i>Risk management</i>	43
3	<i>Disclosure</i>	44
4	<i>Stress testing</i>	45
C	<i>Recovery and Resolution Plan</i>	46
1	<i>Recovery</i>	47
2	<i>Resolution</i>	52

VII CONCLUSION	53
BIBLIOGRAPHY	55

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The text of this paper (excluding table of contents, abstracts, footnotes, list of abbreviations and bibliography) comprised approximately words.

Subjects and Topics

Credit Default Swaps – Counterparty risk

Central clearing – Central counterparties

ABSTRACT

My interest in this research topic was inspired by the apparently global consensus on the mandate for central clearing in the credit default swaps market. At the first glance, the central clearing mechanism with its central counterparties is the hero who saved many market participants from substantial losses following Lehman Brother's collapse. It was heralded for debunking the complex interconnection among financial counterparties and resolving Lehman Brother's positions in a timely and orderly manner.

Nonetheless, after coming into the spotlight, central counterparties raise significant concern about their potential to concentrate systemic risk and grown into 'too important to fail' institutions. Any collapse of a 'too important to fail' institution is undoubtedly disastrous and likely results in a cascade of defaults by other market participants. Therefore, it is highly questionable whether central clearing can ultimately maintain and protect the market robustness and sustainability. It is even criticised as the Maginot Line of the financial market for being a costly but inefficient bulwark and creating a "false sense of security".¹

Therefore, this research paper aims to address the aforementioned concern, whether the central clearing regime should be promoted to mitigate the counterparty risk even when it simultaneously propagates another type of systemic risk to the financial market.

As the legal framework and the risk management practices of CCP have not been battle test, it is impossible to reach any final and ex post conclusion on the ultimate efficiency of CCP. Nevertheless, historically CCP managed to withstand severe market distress whereas currently policymakers and regulators are spending increasing efforts on addressing and mitigating the systemic risk concentrated through CCP. Compared to other alternative clearing infrastructures, it is evident that central clearing is the optimal approach to address the counterparty risk and to enhance the market stability. Further, the research demonstrates that despite central counterparties' potential to concentrate and re-distribute systemic risk, their shortcomings and contagious fallouts are not insurmountable. They can be efficiently controlled and mitigated through the implementation of adequate regulations and supervision.

¹ Mark J Roe "Clearinghouse Overconfidence" (2013) 101 Cal L Rev 1641 at 1648.

LIST OF ABBREVIATIONS

BCBS	Basel Committee on Banking Supervision
CCP	Central counterparties
CDS	Credit default swaps
CPMI	Committee on Payments and Markets Infrastructures
EMIR	Council Regulation (EU) 648/2012 on Over-the-Counter Derivatives, Central Counterparties and Trade Repositories
ESMA	European Securities Market Authority
EU	European Union
FSB	Financial Stability Board
IOSCO	International Organisation of Securities Commissions
OTC	Over-the-counter
PFMI	CPMI-IOSCO Principles of Financial Market Infrastructures
TITF	Too important to fail

I INTRODUCTION

A Research Question

This paper aims to address the question of whether the central clearing infrastructure should be promulgated to reduce the counterparty risk of CDS while it simultaneously creates another type of systemic risk. After the global financial crisis in 2008, certain classes of CDS are mandated to be cleared through CCP in an attempt to combat their counterparty risk.² However, CCP by nature concentrate systemic risk into themselves and major CCP may inexorably become TITF institutions. One of the most unarguable lessons learnt from the recent financial crisis is that TITF institutions are enormously risky and undesirable. Due to its central position in the financial market, a failure of a TITF CCP could be unprecedentedly disastrous and requires a tremendous government bailout (if applicable). Therefore, it is of paramount importance to consider whether the most significant problem of CCP may outweigh their most essential benefit.

B Scope of Research Paper

It is not the purpose of this research paper to argue whether central clearing or any other infrastructure is a panacea for the counterparty risk in the CDS market. Moreover, due to the word limit and for the purpose of the research question, the scope of this paper is limited to the following aspects:

- (a) While central clearing and CCP are potentially beneficial and risky to the CDS market in different contexts, this paper only focuses on CCP's benefit of reducing counterparty risk and their risk of becoming TITF institutions.
- (b) As the financial market is increasingly interconnected and interdependent, this paper considers certain relevant factors which may directly affect the feasibility and the extent of CCP's benefit and risk.

Notwithstanding, the research does not extend to the question whether the promulgation of CCP may undermine the effects of other financial infrastructures. For instance, the collateral requirement imposed by CCP allegedly results in the prioritisation of the claims by CCP's clearing members over other counterparties during a bankruptcy process.³ In no circumstance, a single solution such as the central clearing regime should be considered a perfect solution to all problems in the financial market. Due to its complication and significance, the topic on CCP's

² Benoît Cœuré, Member of the Executive Board of the ECB: Towards a Macroprudential Framework for Central Counterparties, at a policy panel discussion on the progress with new macroprudential instruments at the ESRB international conference on macroprudential margins and haircuts, Frankfurt am Main, 6 June 2016 <https://www.ecb.europa.eu/press/key/date/2016/html/sp160606_1.en.html>.

³ Mark J Roe, above n1, at 1646.

correlation with or impacts on other financial infrastructures deserves an independent and thorough research and paper.

- (c) This paper solely covers the legal aspects of central clearing and does not extend to any economic or strategic analysis. It is crucial to provide a robust and comprehensive regulatory framework to ensure CCP's safe and sound operations, considering how financial giants failed to uphold their position as a risk manager on the basis of self-regulations and financial measures.⁴
- (d) Where relevant, this paper refers to international guidance and European Union's regulations for examples of how central clearing regime has been promulgated and implemented in practice.

C Research Outcomes

Overall, the mandate for central clearing is positive and beneficial to the current reform in the CDS market.⁵ CCP's capability to reduce the counterparty risk was clearly proven throughout the financial crisis 2008. During the bankruptcy case of Lehman Brothers (Lehman),⁶ CCP handled and resolved its centrally cleared positions in such an orderly and timely manner that they eventually did not cause significant losses to Lehman's counterparties. However, as CCP by nature also concentrate and propagate new systemic risk, their ultimate efficiency, most likely, depends on how successfully regulators and CCP themselves can preserve their safe operations and control systemic risk. While mitigation measures to address CCP's risk concentration are still under discussion and have not been verified in practice by any crisis, it remains premature to reach any final conclusion on the ultimate outcomes of the central clearing infrastructure.⁷

D Structure of the Research Paper

To answer the research question, the final paper aims to address the following sub-questions:

- (a) What is counterparty risk of CDS? How was the counterparty risk managed before the financial crisis 2008?

⁴ Jo Braithwaite and David Murphy "Got to be Certain: the Legal Framework for CCP Default Management Processes" (11 May 2016) Bank of England <http://www.bankofengland.co.uk/financialstability/Pages/fpc/fspapers/fs_paper37.aspx> at 5.

⁵ Jerome H Powell, Member of the Board of Governors of the Federal Reserve System: A Financial System Perspective on Central Clearing of Derivatives, at 17th Annual International Banking Conference, Chicago, Illinois, 6 November 2014 <http://www.federalreserve.gov/newsevents/speech/powell20141106a.htm> at 13.

⁶ The term of "Lehman Brothers" or "Lehman" used in this research paper refers to Lehman Brothers Holdings Inc and/or its relevant subsidiaries, as the case may be.

⁷ Jerome H Powell, above n 5, at 13.

- (b) Why was central clearing and CCP promoted to mitigate the counterparty risk?
- (c) How do central clearing and CCP address and mitigate the counterparty risk?
- (d) What is risk concentration by CCP and what are its implications on the mandate central clearing?
- (e) How can the risk concentration and the negative impacts of CCP be mitigated?

This research paper is divided into seven sections: Section I introduces the purpose and the scope of the paper; Section II explains about the CDS market and how it incurred and dealt with the counterparty risk before the financial crisis 2008; Section III analyses the rationale behind the promotion of the central clearing regime to manage the counterparty risk after the financial crisis 2008; Section IV elaborates how CCP operate to control and reduce the counterparty risk; Section V justifies CCP's potential to concentrate systemic risk and its implications on the mandate for central clearing; Section VI highlights policymakers' concerted efforts to establish a comprehensive and robust risk management, recovery and resolution framework for CCP and Section VII presents the conclusion of the research paper.

II CREDIT DEFAULT SWAPS AND COUNTERPARTY RISK

A Pre-crisis Operation of the Credit Default Swap Market

CDS are derivatives contracts in which a party pays a fee to another party in return for a payment or other benefit in the case of a credit event relating to a reference entity and of any other default relating to that derivative contract, which has similar economic effect.⁸ In essence, CDS are highly similar to insurance contracts against credit risks.

Initially, the story of CDS started off like a typical Walt Disney fairy tale with a hero, a grand victory and a happily ever after ending. In 1994, the first CDS transaction was created by Blythe Masters from JP Morgan in the after math of Exxon Valdez oil spill.⁹ By that time, as JP Morgan had lent to Exxon Mobil Valdez a credit line of US\$ 4.8 billion, there was a pressing need for JP Morgan to find a safety net to reduce its exposure to such a high credit risk.¹⁰ JP Morgan finally achieved its purpose by entering into a CDS agreement with the European Bank for Reconstruction and Development who agreed to accept part of the credit risk from JP Morgan.¹¹

⁸ Article 2(1)(c) of Regulation (EU) No 236/2012.

⁹ Arjyo Mitra "Credit Default Swaps: An Update" (14 April 2015) Seven Pillars Institute <<http://sevenpillarsinstitute.org/case-studies/credit-default-swaps-an-update>>.

¹⁰ Arjyo Mitra, above n 9.

¹¹ Marti G Subrahmanyam, Dragon YongjunTang and Sarah Quian Wang "Does the Tail Wag the Dog: the Effect of Credit Default Swaps on Credit Risk" (2014) 27(10) Review of Financial Studies 2927 at 2928.

From its creation, CDS become one of the most successful products in the financial market as they were heralded and favoured for a wide range of purposes. By entering into CDS arrangements, financial institutions such as banks were able to hedge their risks to other entities so that they can reduce their minimum capital reserves.¹² Further, as the transfer of risk via CDS could remain unknown to other counterparties, it meant that banks could create almost any risk profile they desired without impairing their good lending relationships with borrowers.¹³ Meanwhile, the financial market also benefited as CDS potentially allowed the credit risks to be transferred to a larger number of investors who should have been the most capable of handling them.¹⁴ For these reasons, CDS were widely believed to make the financial market safer and more efficient.¹⁵ The value of the CDS market burgeoned from merely US\$ 180 billion in 1997 to US\$ 62 trillion in 2007, measured by the notional amount outstanding.¹⁶ Together with assets backed securities and collateralised debt obligations, CDS realised the “American Dream” in which millions of average income earners in the United States of America could purchase their own houses. All of these wide-ranging benefits explained why the CDS market during this period was mainly deregulated.¹⁷

However, when the real estate bubbles exploded, the CDS fairy tale terminated more bitterly and detrimentally than many ever thought. CDS was alleged to be one of the major causes of the financial crisis 2008.¹⁸ After millions of consumers binged on the real estate investment, the house price began to plummet while the interest rate on loans rose.¹⁹ Therefore, borrowers with subprime mortgage set off a default chain when they failed to refinance and repay the loans, leading to a collapse in the value of mortgage backed securities and the loss of more than US\$ 1 trillion in the balance sheet of financial institutions.²⁰ Afterwards, financial instruments such as CDS also exploded and exacerbated the financial plunge.²¹ While the financial giants like American Insurance

¹² M Todd Henderson “Credit Derivatives are not Insurance” (2009) 16 Conn Ins L J 1 at 5.

¹³ Stan Cerulus “Central Clearing for CDS: A Legal Analysis of the New Central Clearing Regulations in Europe and the US” (2012) 20(2) Journal of Financial Regulation and Compliance 212 at 213.

¹⁴ At 213.

¹⁵ Frank Partnoy and David A Skeel “The Promise and Perils of Credit Derivatives” (2007) 75(3) U Cin L Rev 1019 at 1024.

¹⁶ Marti G Subrahmanyam, Dragon Yongjun Tang and Sarah Quian Want, above n 11, at 2927.

¹⁷ Anupam Chander and Randall Costa “Clearing Credit Default Swaps: A Case Study in Global Legal Convergence” (2010) 10(2) Chicago Journal of International Law 639 at 659.

¹⁸ European Union Committee “The Future Regulation of Derivatives Markets Markets: is the EU on the Right Track” (31 March 2010) United Kingdom Parliament <http://www.publications.parliament.uk/pa/ld200910/ldselect/ldeucom/93/93.pdf> at 19.

¹⁹ “The Crisis in a Nutshell” *The Research Magazine* (The United State of America, December 2008) at 36.

²⁰ Ben S Bernanke: Causes of the Recent Financial and Economic Crisis before the Financial Crisis Inquiry Commission, Washington DC, 2 September 2010 <https://www.federalreserve.gov/newsevents/testimony/bernanke20100902a.htm>.

²¹ “The Crisis in a Nutshell” *The Research Magazine* (The United State of America, December 2008) at 36.

Group Inc (AIG), Freddie Mac, Fannie Mae, Indy Mac, Lehman Brothers and Washington Mutual collapsed, others strived to survive and stopped extending loans, businesses consequently failing to carry on their normal operations.²² Eventually, the cascading failures led to the liquidity deficiency in the financial system and the cessation of the whole economy.²³

As pointed out by Gregory (2014), OTC derivatives and their counterparty risk is a major contributor to the market volatility.²⁴ Thus, by the time the financial crisis subsided, most regulators acknowledged that the OTC derivatives, including CDS, needed a more stringent legal framework to ensure that their systemic risks could be addressed and mitigated promptly and properly.²⁵ The follow-up question is what legislation could be relied on as the saviour of the CDS market.

The biggest challenge of CDS is that they are innately subject to counterparty risk which is the possibility that a counterparty to a transaction may default on its obligations before the final settlement of the transaction.²⁶ Due to the interconnectedness among market participants in the financial market, the counterparty risk is systemic and contagious.²⁷ When one or several big CDS counterparty defaults, it likely triggers cascading defaults of other counterparties and results in the interruption to the whole network.

B Pre-Financial Crisis Collateral Practices

While the counterparty risk is a systemic risk inherent in the CDS market, it definitely can be mitigated by adequate risk management measures. One of the most common measures is to post collateral.²⁸ However, before the financial crisis, as the collateral requirement was contractual arrangement rather than regulatory requirement, many counterparties chose not to follow the rule.²⁹ The relaxation of collateral requirement

²² At 36.

²³ At 36.

²⁴ Jon Gregory *Central Counterparties: Mandatory Clearing and Bilateral Margin Requirements for OTC Derivatives* (John Wiley & Sons, Inc, West Sussex, 2014) at 4.

²⁵ IMF “Global Financial Stability Report – Meeting New Challenges to Stability and Building a Safer System” (10 April 2010) International Monetary Fund <<https://www.imf.org/external/pubs/ft/gfsr/2010/01/pdf/text.pdf>> at 92.

²⁶ Article 2(11) of Regulation 648/2012.

²⁷ George G Kaufman and Kenneth E Scott “What is Systemic Risk, and Do Bank Regulators Retard or Contribute to It?” (2003) 7(3) *Independent Review*, Wntr 371 at 371.

²⁸ Mark J Roe, above n 1, at 1658.

²⁹ European Commission “Summary of the Impact Assessment – Proposal for a Regulations of the European Parliament and of the Council on OTC derivatives, Central Counterparties and Trade Repositories” (2010) European Commission <http://ec.europa.eu/finance/financial-markets/docs/derivatives/20100915_summary_impact_assessment_en.pdf> at 4.³⁰ Amandeep Rehlon “Central Counterparties: What are they, Why do they matter and How does the Bank Supervise them?” (1 June 2013) Bank of England <<http://www.bing.com/search?q=Amandeep+Rehlon+central+counterparty&qs=n&form=QBRE&pq=amandee>

inevitably led to a disordered and opaque market where excessive risks were transferred without adequate collateral and the value of collateral which had been posted was also a mystery.³⁰

This practice was evident in the case of AIG. Before the collapse, AIG had exploited its strong credit rating (which was AAA by March 2005³¹) to sell protection against credit risk to numerous investors under CDS contracts mostly without posting collateral.³² Not only until AIG's credit rating had fallen to AA+ in March 2005 did AIG's customers start pressuring it to post collateral.³³ Following its continuous downgrades, AIG's liability for collateral surged and, by 5 November, peaked at approximately US\$ 39 billion.³⁴ Just a few days ago, AIG's collateral call was only US\$8.6 billion. Despite the shockingly increased collateral aggregate, it remained insufficient for AIG to maintain its position since the notional value of AIG's derivatives had amounted to approximately US\$ 1 trillion by 2009,³⁵ including around US\$ 440 billion of CDS.³⁶ It was inevitable when the financial crisis unfolded and the value of the protection under CDS contracts soared following a chain of defaults by reference entities, AIG was faced with excessive obligations which they ultimately failed to fulfil.³⁷

1 Arbitrary waiver of collateral requirement

Due to the arbitrary implementation of collateral requirement, the traditional CDS market exposed its participants to tremendous counterparty risks without adequate collateral. Posting collateral was mainly a “matter of contractual negotiations” rather than an outcome of an appropriate risk assessment.³⁸ As dealers were part of every CDS contracts

[p+rehlon+central+counterparty&sc=0-34&sp=-1&sk=&cvid=44D955B0D5C043CBA33F59C2AC0E0751](http://www.bing.com/search?q=Amandeep+Rehlon+central+counterparty&sc=0-34&sp=-1&sk=&cvid=44D955B0D5C043CBA33F59C2AC0E0751)> at 148.

³⁰ Amandeep Rehlon “Central Counterparties: What are they, Why do they matter and How does the Bank Supervise them?” (1 June 2013) Bank of England <<http://www.bing.com/search?q=Amandeep+Rehlon+central+counterparty&qs=n&form=QBRE&pq=amandee+p+rehlon+central+counterparty&sc=0-34&sp=-1&sk=&cvid=44D955B0D5C043CBA33F59C2AC0E0751>> at 148.

³¹ IMF, above n 25, at 5.

³² “AIG and Credit Default Swaps” (November 2009) ISDA <http://www.isda.org/c_and_a/pdf/ISDA-AIGandCDS.pdf>.

³³ Above n 33.

³⁴ Above n 33.

³⁵ Rosalind Z Wiggins and Andrew Metrick “The Lehman Brothers Bankruptcy G: The Special Case of Derivatives” (1 October 2014) Social Science Research Network <<http://ssrn.com/abstract=2593080> or <http://dx.doi.org/10.2139/ssrn.2593080>> at 15.

³⁶ Deutsche Borse Group and Eurex Clearing “How Central Counterparties strengthen the safety and integrity of financial markets” (July 2014) Deutsche Borse Group <https://deutsche-boerse.com/blob/2534542/37fbfb2a577d8e43d52d19223b49c63/data/how-central-counter-parties-strengthen-the-safety-and-integrity-of-financial-markets_de.pdf> at 11.

³⁷ IMF, above n 25, at 99.

³⁸ Anupam Chander and Randall Costa, above n 17, at 651.

with other dealers or customers, they played a significant role in the compliance with collateral requirement. On one hand, dealers did not pose collateral because their customers did not require them to do so, relying on the dealers' strong credit rating and compliance with minimum capital reserves. On the other hand, dealers relieved major customers such as sovereign entities and big corporate clients from posting collateral and instead accept other illiquid collateral as a security against counterparty risk. While reflecting the economic power of the market players participating in the negotiation, the total of collateral to be posted failed to address the probability of counterparty defaults in CDS contracts.³⁹ Once the market was under distress and the underlying obligations under CDS contracts crumbled, protection sellers therefore did not have sufficient financial resources to maintain their positions as insurers against credit risks.

Strict compliance with collateral requirement could have worked as a safety barrier in the risk transferring playground. Had AIG been required by its customers to post collateral in proportion to its CDS positions, it would have not been able to assume excessive risks nor incur pressing liability to post enormous collateral upon the fall of its credit rating.⁴⁰ Urgent call for collateral at that time undoubtedly amplified AIG's on-going financial distress.

2 *Inadequate collateral*

It is virtually impossible to post adequate collateral for each CDS position when there is limited market information. In the exchanges, derivatives products are subject to strict reporting duties to make information about their price and transaction publicly available. In contrast, most OTC derivatives are transacted privately and not required to disclose information about their transactions. Meanwhile, the value of collateral to be posted for each position needs to be based on current market prices of actual transactions and their variability. Without access to accurate and complete market information, it was questionable how CDS counterparties could determine and post adequate collateral for their positions before the financial crisis.

3 *No segregation between collateral and working capital*

Another problem rooted in the pre-crisis CDS market was no segregation between customers' collateral and dealers' working capital. As a matter of practice, collateral posted by customers were usually commingled into and inseparable from the accounts of their dealers.⁴¹ Once a dealer defaulted on its obligations and filed for bankruptcy, such collateral was considered part of the dealer's bankrupt estate and could not be utilised until the completion of the resolution procedure in accordance with bankruptcy law. This

³⁹ At 651.

⁴⁰ At 651.

⁴¹ At 651.

consequence pressurised counterparties to novate or terminate their contracts before the dealer filed for bankruptcy so that their collateral would not be trapped in the dealer's accounts. Such reaction can be seen clearly in the case of Lehman Brother's collapse. The unilateral terminations prematurely triggered Lehman Brother's obligations for protection payments and transmitted the negative impacts of Lehman Brothers' collapse throughout the whole network.⁴²

III RATIONALE BEHIND IMPOSING CENTRAL CLEARING ON CREDIT DEFAULT SWAPS

A Proposed Solutions to Counterparty Risk

In the aftermath of the financial crisis, various solutions were proposed to address the counterparty risk in the CDS market. One proposal was to maintain the deregulation status quo or impose minimal reporting duties on the CDS market.⁴³ However, the unstoppable collapse of a giant financial institution such as Lehman Brothers demonstrated how the unregulated CDS market failed to maintain adequate internal risk controls to endure a severe market distress and retain its stability. Moreover, without an adequate legal framework in place, the government also could not predict and prepare for any imminent collapse.

Another proposal was to ban CDS contracts entirely. It is however unreasonable to eradicate a financial instrument which both World Bank and private institutions hold valuable,⁴⁴ especially in the context where many regulators believed that a more efficient legal framework such as CCP may help.⁴⁵

There were other more moderate proposals such as banning naked CDS⁴⁶ (which refers to CDS contracts where protection buyers do not hold creditor interest in the underlying obligations)⁴⁷ or regulating CDS as insurance products.⁴⁸ The aforementioned proposals however contained certain disadvantages that made it infeasible or incomplete for the

⁴² Anupam Chander and Randall Costa, above n 17, at 650.

⁴³ Peter J Wallison "Financial Services Outlook: Unnecessary Intervention: The Administration's Effort to Regulate Credit Default" (2009) American Enterprise Institute <<https://www.aei.org/publication/unnecessary-intervention-the-administrations-effort-to-regulate-credit-default-swaps/>>.

⁴⁴ Anupam Chander and Randall Costa, above n 17, at 672.

⁴⁵ At 674.

⁴⁶ At 674.

⁴⁷ Charles W Murdock "Credit Default Swaps: Dubious Instruments (2013) Harvard Business Law Review <<http://www.hblr.org/?p=3216>>.

⁴⁸ Leah Campbell and Robin Choi "State Initiatives to Regulate Credit Default Swaps Deferred Pending Federal Action" (1 September 2009) Metropolitan Corporate Counsel <<http://www.metrocorpocounsel.com/articles/11643/state-initiatives-regulate-credit-default-swaps-deferred-pending-federal-action>>.

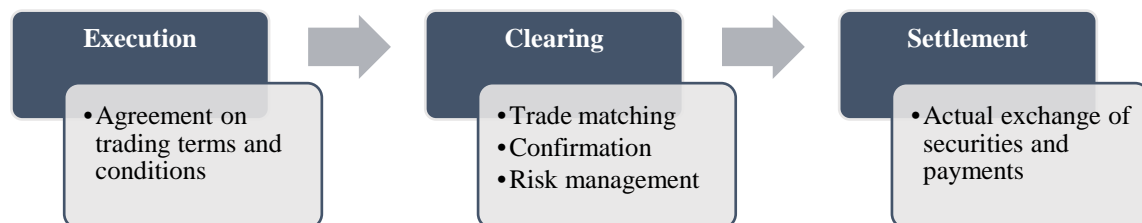
purpose of mitigating the risks of CDS. The analysis of such advantages is not covered within the scope of this paper.

The last proposal which was widely extolled by major international organisations and governments was to establish a legal framework to clear CDS.⁴⁹ This approach was believed to strike a balance between efforts to prevent another financial crisis and not to cause disruption to the whole market.⁵⁰ The latter part of this Section explains the available clearing structures in the financial market to prove why central clearing is the optimal infrastructure to clear CDS.

B Alternative Clearing Structures

1 Clearing concept

Clearing is the interim stage between the execution and the settlement in a trading circle of a financial instrument.⁵¹ The concept of clearing has different meanings and implications, depending on the jurisdiction and the market in which it is conducted.⁵² Typically, the clearing stage involves trade matching, confirmation and risk management.⁵³ From a legal perspective, European Union defines clearing as “the process of establishing positions, including the calculation of net obligations and ensuring that financial instruments, cash, or both, are available to secure the exposures arising from those positions”.⁵⁴



Clearing plays a vital role in the stability and safeness of the financial market which becomes increasingly interconnected and trans-jurisdictional.⁵⁵ In the exchange market, the standard period from execution to settlement is within three to five days (ie T+3 or T+5 rules). In the OTC derivatives market, the period between execution and settlement is usually much longer. Clearing of OTC derivatives is also more complicated due to the

⁴⁹ Anupam Chander and Randall Costa, above n 17, at 642.

⁵⁰ Anupam Chander and Randall Costa, above n 17, at 674.

⁵¹ Jiabin Huang *The Law and Regulation of CCPs* (Oxford and Portland, Oregon, 2010) at 13.

⁵² Robert R Bliss and Robert S Steigerwald “Derivatives Clearing and Settlement: A Comparison of Central Counterparties and Alternative Structures” (2006) 30(4) *Economic Perspectives* 22 at 22.

⁵³ Jon Gregory, above n 24, at 27.

⁵⁴ Article 2(3) of EMIR.

⁵⁵ Robert R Bliss and Robert S Steigerwald, above n 52, at 22.

potential fluctuation and divergence of the obligations between counterparties during that period. Therefore, the exposure of CDS transactions to counterparty risk is more significant in the OTC market.

2 *Bilateral clearing*

Bilateral clearing is the most historical and common clearing arrangement where CDS counterparties reconcile and resolve their transactions bilaterally.⁵⁶ In this structure, they are completely exposed and susceptible to the counterparty risk upon the default of the other party. One measure to mitigate the counterparty risk in bilateral clearing is to require counterparties to make deposit in a margin account.⁵⁷ Nevertheless, whether the counterparties make the deposit as required and how they handle the deposit is entirely subject to their financial health, credit rating and contractual arrangements. That is to say, this requirement may counter-intuitively pose more counterparty risk when the counterparty refuses to deposit or delay returning the deposit upon the termination of the contract.⁵⁸

3 *Ring clearing*

When CDS contracts are standardised appropriately, bilateral clearing can be expanded to ring clearing.⁵⁹ This clearing infrastructure allows the involved parties to net their positions multilaterally although it maintains their counterparty risk exposure.⁶⁰ An advantage of the ring clearing structure is its potential to reduce counterparty risk⁶¹ as the members can offset their positions within a group when any of them defaults.⁶² It may also reduce the collateral cost while increasing the liquidity within the ring.⁶³

However, members within a ring clearing structure remain vulnerable to counterparty risk since no individual member, even with the requirement for posting collateral, can attain sufficient financial capability to completely substitute another member's position. Other undesirable fallouts of the ring clearing are that the ring members must monitor

⁵⁶ Jon Gregory, above n 24, at 13.

⁵⁷ Cyril Monnet "Let's Make it Clear: How Central Counterparties Save(d) the Day" (2010) Federal Reserve Bank of Philadelphia <https://www.philadelphiafed.org/-/media/research-and-data/publications/business-review/2010/q1/brq110_central-counterparties.pdf> at 4.

⁵⁸ At 4.

⁵⁹ Jon Gregory, above n 24, at 13.

⁶⁰ John P Jackson and Mark J Manning "Comparing Pre-Settlement Risk Implications of Alternative Clearing Arrangement" (March 2006) Bank of England <<http://www.bankofengland.co.uk/research/Pages/workingpapers/2007/wp321.aspx>> at 5.

⁶¹ Jon Gregory, above n 24, at 13.

⁶² John P Jackson and Mark J Manning, above n 60, at 5.

⁶³ At 5.

each other's position while they may not have adequate resources to do so and by doing that, no member can keep their identity anonymous.⁶⁴

⁶⁴ Cyril Monnet, above n 57, at 4.

4 *Central clearing*

Central clearing was created as an attempt to tackle the shortcomings of the ring clearing structure. Accordingly, counterparties novate their contracts to CCP who interpose itself among the counterparties. Traditionally, clearing houses participated during the clearing stage and simply acted as intermediaries to reconcile and confirm transactions. However, the functions of CCP today are widely extended to cover trade management, position management, collateral, risk management and delivery management.⁶⁵ As part of that, they determine the positions of the different counterparties, transferring securities or assets, reporting to regulators, calling margin, deposits, netting and handling counterparty failure.⁶⁶

The most essential benefit of central clearing is that it relieves original counterparties from counterparty risk exposure. In addition, compared to ring clearing, members in a central clearing structure need not to monitor other parties' positions and can trade with each other. Another significant advantage of CCP is its potential to maintain or orderly dissolve positions upon a member's default. As CCP attract more clearing member and implement a well-organised risk management system, they have more financial capacity, expertise and experience than any single member to handle a default within its clearing network.⁶⁷

The fact that all exchange traded contracts are centrally cleared reflects the natural selection in the search for the optimal clearing structure. Central clearing has provided a wide range of benefits to the exchange market.⁶⁸ Information is disclosed promptly and accurately according to a stringent legal framework to make it publicly available. Positions can be closed easily by trading on the exchanges and such trades are usually supervised and regulated by competent authorities. Nevertheless, it is unfeasible to clear all CDS transactions on exchange market since trading on OTC market also offers its own benefits to investors and the market such as flexibility and confidentiality.⁶⁹ Thus, imposing central clearing on the OTC CDS market can be an appropriate approach to promote the benefit of exchange market in the OTC market without entirely abandoning its inborn attractiveness.⁷⁰

⁶⁵ Jiabin Huang, above n 51, at 13.

⁶⁶ Bruno Biais, Florian Heider and Marie Hoerova "Clearing, Counterparty Risk, and Aggregate Risk" (October 2011) International Monetary Fund <<http://www.imf.org/external/np/res/seminars/2011/arc/pdf/bbfhmfh.pdf>> at 197.

⁶⁷ At 197.

⁶⁸ Jon Gregory, above n 24, at 13.

⁶⁹ At 13.

⁷⁰ At 13.

5 *Distributed ledger technology*

The most recently developed clearing structure is the distributed ledger technology (DLT). DLT is a system maintained by a shared network of participants in lieu of a central validation entity.⁷¹ It relies on computer-based encryption techniques to store assets and validate transactions.⁷² While DLT is the best-known for its application to virtual currencies such as Bitcoins, its contemplated design to be used in the financial market would be different.⁷³ For Bitcoins transactions, DLT is permission-less system where every participant can take part in the validation process.⁷⁴ By contrast, DLT in the financial market, if applied, need to be a permission-based system which can be validated by authorised persons only.⁷⁵

Some believe that DLT is revolutionising the clearing mechanism in the financial market and potentially render central clearing and CCP obsolete.⁷⁶ DLT may allow securities transactions to be cleared and settled in near real time instead of following T+2 or T+3 rules.⁷⁷ As a shared network, DLT enables its participants to keep consistent records of the ledger and engage in multinational transactions easily and instantaneously without multiple intermediaries.⁷⁸ The reconciliation process therefore would be expedited and more efficient.⁷⁹ As a result of the shorter clearing and settlement period, DLT may significantly reduce its participants' exposure to counterparty risks and minimise the requirement for collateral.⁸⁰

The research in the benefits and shortcomings of DLT is however at a very early stage and limited to the securities market only. The likelihood of DLT to be applied in the securities market therefore remains ambiguous. As of June 2016, ESMA published a discussion paper to seek opinions of the stakeholders on its assessment of the potential outcomes of DLT within the securities market. Accordingly, ESMA emphasises that it is

⁷¹ ESMA “Discussion Paper - The Distributed Ledger Technology Applied to Securities Market” (2 June 2016) ESMA <https://www.esma.europa.eu/sites/default/files/library/2016-773_dp_dlt.pdf> at 8..

⁷² At 8.

⁷³ At 8.

⁷⁴ At 8.

⁷⁵ At 8.

⁷⁶ For instance, see Charles Gubert “Five things to watch out for with block chain” (14 March 2016) Global Derivatives <<http://globalderivativeslive.com/five-things-to-watch-out-for-with-blockchain/>> and Kevin Maney “Trust and Verify: the Coming Blockchain Revolution (23 May 2016) <<http://europe.newsweek.com/blockchain-technology-will-remake-global-financial-system-462537?rm=eu>>.

⁷⁷ Joanna Diane Caytas “Developing Blockchain Real-Time Clearing and Settlement in the EU, U.S., and Globally” (22 June 2016) Columbia Journal of European Law <<http://cjel.law.columbia.edu/preliminary-reference/2016/developing-blockchain-real-time-clearing-and-settlement-in-the-eu-u-s-and-globally-2/>>.

⁷⁸ Joanna Diane Caytas, above n 77.

⁷⁹ Joanna Diane Caytas, above n 77.

⁸⁰ ESMA, above n 71, at 10 and 12.

premature to conclude whether DLT can actually solve the technical, governance, legal and regulatory issues existing in the securities market.⁸¹

Notwithstanding, ESMA expressly dismisses the possibility of applying DLT in the derivatives market for the time being. In their opinion, it is unlikely that DLT could replace CCP as a clearing infrastructure for derivatives contracts, including CDS.⁸² In ECB's occasional paper publication regarding the possible application of DLE in securities post-trading, Andrea Pinna and Wiebe Ruttenberg express similar opinions to ESMA's.⁸³ They believe that clearing functions through CCP remains apposite to derivatives contracts because of the need to manage the risk until the relevant contracts are final or irrevocable.⁸⁴

The most significant divergence of derivatives from exchange traded products is that counterparties' obligations remain throughout the entire life of contract and cannot be discharged at once via single settlement.⁸⁵ Because of such nature, it is essential to engage and maintain CCP throughout the life of derivatives for the purpose of collateral management and counterparty risk mitigation.⁸⁶

Another challenge which makes the current DLT structure unfit for derivatives is that DLT is recording transaction on the gross basis.⁸⁷ By contrast, derivatives such as CDS are applying collateral requirements which are based on a net basis.⁸⁸ Without multilateral netting through CCP, derivatives counterparties may be required to post significantly more collateral to cover their exposures.⁸⁹

In addition, DLT requires its participants to hold the ownership of the assets which they are going to transact on DLT. Such requirement will automatically invalidate margin finance and short selling transactions such as uncovered CDS. In those transactions, counterparties do not necessarily own the assets but instead retain financing for such assets externally.⁹⁰

⁸¹ At 6.

⁸² At 10.

⁸³ Andrea Pinna and Wiebe Ruttenberg "Occasional Paper Series: Distributed Ledger Technologies in Securities Post Trading – Revolution or Evolution?" (April 2016) European Central Bank <<https://www.ecb.europa.eu/pub/pdf/scpops/ecbop172.en.pdf>>.

⁸⁴ Andrea Pinna and Wiebe Ruttenberg, above n 84, at 26.

⁸⁵ ESMA "Discussion Paper - The Distributed Ledger Technology Applied to Securities Market" (2 June 2016) ESMA <https://www.esma.europa.eu/sites/default/files/library/2016-773_dp_dlt.pdf> at 11.

⁸⁶ At 11.

⁸⁷ At 15.

⁸⁸ At 15.

⁸⁹ At 15.

⁹⁰ At 15.

Finally, although DLT is arguably more resilient to cyber-attacks under normal circumstances,⁹¹ once the system is successfully hacked, the possible fallouts would be more negative and far-reaching.⁹² Hackers would gain access information not only at the point of attack but also throughout the shared network and then manipulate or alter the recording system.⁹³ Without adequate regulatory framework, DLT could contribute to a perfect storm for money-laundering and terrorist financing activities.⁹⁴

Rather than replacing the current clearing structure, it appears that the current clearing requirement is the operational cornerstone that DLT needs to adapt to and comply with. OTC derivatives counterparties are not prohibited from voluntarily applying DLT in the course of clearing and settlement of their derivatives. However, as indicated by ESMA, the application of DLT must be consistent with the existing clearing requirements applicable to each class of OTC derivatives.⁹⁵ In particular, if they transact a class of CDS which are mandated to be cleared by CCP, they must ensure that there is a CCP to clear their CDS transactions at all times.⁹⁶

C How Central Counterparties Cleared Credit Default Swaps in Lehman Brothers' Bankruptcy

In practice, the efficiency of the CCP was evident in the resolution of Lehman whose bankruptcy was one of the largest and the most complex in the United States of America's history.⁹⁷ By the time of collapse, Lehman was a major participant in both centrally cleared market and bilaterally cleared market. Upon its bankruptcy, the ways in which the two markets resolved its positions are "contrasting strikingly".⁹⁸ Although the overall recovery rate for Lehman's creditors was historically low, the actual amount which each creditor actually recovered from Lehman Brothers was varied, depending on the market in which they had been dealing with Lehman Brothers.⁹⁹ Particularly, most counterparties in centrally cleared securities contracts were left undamaged while those in the OTC derivatives market suffered substantial losses upon Lehman's default.¹⁰⁰

⁹¹ At 12.

⁹² At 17.

⁹³ At 17.

⁹⁴ At 17.

⁹⁵ At 21.

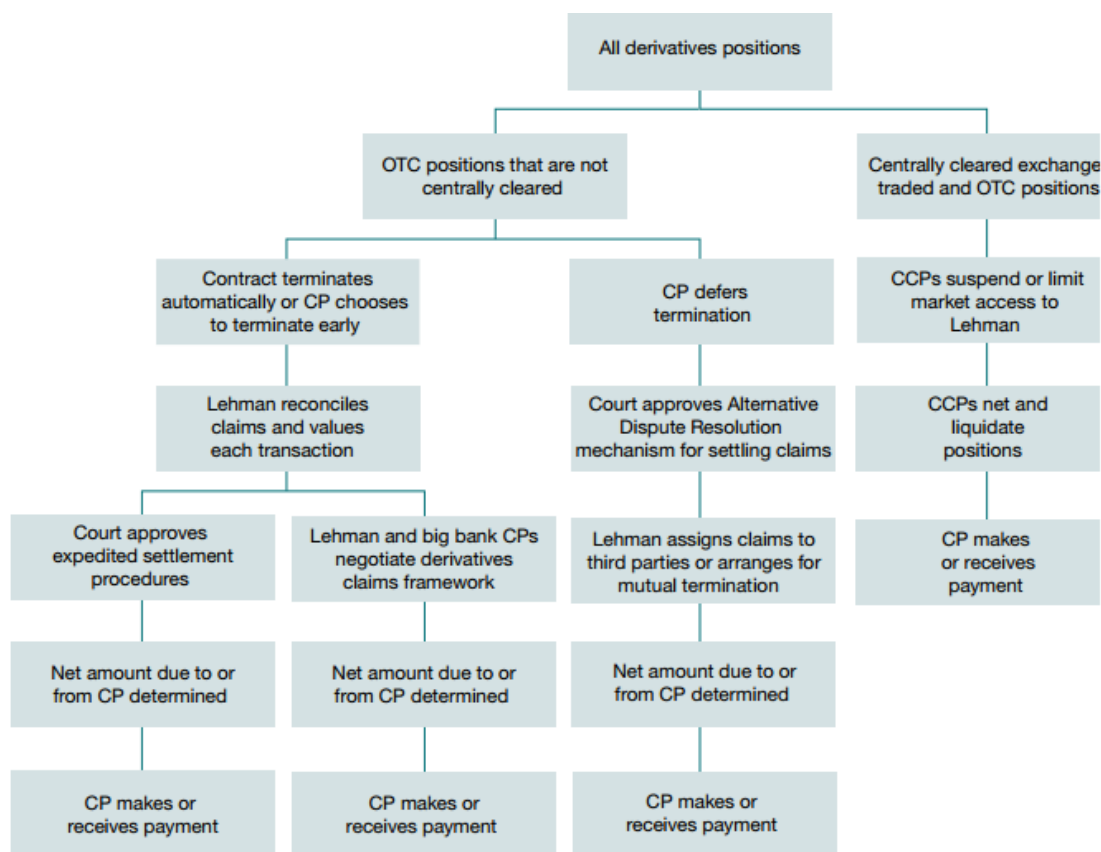
⁹⁶ At 21 and 32.

⁹⁷ Michael J Fleming and Asani Sarkar "The Failure Resolution of Lehman Brothers" (2014) 20(2) Federal Reserve Bank of New York Economic Policy Review 175 at 175.

⁹⁸ Anupam Chander and Randall Costa, above n 17, at 655.

⁹⁹ At 655.

¹⁰⁰ Michael J Fleming and Asani Sarka, above n 98, at 178.



Resource: Michael J Fleming and Asani Sarkar (2014).

1 Exchange traded and OTC positions which were centrally cleared

Lehman’s positions in the centrally cleared market were resolved by CCP in accordance with their rules instead of following the United States’ Chapter 11 bankruptcy process.¹⁰¹ With respect to contracts where Lehman was a broker acting on behalf of its clients,¹⁰² CCP either closed out or transferred Lehman’ accounts to other brokers. In other cases where Lehman was a clearing member acting for its own capacity, CCP transferred part of Lehman’ portfolios to other solvent clearing member. The remaining portfolios were took over by CCP themselves and then auctioned to other market participants.¹⁰³ As CCP were able to restrict market access to the Lehman’ defaulting entities quickly after the default, its positions were resolved smoothly without significantly adverse impacts on other clearing member.¹⁰⁴

Specially, CCP even helped to resolve Lehman’ bilaterally cleared derivative positions. LCH Clearnet resolved the default of Lehman’ interest rate swap portfolio consisting of

¹⁰¹ At182.

¹⁰² At 188.

¹⁰³ Anupam Chander and Randall Costa, above n 17, at 655 and 656.

¹⁰⁴ Michael J Fleming and Asani Sarka, above n 98, at 196.

US\$ 9 trillion in notional value within 3 weeks. It is worth noting that this settlement was conducted within the margin held and no loss caused to other market participants.¹⁰⁵

2 *OTC positions that were not centrally cleared*

In contrast, the resolution of Lehman's positions in bilateral derivatives which had to follow the bankruptcy process was far more complicated and divergent.¹⁰⁶ Lehman was participating in more than 900,000 derivatives contracts which led to the creditors' claims of US\$ 1.2 trillion against its estate.¹⁰⁷ By 13 November 2008, the majority of counterparties to these derivatives, 733,000 out of 900,000, decided to terminate the contracts earlier.¹⁰⁸ The remainder who were out-of-money counterparties chose not to terminate earlier. There were various reasons for the struggle in the resolution of Lehman's bilateral positions, from the complicated corporate organisation of Lehman, the opacity of the market until the complexity of the bankruptcy process.

(a) Contracts which counterparties terminated earlier

While not terminating earlier, the out-of-money counterparties withheld the periodic payments under their contracts with Lehman, arguing that Lehman had defaulted under ISDA Master Agreement.¹⁰⁹ Due to difficulties in reaching agreement with its counterparties on the value of the non-terminated contracts, Lehman had to request and obtain approval from the court for Alternative Dispute Resolution. Accordingly, the value of non-terminated contracts were realised either by Lehman assigning them to other third parties or by mutual termination. The assignment of these contracts was conducted slowly because the whole market and financial institutions were under distress and these contracts were also not really attractive (for instance, some of them were uncollateralised, had weak credits or long maturity instruments). On 10 January 2011, Lehman issued a notice that they had commenced Alternative Dispute Resolution procedure on 144 contracts and resolved 52, collecting around US\$ 356 million.

(b) Contracts which counterparties terminated earlier

It was also challenging for the counterparties who terminated their contracts with Lehman to settle their termination. First, they had to reconcile all trades with Lehman and then had each transaction evaluated and calculated. Afterwards, they needed to negotiate the settlement amount with Lehman before the actual payments could be made. The process was first delayed because it had to be reviewed and approved by the court in

¹⁰⁵ At 196.

¹⁰⁶ Rosalind Z Wiggins and Andrew Metrick, above n 36.

¹⁰⁷ Fleming and Sarkar (2014) at 175.

¹⁰⁸ At 175.

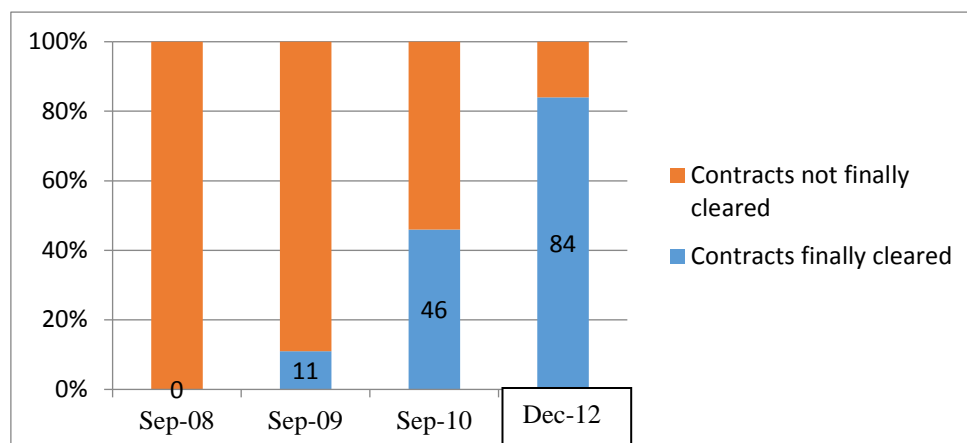
¹⁰⁹ At 177.

accordance with the bankruptcy law. The second delay was because of Lehman's highly complex organisational structure, it was difficult for the counterparties to identify which subsidiary should be held liable for their claims. The last but possibly the most important reason was that the lack of market information caused hindrance to the evaluation and determination of the termination values. On 15 December 2008, Lehman obtained approval from the court for entering into settlements agreements, making termination payment and liquidating collateral without the need for further action by the bankruptcy court. However, the settlement was very slow and only 46% of the contracts was resolved by September 2010.

(c) Contracts in which big bank counterparties terminated earlier

While Lehman's derivatives contracts with the thirty largest banks were only 5% of the number of outstanding contracts in January 2011, they accounted for 48% of the derivatives value. Again, Lehman faced difficulties in resolving the contracts due to disagreement on the evaluation of the contract value. Lehman disputed about many important issues in the valuation claims made by its counterparties, including timeline, method and set-off. For instance, Lehman alleged Nomaru Holdings wrongly applied the loss method, instead of quotation method, to claim that Lehman Brothers owned it a total of US\$ 217 million while in fact, Nomaru Holdings had owned US\$484 million to Lehman prior to the termination.

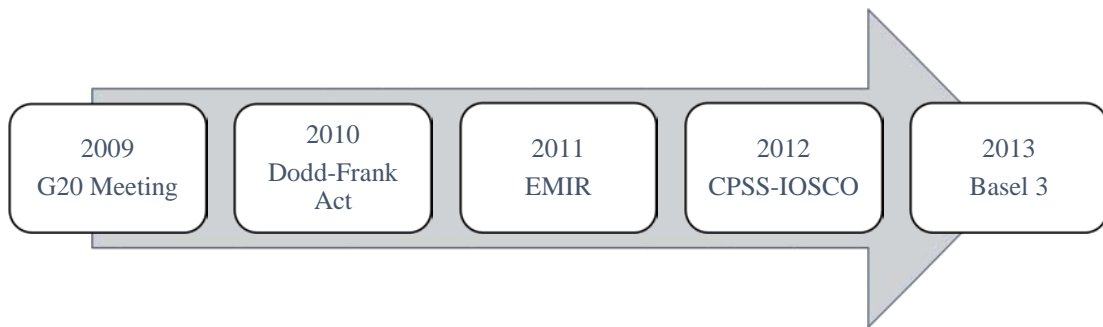
Finally, Lehman had to include a derivatives claim settlement framework in its January 2011 liquidation plan to settle the remaining derivatives contracts with big bank counterparties. However, this liquidation plan did not completely resolve the settlement of derivatives with big banks and progressed very slowly.



Source: Deutsche Borse Group and Eurex Clearing (2014).

D Regulatory Development in Support of the Central Clearing Regime

International institutions and governments have unanimously promoted for mandatory central clearing in the CDS market since the financial crisis 2008.



The use of CCP was first promoted by G20 leaders at Pittsburgh Summit in 2009. They agreed that “Standardized OTC derivative contracts should be traded on exchanges or electronic trading platforms, where appropriate, and cleared through CCP by end-2012 at the latest”.¹¹⁰

The United States and the European Union consequently supported this approach with the promulgation of Dodd-Frank Act in 2010 and European Market Infrastructures Regulations in 2011 respectively which mandate central clearing with respect to certain category of OTC derivatives.

In 2012, CPMI-IOSCO published 24 Principles of Financial Markets Infrastructures which became the internationally accepted standards for payment, clearing and settlement systems and trade repositories. In particular, it sets out the principles and provide guidance on the risk management framework, disclosure requirements and assessment methodology for CCP. They are purported to ensure that the infrastructure supporting global financial markets is robust and diligently operated in order to withstand financial distresses.

Most recently, in 2013, Basel 3 was promoted to increase of capital requirements for bilateral exposures (without CCP), reducing capital requirements for exposures against qualifying CCP and normal capital requirements for exposures against non-qualifying CCP.

IV CENTRAL CLEARING AND COUNTERPARTY RISK REDUCTION

A Multilateral Netting

CCP participate in the trading relationship between sellers and buyers via the novation of their contracts.¹¹¹ As a result of the novation, the original sellers and buyers are released from the obligations to each other and become bound against CCP only.¹¹² If a

¹¹⁰ G20 Leaders’ Statement: The Pittsburgh Summit 24 – 25 September 2009.

¹¹¹ CPSS-IOSCO “Recommendations for Central Counterparties” (November 2004) Bank for International Settlements < <http://www.bis.org/cpmi/publ/d64.pdf>> at 66.

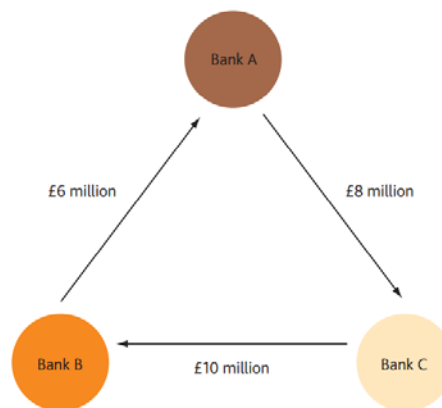
¹¹² CPSS-IOSCO, above n 112, at 66.

counterparty fails to discharge its due obligations, the other counterparty would not be directly affected and the losses arising from the default ideally would be borne by CCP solely.

By interposing themselves between sellers and buyers, CCP can perform multilateral netting functions among its clearing member.¹¹³ It allows and requires CCP to maintain “matched book” at all times because any position must be offset by another opposite position.¹¹⁴ Therefore, the larger and more diverse market share CCP can maintain, the more efficient and beneficial their multilateral netting would be.¹¹⁵ In such circumstance, CCP can retain better capability in terms of commensurate positions and tailored risk management structure.¹¹⁶

Multilateral netting is an essential function of CCP and an efficient tool to debunk the interconnectedness of the CDS and dismiss the counterparty risk.¹¹⁷ Compared to bilateral trades, multilateral netting via CCP simplifies and reduces the exposures of each clearing member¹¹⁸ and the value of its outstanding exposures.¹¹⁹ Further, as long as no clearing member defaults, CCP are risk flat¹²⁰ and not subject to changes in the market value of the transactions to which they are a party.¹²¹

Non-cleared, bilateral trades...



Note: Arrows and figures represent the direction and size of financial obligations from one bank to another.

¹¹³ Cyril Monnet, above n 57, at 9.

¹¹⁴ Amandeep Rehlon, above n 30, at 148.

¹¹⁵ Deutsche Borse Group and Eurex Clearing, above n 36, at 24.

¹¹⁶ At 24.

¹¹⁷ At 12.

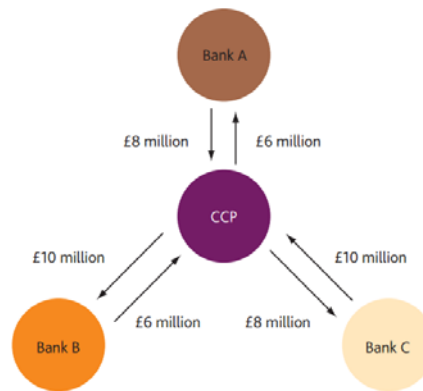
¹¹⁸ Craig Pirrong “A Bill of Goods: CCP and Systemic Risk” (29 June 2014) Columbia Law School http://web.law.columbia.edu/sites/default/files/microsites/law-economics-studies/Pirrong_Paper.pdf at 6.

¹¹⁹ Amandeep Rehlon, above n 30, at 150.

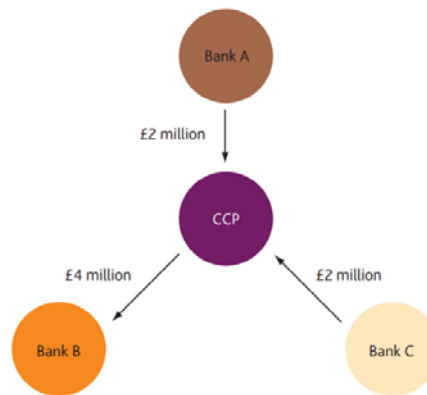
¹²⁰ Jo Braithwaite and David Murphy, above n 4.

¹²¹ Amandeep Rehlon, above n 30, at 148.

...are centrally cleared using a CCP...



...allowing gross exposures to be netted.



Source: Amandeep Rehlon (2013).

B Collateralisation of Residual Net Exposures

Collateralisation means that a party provides an asset or a third party's commitment to a risk taker to secure its obligations to the risk taker.¹²² The viability of the collateralisation mechanism is considered as the cornerstone for the risk management capability of the whole CCP.¹²³ For such purpose, Principle 5 of PFMI requires CCP to only accept collateral with low credit, liquidity and market risks. Particularly, CCP should pursue prudent approach in valuation and haircutting to avoid procyclical effects. In addition, it should not concentrate in certain assets as collateral as it may undermine CCP's flexibility and capacity in when they need to liquidate such collateral under market distress.

A prudent collateralisation structure is beneficial and desirable to CCP and their participants because they must share the losses arising from any default. Therefore, CCP are incentivised to mark the transaction as close as possible to the market price and

¹²² CPSS-IOSCO, above n 112, at 64.

¹²³ Jo Braithwaite and David Murphy, above n 4, at 10.

maintain adequate collateral to cover their exposures.¹²⁴ On the other hand, clearing member are motivated to only contract with CCP who maintain conservative collateral requirements to fully insure against potential losses derived from a default.¹²⁵ Mutual benefit and supervision also prevent CCP and their participants from taking excessive risk which they cannot provide adequate collateral as required under CCP rules.¹²⁶

Collateral typically comprises initial margin and variation margin:

- (a) Initial margin is an additional amount which a clearing member pays to a CCP in lump sum at trade inception.¹²⁷ Initial margin is purported to cover the close out costs in case that clearing member defaults.¹²⁸
- (b) Variation margin is an amount corresponding to the net change in the market value of a clearing member's position and made by that clearing member to a CCP on a daily basis or multiple times in a day.¹²⁹ Variation margin is to ensure that the relevant CDS contracts are current.¹³⁰

Cash is the most common payment form for both initial and variation margin.¹³¹ Subject to the rules of each CCP, high quality liquid securities can also be provided for initial margin.¹³² When posting collateral in cash, CCP and its clearing member open accounts at the same bank so that the CCP can simply instruct the bank to transfer the payable margin from clearing member's account to its account.¹³³ That process is known as title transfer where there is no actual transfer of cash between the clearing member and the CCP.¹³⁴

Principle 6 exclusively requires CCP to establish a margin mechanism which is commensurate with the risks in each product, portfolio and market it serves. They need to retain reliable resources of market price to ensure adequate and prompt valuation of margin requirement, even under extreme market conditions.

¹²⁴ Anupam Chander and Randall Costa, above n 17, at 653 and 676.

¹²⁵ Deutsche Borse Group and Eurex Clearing, above n 36, at 11.

¹²⁶ At 11.

¹²⁷ Jon Gregory, above n 24, at 30.

¹²⁸ At 30.

¹²⁹ Craig Pirrong, above n 119, at 13.

¹³⁰ At 13.

¹³¹ Jo Braithwaite and David Murphy, above n 4, at 10.

¹³² At 6.

¹³³ At 10.

¹³⁴ At 10.

In consistency with PFMI, EMIR emphasises that margin is the primary bulwark for CCP.¹³⁵ Therefore, CCP operating in the EU must impose and collect margin at least on a daily basis to fully collateralise its potential credit exposures from its clearing member and other interoperability arrangements.¹³⁶ Moreover, the margin amount must be sufficient to cover the credit exposure which CCP may incur until the liquidation of the relevant position plus the potential losses derived from at least 99% of the exposure movements.¹³⁷

C Segregation and Portability

As explained in Section III.C.2, during the liquidation of Lehman's bilateral positions, most collateral posted by the counterparties was trapped in Lehman's bankruptcy estate. Therefore, in the central clearing regime, collateral segregation aims to protect CCP's participants against the risk that their collateral may get trapped and be used to discharge the obligations of the defaulting member to other creditors in the bankruptcy process instead of the obligations to such participants.¹³⁸ Collateral segregation also facilitates position portability, enabling CCP to transfer positions from a defaulting clearing member to other non-defaulting clearing member without the need to close out the defaulter's positions.¹³⁹ Efficient segregation and portability would provide counterparties with necessary protection for collateralised positions and enhance the continuity of the financial market during the event of default.¹⁴⁰

Principle 14 of PFMI exclusively requires CCP:

- Have segregation and portability arrangements which at least can protect clients' positions and collateral from the default of the its clearing member
- Employ account structure to identify positions of clients and to segregate related collateral.
- Portability arrangements that make it likely to transfer the positions and collateral to another participants.

Similarly, according to Article 39 of EMIR, CCP must keep separate records and accounts between (i) CCP and its clearing member, (ii) each clearing member and its clients (omnibus client segregation) and (iii) each clients (individual client segregation).

¹³⁵ Item 70 of EMIR.

¹³⁶ Article 41(1) of EMIR.

¹³⁷ Article 41(1) of EMIR.

¹³⁸ IMF, above n 25, at 14.

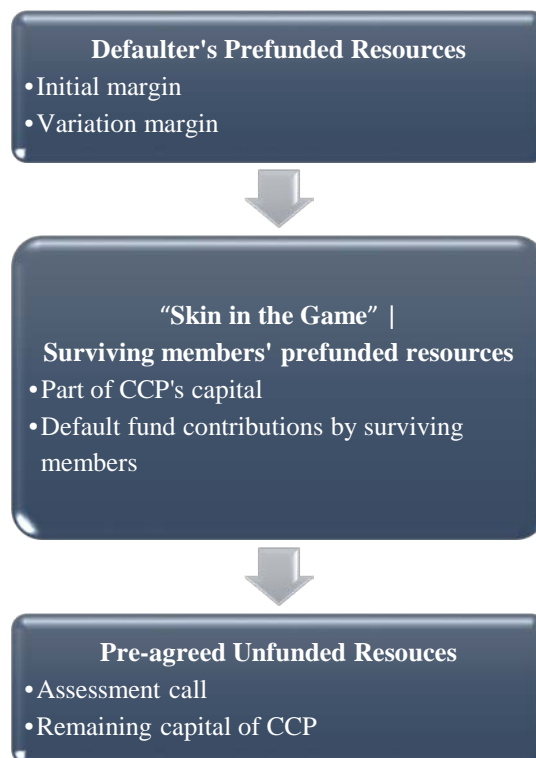
¹³⁹ Deutsche Borse Group and Eurex Clearing, above n 36, at 13.

¹⁴⁰ IMF, above n 25, at 14.

For this purpose, a CCP is deemed to satisfy the segregation and portability requirement if (i) the assets and positions are recorded in separate accounts; (ii) there is no netting of positions recorded on different accounts and (iii) the assets covering the positions recorded in one account are not exposed to losses connected to positions recorded in another account.

D *Loss Mutualisation*

As a common practice, CCP maintain a loss absorption and mutualisation mechanism which is commonly known as “waterfall”. A waterfall comprises multi-layers of protections to cover losses following the default of a clearing member.¹⁴¹ The fund for each layer can be collected by CCP from defaulting members, its own capital, non-defaulting members and other pre-agreed resources in a chronological order.¹⁴² Such default fund structure allows CCP to allocate and mutualise losses arising from a default in a transparent and orderly manner and avert uncertainty or panic from the participants and the market.¹⁴³



¹⁴¹ Froukelien Wendt “Central Counterparties: Addressing their Too Important to Fail Nature (January 2015) International Monetary Fund <<https://www.imf.org/external/pubs/ft/wp/2015/wp1521.pdf>> at 7.

¹⁴² Dietrich Domanski, Leonardo Gambacorta and Cristina Picillo “Central Clearing: Trends and Current Issue” (6 December 2015) Bank for International Settlements <http://www.bis.org/publ/qtrpdf/r_qt1512g.htm> at 61.

¹⁴³ Amandeep Rehlon, above n 30, at 152.

1 *Defaulting member's prefunded resources*

The top layer of the waterfall is always the fund contributed by a defaulting member, including its initial margin and variation margin.¹⁴⁴ Historically, the initial margins collected by CCP in the United Kingdom were able to fully cover the losses incurred from the defaults of their clearing member such as Lehman and MF Global.¹⁴⁵

2 *CCP and surviving members' prefunded resources*

If all prefunded resources provided by a defaulting member are insufficient to cover losses, CCP can draw on the funds contributed by other clearing member and part of its own capital.¹⁴⁶ Such a risk mutualisation mechanism is commonly known as “skin in the game”.

“Skin in the game” approach effectively mitigates the moral hazard risk, which is one of the most alleged risks of the central clearing regime. As CCP's profits mostly depend on the volume of transactions they clear, there is always a possibility that CCP may implement low-standards in risk management requirements to attract as many participants as possible.¹⁴⁷ However, under the aforementioned “skin in the game” approach, as CCP need to inject its own capital into the prefunded default fund, they are incentivised to act diligently in their risk management process.¹⁴⁸ From participants' perspective, they would also require CCP to apply best practice risks management to ensure that their contribution is utilised in a safe and proper manner. Generally, the “skin in the game” structure prevents CCP from competing on risk ensure a level playing field in the central clearing regime.¹⁴⁹

3 *Pre-agreed unfunded resources*

If all the prefunded resources become exhausted, CCP may assess and call for additional contribution from their clearing member to replenish the default fund in accordance with CCP's rules.¹⁵⁰ Such assessment call may be based on their initial default fund contribution (potentially range from 100% to 275% of the initial contribution) and other criteria such as stress testing scenarios”.¹⁵¹

¹⁴⁴Article 45(1) of EMIR.

¹⁴⁵ Amandeep Rehlon, above n 30, at 151.

¹⁴⁶Articles 45(2) and 45(3) of EMIR.

¹⁴⁷ “Systemic risk in Central Counterparty Clearing House” (2014) *Journal of Risk Management in Financial Institutions* 7(3) 226 at 227.

¹⁴⁸ At 227.

¹⁴⁹ At 227.

¹⁵⁰ Craig Pirrong, above n 119, at 25.

¹⁵¹ Deutsche Borse Group and Eurex Clearing, above n 36, at 15.

4 *Application of waterfall structure in practice*

In practice, how CCP organise their default fund and collect contribution from their clearing member for each protection layer is subject to their organisation and the jurisdictions where they operate. For instance, Chicago Mercantile Exchange Inc (clearing member), Eurex Clearing, ICE Clear Credit and LCH.Clearnet Limited (LHC.C) apply the same structure as described above.¹⁵² Other CCP may require additional contribution to create more buffers in the waterfall.¹⁵³ ASX Clear (Futures) divides the defaulter's prefunded resources into two tranches between which are the capital of the CCP itself.¹⁵⁴ Japan Securities Clearing Corporation allows utilising its own capital simultaneously with the prefunded resources from surviving members.¹⁵⁵ There are other exceptional cases such as Options Clearing Corporation which does not apply 'skin in the game' at all.¹⁵⁶

On the international level, it is advisable for CCP to establish and disclose their default rules and procedures that enable CCP to meet their obligations and replenish the exhausted resources when a clearing member defaults.¹⁵⁷ Nevertheless, with regard to CCP operating in the EU, the implementation of the waterfall and "skin in the game" structure is compulsory.¹⁵⁸ The composition and the chronological order of the default waterfall under EMIR are similar to the structure explained in Section IV. D above.

- (a) More specifically, CCP must use their dedicated capital before the contribution of other non-defaulting members.¹⁵⁹ It is also prohibited to use margin posted by one clearing member to cover the losses from a default by another clearing member.¹⁶⁰
- (b) Regarding the amount of the default fund, CCP must set forth the minimum threshold and the criteria to calculate the contributions by each clearing member.¹⁶¹ In all circumstances, CCP's default fund prefunded by their clearing member must be able to withstand, under extreme but plausible market conditions, the default of (i) a clearing member to which they have the largest exposures or (ii) the second and

¹⁵² Louise Carter and Megan Garner "Skin in the Game – Central Counterparty Risk Controls and Incentives" (June 2015) Reserves Bank of Australia <<http://www.rba.gov.au/publications/bulletin/2015/jun/pdf/bu-0615-9.pdf>> at 82.

¹⁵³ At 82.

¹⁵⁴ At 82.

¹⁵⁵ At 82.

¹⁵⁶ At 82.

¹⁵⁷ Principle 13 of PFMI.

¹⁵⁸ Article 42(1) of EMIR.

¹⁵⁹ Article 45(4) of EMIR.

¹⁶⁰ Article 45(4) of EMIR.

¹⁶¹ Article 42(2) of EMIR.

third largest clearing member, whichever is larger.¹⁶² When combining the aforementioned default fund and other prefunded financial resources (including CCP's dedicated capital) which CCP reserve to cover excessive losses arising from any default, the aggregate amount must be able to withstand the default of at least the two largest exposures.¹⁶³

5 *How CCP uses the funds under the waterfall*

The default management process is typically triggered after CCP make a formal declaration that one or some of their clearing member default(s). Such default can be a filing for bankruptcy or a non-compliance with CCP's rules, including but not limited to failure to post collateral on due.¹⁶⁴ The default declaration aims to prevent other market players from further engaging in the defaulter's portfolio.¹⁶⁵ In the EU, upon being aware that any clearing member may not meet its upcoming obligations, CCP must promptly notify the competent authority before making a default declaration.¹⁶⁶ Afterwards, the competent authority will notify ESMA, ESCB and the authority supervising the defaulting clearing member for further action and cooperation.¹⁶⁷

The next step for CCP is to return to a matched book. In general, the trade between CCP and the defaulting clearing member will be terminated immediately in accordance with CCP's rules.¹⁶⁸ Subsequently, CCP may establish identical contracts with other market participants or auction the portfolio to other clearing member and market participants.¹⁶⁹ This process may be completed within two to five days after the termination.¹⁷⁰ CCP in the EU must verify that their default procedures are enforceable and take all reasonable steps to liquidate or transfer the defaulter's positions.¹⁷¹

The last step is to mobilise the CCP's available default management resources to absorb losses resulted from the default (if any).¹⁷² Any remainder in the defaulter's obligations is discharged by the CCP on the behalf of the defaulter according to the aforementioned

¹⁶² Article 42(3) of EMIR.

¹⁶³ Article 43(2) of EMIR.

¹⁶⁴ Jo Braithwaite and David Murphy, above n 4, at 7.

¹⁶⁵ At 7.

¹⁶⁶ Article 48.3 of EMIR.

¹⁶⁷ Article 48.3 of EMIR.

¹⁶⁸ Deutsche Borse Group and Eurex Clearing, above n 36, at 16.

¹⁶⁹ Froukelien Wendt, above n 143, at 8.

¹⁷⁰ Deutsche Borse Group and Eurex Clearing, above n 36, at 16.

¹⁷¹ Article 48.4 of EMIR.

¹⁷² Jo Braithwaite and David Murphy, above n 4, at 7.

chronological order of the waterfall fund.¹⁷³ If the uncovered losses exceed all assessment call and CCP's own capital, CCP become insolvent and collapses.

V *CENTRAL CLEARING AND SYSTEMIC RISK CONCENTRATION*

Despite its obvious advantage of CCP in mitigating the counterparty risk of CDS, the shift to mandatory central clearing in fact did not gain consensus among academics. Opponents of central clearing are most concerned about its potential of concentrating risk. Therefore, this section analyses CCP's shortcomings of pooling risk and becoming TITF institutions and determines their implications on the mandate for central clearing.

A *Risk Concentration and "Too Important to Fail" Central Counterparties*

Central clearing via CCP does not operate without risk. One of the most criticised shortcomings of CCP is its capacity to propagate new systemic risk.¹⁷⁴ Mandate central clearing via CCP means to pool all substantial counterparty risks incurred by the whole CDS market to a small group of CCP.¹⁷⁵ With more and more financial products being cleared through CCP, more and more risks are being concentrated into CCP on both national and international levels.¹⁷⁶

Due to the increasing popularity of central clearing, CCP would inevitably play the central role in the market and major CCP would turn into unprecedented TITF institutions.¹⁷⁷ According to Bernanke (2011), TITF concept refers to institutions whose size, complexity, interconnectedness, and critical functions may inflict materially adverse impacts on the whole financial market if they become insolvent.¹⁷⁸ In such scenario, a collapse of a TITF CCP may lead to cascading failures and cause the systemic disruption to the economy. With the hindsight from the financial crisis 2008, the creation of TITF institutions must be prevented and controlled.

It is questionable whether and how CCP may sustain a default of a major clearing member or a chain of defaults under severe market stress.¹⁷⁹ With a risk and default management mechanism in place, CCP definitely can manage risks arising from one or

¹⁷³ At 7.

¹⁷⁴ Froukelien Wendt, above n 143, at 4.

¹⁷⁵ Bernanke (2011)

¹⁷⁶ Benoît Cœuré, Member of the Executive Board of the ECB: Risks in CCP, at the conference "Mapping and Monitoring the Financial System: Liquidity, Funding, and Plumbing" organised by Office of Financial Research and Financial Stability Oversight Council, Washington DC, 23 January 2014 <https://www.ecb.europa.eu/press/key/date/2014/html/sp140123_1.en.html>.

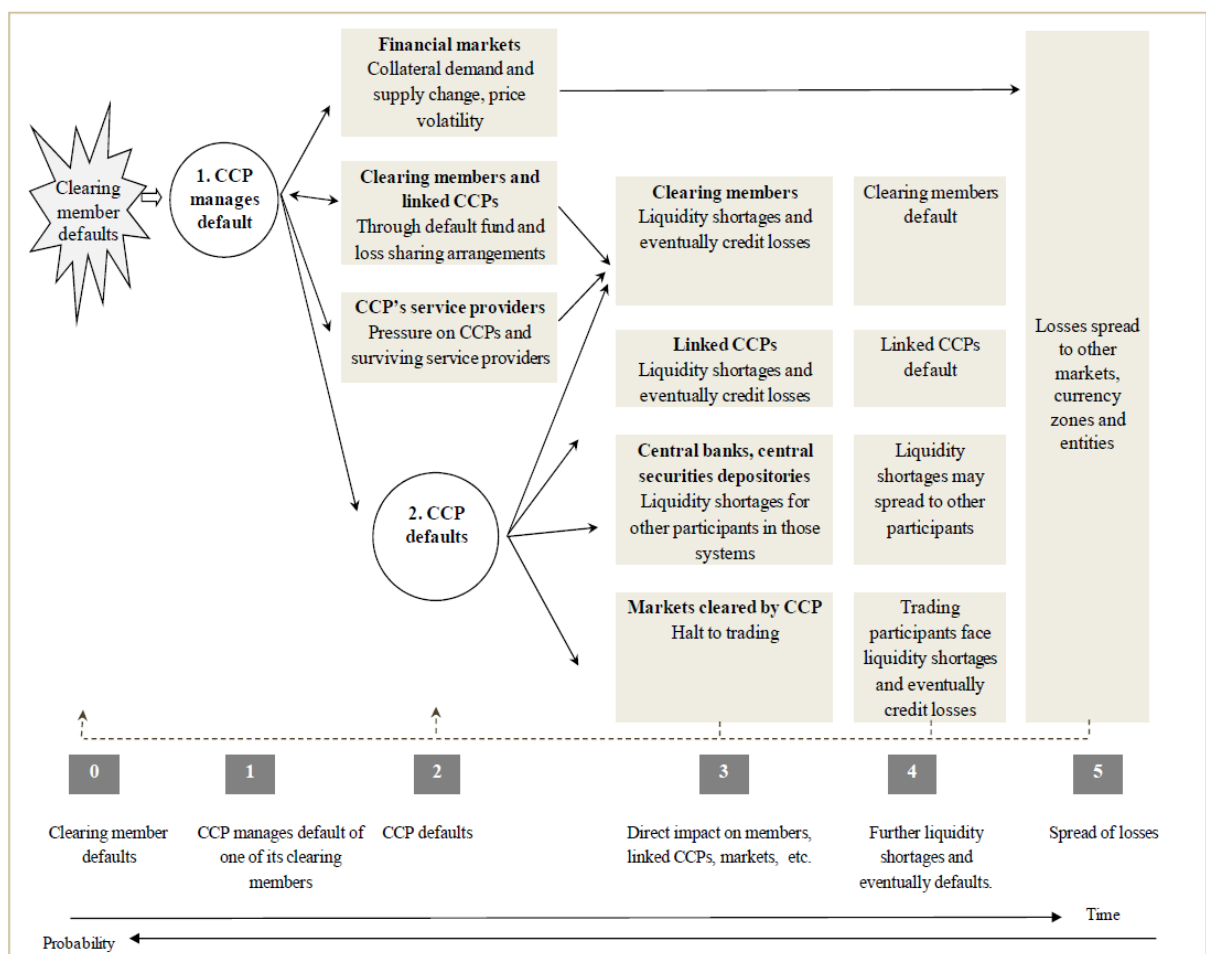
¹⁷⁷ Froukelien Wendt, above n 142, at 3.

¹⁷⁸ Ben S Bernanke, above n 20.

¹⁷⁹ Dietrich Domanski, Leonardo Gambacorta and Cristina Picillo, above n 143, at 68.

several defaults which are sufficient small and under normal market conditions.¹⁸⁰ Nonetheless, extreme market volatility and lack of liquidity may preclude CCP and their surviving clearing member from fulfilling their financial liabilities and relinquishing the exhausted default fund promptly to cover for the arising losses.¹⁸¹ Due to the vast number of transactions being cleared via CCP and their complex interconnections with other counterparties in the whole financial system, a failure of a TITF CCP would probably far more horrendous and destructive than the failure of Lehman or AIG.

The diagram below illustrates the process and the possibility level of a CCP failure inflicting contagious impacts on other institutions and infrastructures in the market.



Source: Froukelien Wendt (2015).

¹⁸⁰ At 68.

¹⁸¹ At 68.

B Historical Record of Central Counterparties' Failures

1 CCP failures in practice

Notwithstanding the increasing concerns over their catastrophic impacts, CCP failures are extremely rare, compared to banks.¹⁸² There are only four CCP failures from 1974, including:

- (a) French Caisse de Liquidation clearing house was closed down in 1974 after the sugar prices on the future exchange plummeted.¹⁸³ Nataf Trading House, who held the significant positions and other clearing members failed to meet the margin call. The main problems causing and exacerbating the collapse include: (i) failure to increase the margin requirements in response to greater market volatility, (ii) application of questionable prices and non-transparent methods when allocating losses among clearing member, (iii) no appropriate position limit imposed on major clearing member such as Nataf Trading House and (iv) failure to notify the authorised exchange of the large size of its exposure.
- (b) The Malaysian Kuala Lumpur Commodity Clearing House was closed down in 1983 after six major brokers defaulted on their obligations because of a crash in palm oil futures prices.¹⁸⁴ In addition to the inappropriate margin requirement, the collapse of the three-year-old clearing house was blamed on their lack of experience in default management.¹⁸⁵ Sloppy process on trade confirmation and registration also resulted in long delays in the resolution because the authority could not determine who owned what to whom.¹⁸⁶
- (c) The Hong Kong Futures Exchange had to close for four days, and be bailed out by the government in 1987 after the stock market crash. Similarly to Caisse de Liquidation, they also did not impose any position limit and therefore the market risk was concentrated in a few counterparties (5 out of 102 brokers accounted for 80% of open sold contracts).¹⁸⁷
- (d) Indian National Spot Exchange was closed in 2013 as a consequence of various violations, including fraud in commodities collateral and executing prohibited derivatives contracts.¹⁸⁸

¹⁸² Jon Gregory, above n 24, at 267

¹⁸³ IMF, above n 25, at 18.

¹⁸⁴ At 18.

¹⁸⁵ Jon Gregory, above n 24, at 268.

¹⁸⁶ IMF, above n 25, at 18.

¹⁸⁷ At 18.

¹⁸⁸ Deutsche Borse Group and Eurex Clearing, above n 36, at 20.

2 *Lesson learnt*

The failures of CCP in the past provide enlightening evidence and helpful hindsight into CCP failures to facilitate further research on mitigation measures for CCP. Most past failures were triggered by tremendous price drop in the relevant market and a chain of default by clearing member stemming from such market volatility. As CCP could not adjust their margin requirement appropriately and suffered from other operational problems, they completely failed to cover the losses arising from the default and prevent their own collapse.

Nevertheless, the aforementioned triggers and challenges are not insurmountable. First and foremost, it is evident that public sector must play an active role in guiding, managing and auditing CCP to ensure they maintain the highest standards of risk and default management.¹⁸⁹ Simultaneously, CCP must enhance and monitor their risk management capabilities and default funds so that they can handle significant exposures and imminent risks promptly and appropriately.¹⁹⁰ In particular, the past failures underpin the necessity for CCP to adjust their margin requirements frequently in correspondence to the price fluctuation.¹⁹¹ Further, it is critical for CCP to maintain an efficient payment system which enables them to collect due payments from clearing member to maintain their matched book.¹⁹²

C Implication of CCP's Risk Concentration on the Promotion of Central Clearing

Although CCP's risk concentration raises legitimate concerns about the devastating impacts caused by a failed CCP, there is little likelihood of CCP failing in practice.

More importantly, other alternative clearing structures are definitely more flawed and risky. The financial crisis 2008 completely refuted the belief that risks could be controlled more efficiently if they were thinly dispersed across the system. The pre-crisis bilaterally cleared market was opaque, insufficiently collateralised and pooled the risks dangerously without raising much awareness from regulators and the public. It is noteworthy that even without the mandate for central clearing, Bear, Lehman and AIG did act as de facto CCP and concentrated excessive risks without being subject to adequate risk management requirements.¹⁹³ While those giants eventually failed, CCP survived the financial crisis 2008 and assisted other institutions in handling defaults efficiently even without government supervision or support.

¹⁸⁹Deutsche Borse Group and Eurex Clearing, above n 36, at 20.

¹⁹⁰ IMF, above n 25, at 18.

¹⁹¹ At 18.

¹⁹² At 18.

¹⁹³ Anupam Chander and Randall Costa, above n 17, at 676 and 677.

On the other hand, with the hindsight from the past, it is convincing the flaws in CC are entirely remediable. In particular, the risks in CCP can be classified into two forms, either market risk or counterparty risk.¹⁹⁴ Regarding the market risk, matched book is a comprehensive solution because it allows CCP to maintain and offset equal and opposite positions.¹⁹⁵ Regarding the counterparty risk, public sectors have been developing comprehensive and robust regulatory framework to ensure that CCP are pooling and managing the risk appropriately.¹⁹⁶ Furthermore, to protect themselves from any imminent collapse, CCP have an advantage over other financial infrastructure is that they can obtain additional financial supports from their participants instead of government bailout.¹⁹⁷

VI RISK MANGAGEMENT AND MITIGATION MEASURES

A safe and sound risk management framework is potentially the most decisive factor in determining whether the promotion of central clearing is the optimal solution to CDS counterparty risk.

Unlike the pre-crisis negligence and overconfidence in the safety of the self-regulated CDS market,¹⁹⁸ regulators now are fully aware of the systemic risk posed by CCP. Therefore, they are determined to impose stringent and consistent international standards and regulations on CCP to ensure their robustness and sustainability.¹⁹⁹ The umbrella guidance and standards on CCP's risk management framework is the PFMI issued by CPMI - IOSCO. At regional level, ESMA has also issued various regulations and delegated regulations in consistency with PFMI.

As there is no definite answer to the effectiveness of CCP until the next global financial crisis, this section does not aim to determine any priori or assess the ex ante enforceability of the requirements for risk management framework. Instead, it focuses on the current regulatory efforts to enhance the viability and safety of central clearing and analyses the key guidance on CCP's organisation and operation. Based on the findings, it assesses whether the regulations on central clearing regime may be developed appropriately for its purpose of acting as the risk manager of the CDS market in the foreseeable future.

¹⁹⁴ At 676 and 677.

¹⁹⁵ At 676 and 677.

¹⁹⁶ At 676 and 677.

¹⁹⁷ At 676 and 677.

¹⁹⁸ Navneet Arora, Priyank Gandhi and Francis A Longstaff "Counterparty Credit Risk and the Credit Default Swap Market" (2012) 103(2) *Journal of Financial Economics* 280 at 280.

¹⁹⁹ Jerome H Powell, above n 5, at 4.

A Regulatory Overview

A risk management framework for CCP comprises a regular risk management regime, recovery plan and resolution plan. Regular risk management regime is to regulate the way CCP pool and manage their risks while operating as a going concern. If CCP duly implement their regular risk management regime in good times, it would minimise their need to take sudden and abrupt measures in more stressed situations. On the other hand, recovery and resolution plan is considered as the last step and performed only after CCP's regular risk management process has failed.²⁰⁰ A recovery plan is to ensure CCP's capability to handle uncovered losses and liquidity insufficiency and maintain their business continuity under extreme situations.²⁰¹ A resolution plan is to prepare for CCP's orderly and timely winding-down in case the recovery plan fails to regain their resilience and viability.

Both Steven Maijor, ESMA Chairman and Benoît Cœuré, executive board member of the ECB agreed that regulators should play a central role in ensuring CCP maintain a safe and sound risk management framework. As most CCP are profit oriented institutions (or subsidiaries of profit oriented institutions)²⁰² and the derivatives market is highly susceptible to regulatory competition,²⁰³ it is vital to provide necessary incentives for CCP to be conservative. The Chairman of ESMA emphasised that in addition to the promulgation of stringent regulations, the competent authority must monitor and supervise CCP's operations consistently and thoroughly to ensure an even playground for all CCP in the relevant market.²⁰⁴

So far, regulations on CCP's risk management regime are the most developed and comprehensive. Until now, CCP's governance, risk management and default fund have been the main focus for regulators to achieve the post-crisis resilience of CCP under normal market condition.²⁰⁵ On the other hand, guidance on the recovery and resolution planning is still at developing stage. The status quo of CCP regime is analogous to "seaworthy vessels heading for the ocean but without the lifeboats in place."²⁰⁶ Nonetheless, there is a general consensus that now is the time to focus on building the lifeboats for CCP to ensure that they can survive unpredictable extreme circumstances

²⁰⁰ Steven Maijor, ESMA Chair: Recovery and Resolution of CCPs: Let's Bring the Lifeboats in Place, at Banque de France's policy conference on Recovery and Resolution of CCPs, Paris, 24 June 2016 <https://www.esma.europa.eu/sites/default/files/library/2016-1002_speech_bdf_conference_on_ccp_rr.pdf>.

²⁰¹ Item 2.2.2 of CPMI-IOSCO "Recovery Report of Financial Market Infrastructure" <http://www.bis.org/cpmi/publ/d121.pdf> (Recovery report).

²⁰² Froukelien Wendt, above n 143, at 13.

²⁰³ Steven Maijor, above n 204.

²⁰⁴ Steven Maijor, above n 204.

²⁰⁵ Steven Maijor, above n 204.

²⁰⁶ Steven Maijor, above n 204.

without transmitting negative impacts across the market. Since 2015, BCBS, CPMI, IOSCO and FSB have collaboratively working on, among others, reviewing and publishing guidance on recovery and resolution plan.²⁰⁷

B Risk Management

1 Governance and incentives

The most essential principle for CCP is to establish a clear and transparent governance structure to promote their safety and efficiency as well as support the financial stability, other public interest and objectives of relevant stakeholders.²⁰⁸ To achieve such principle, EMIR specifically requires a legal person providing clearing services in EU to obtain a prior authorisation from the competent authority.²⁰⁹ Such authorisation is issued and remains valid only if CCP satisfy all the requirements under EMIR.²¹⁰ Below are the key requirements under EMIR and its relevant delegated regulations:

Criteria	EMIR Requirement
Capital	<ul style="list-style-type: none"> • CCP must maintain a permanent and available initial capital of at least EUR 7,5 million.²¹¹ • The capital portion which is dedicated to default fund must not be included in the aforementioned minimum capital requirement.²¹² • The capital must be proportionate to the risk stemming from CCP's activities.²¹³ • The capital must be sufficient to ensure an orderly resolution or

²⁰⁷ FSB “Progress Report on the CCP Workplan” (16 August 2016) Financial Stability Board <<http://www.fsb.org/wp-content/uploads/Progress-Report-on-the-CCP-Workplan.pdf>>.

²⁰⁸ Principle 2 of PFMI.

²⁰⁹ Article 14(1) of EMIR.

²¹⁰ Article 17(4) of EMIR.

²¹¹ Article 16(1) of EMIR.

²¹² Article 43(1) of EMIR.

²¹³ Article 16(2) of EMIR and Article 1 of Commission Delegated regulation (EU) 152/2013.

	restructuring of CCP and protect CCP from losses and risks which exceed the margin and waterfall prefunded resources. ²¹⁴
Organisational structure	<ul style="list-style-type: none"> • Senior management (ie persons who direct CCP's business and members of the board)²¹⁵ must have good repute and sufficient experience.²¹⁶
	<ul style="list-style-type: none"> • CCP must establish a board (ie administrative or supervisory board under national company law)²¹⁷ and a risk committee.
	<p>Board</p> <ul style="list-style-type: none"> • It comprises at least 1/3 but no less than 2 members who are 'independent' (as defined under Article 2(28) of EMIR).²¹⁸ • Representatives of CCP's clients must be invited to board meetings for matters relating to CCP's transparency and segregation and portability.²¹⁹ • Roles and functions of the board are defined by CCP and notified to competent authorities and auditors.²²⁰
	<p>Risk committee</p> <ul style="list-style-type: none"> • It comprises independent board members and representatives of CCP's participants.²²¹

²¹⁴ Article 16(2) of EMIR and Article 1 of Commission Delegated regulation (EU) 152/2013.

²¹⁵ Article 2(28) of EMIR.

²¹⁶ Article 27(1) of EMIR.

²¹⁷ Article 2(27) of EMIR.

²¹⁸ Article 27.2 of EMIR.

²¹⁹ Article 27.2 of EMIR.

²²⁰ Article 27.3 of EMIR.

²²¹ Article 28.3 of EMIR.

	<ul style="list-style-type: none"> • It advises the board on any arrangement which may impact the CCP's risk management.²²² • A CCP must inform the competent authority of any decision which the board make inconsistently with the advice of risk committee.²²³
Shareholders and members with qualifying holdings ²²⁴	<ul style="list-style-type: none"> • The identity and details of CCP's shareholders and other members having qualifying holdings whether direct or indirect must be disclosed to the competent authority for authorisation.²²⁵ • The shareholding structure must be appropriate to ensure CCP's safe and sound operation and not prevent any contemplated supervision of the competent authority.²²⁶
Proposed acquisition of qualifying holding	<ul style="list-style-type: none"> • CCP must obtain prior approval for any proposed acquisition or disposal of qualifying holding which may lead a change in direct or indirect ownership of the capital exceeding 10%, 20%, 30% or 50% or cause CCP to become its subsidiary.²²⁷
Business continuity and disaster recovery plan	<ul style="list-style-type: none"> • Business continuity and disaster recovery plan must allow at least the recovery of all transactions at the time of disruption to allow CCP to operate and complete settlement on the scheduled date.²²⁸
Participation requirements	<ul style="list-style-type: none"> • CCP must impose conditions for clearing on a non-discriminatory basis provided that the trading venue complies with CCP's applicable operation and technical requirements.²²⁹

²²² Article 28.4 of EMIR.

²²³ Article 28.4 of EMIR.

²²⁴ According to Article 2(20) of EMIR, qualifying holding means "any direct or indirect holding in a CCP which represents at least 10% of the capital of the voting rights [...] or which makes it possible to exercise a significant influence over the management of the CCP in which that holding subsists".

²²⁵ Article 30(1) of EMIR.

²²⁶ Article 30(1) of EMIR.

²²⁷ Article 31(2) of EMIR.

²²⁸ Article 34(1) of EMIR.

²²⁹ Article 7(1) of EMIR

- CCP must determine the adequate admission criteria to ensure their clearing member have enough financial resources and operation capacity to meet their obligations.²³⁰
- clearing member who clear products on behalf of their clients must have necessarily additional resources and operational capacity.²³¹

2 *Risk management*

CCP risk management framework needs to be comprehensive and efficient for the purpose of managing the legal, credit, liquidity, operational and other risks.²³² PFMI and EMIR promulgated detailed guidance on various aspects of risk management such as collateral, margin, segregation and portability. The key details of such requirements are covered in Section IV above.

The research by Deutsche Borse Group and Eurex Clearing demonstrates that if CCP comply with the default fund requirements under EMIR, it may sustain an equity market drops of approximately 30%.²³³ Historically, there has been no higher market drop than 30%. In particular, the daily percentage losses in the financial crisis 2008 was around 8% while the losses in the market crash 1929 and the Black Monday 1987 were 13% and 23% respectively.²³⁴ Even in such unprecedented extreme market condition, the analysis demonstrates that CCP in compliance with EMIR still have more than half of its default fund remain intact after covering the losses.²³⁵

In practice, ESMA conducted stress test on 17 CCP in the EU to assess their viability in terms of counterparty risk. Based on the assessment result, ESMA is confident that CCP's risk management regimes overall have been well-developed and adequate for counterparty risk mitigation. Their resources are sufficient to cover losses from a default of the top two EU-wide clearing member groups combined with historical and hypothetical market stress scenarios.

²³⁰ Article 37(1) of EMIR.

²³¹ Article 37.3 of EMIR.

²³² Principle 3 of PFMI.

²³³ Deutsche Borse Group and Eurex Clearing, above n 36, at 22.

²³⁴ Deutsche Borse Group and Eurex Clearing, above n 36, at 22.

²³⁵ Deutsche Borse Group and Eurex Clearing, above n 36, at 23.

3 Disclosure

Disclosure requirement is a prerequisite for a transparent and efficient central clearing regime. In addition to PFMI, CPSS-IOSCO further issued detailed guidance on Disclosure Framework for financial market infrastructure.²³⁶

In general, CCP must have clear and comprehensive rules and procedures. They should disclose such rules and procedures, alongside other key information such as fee policies, basic data on transaction volumes and values, to their participants.²³⁷ Not only being subject to disclosure duty, CCP are also required to facilitate their participants' understanding of such information to ensure that the participants can assess the risks occurring to them when participating in CCP.

Specifically, CCP in the EU are subject to various disclosure and/or notification duties to their participants and/or the competent authority, for instance:

- (a) Notify any change in the CCP's management and provide the competent authority with sufficient information to assess the CCP's compliance with the regulations on their management and board;²³⁸
- (b) Notify the result of stress tests for them to assess the exposure of financial undertakings to the defaults of CCP;²³⁹
- (c) Notify any capital reduction which makes the aggregate capital lower than 110% of the capital requirements or of EUR 7,5 million;²⁴⁰
- (d) Disclose details of price and fees for each service to be provided by CCP;²⁴¹
- (e) Disclose all the risks associated to the services;²⁴²
- (f) Disclose the price information used to calculate end-of-day exposures;²⁴³
- (g) Disclose volume of cleared transactions for each class of instruments on an aggregated basis;²⁴⁴

²³⁶ See CPSS-IOSCO Disclosure Framework and Assessment Methodology for their Principles for Financial Market Infrastructures at <http://www.iosco.org/news/pdf/IOSCONEWS260.pdf>.

²³⁷ Principle 23 of PFMI.

²³⁸ Article 31(1) of EMIR.

²³⁹ Article 49(1) of EMIR.

²⁴⁰ Article 1(3) of Commission Delegated Regulation (EU) 152/2013.

²⁴¹ Article 38.1 of EMIR.

²⁴² Article 38.2 of EMIR.

²⁴³ Article 38.3 of EMIR.

²⁴⁴ Article 38.3 of EMIR.

- (h) Disclose operational and technical requirements regarding communication with third parties;²⁴⁵
- (i) Disclose any clearing member's breach of their admission requirements and fees unless such disclosure may destabilise the market;²⁴⁶
- (j) Disclose the level of protection and costs associate with different level of segregation;²⁴⁷
- (k) Disclose key information on its risk management model and assumptions for the stress test;²⁴⁸ and
- (l) Disclose details of any concluded contract or any amendment or termination of contracts to the registered trade repository no later than the following of such conclusion, modification or termination.²⁴⁹

4 *Stress testing*

Stress testing is extremely critical for CCP because it constitutes the foundation for the recovery and resolution plan. The frequency of stress testing also need to be increased if CCP clear products or operate in market with high volatility and/or less liquidity or when the size or position concentration of CCP's clearing member and clients increase significantly. PFMI introduces certain stress testing principles which are exclusively reserved for CCP in different circumstances, in particular:

- (a) CCP should verify the sufficiency of their default management resources in extreme but plausible market conditions through rigorous stress testing on a daily basis.²⁵⁰
- (b) At least on monthly basis, CCP should conduct a comprehensive and thorough analysis of stress testing scenarios, models and underlying parameters and assumptions to ensure they properly reflect CCP's required level of default protection subject to the current and evolving market conditions.²⁵¹
- (c) They should test their overall margin coverage and model performance on a daily basis and sensitivity analysis at least monthly.²⁵²

²⁴⁵ Article 38(4) of EMIR.

²⁴⁶ Article 38(5) of EMIR.

²⁴⁷ Article 39(7) of EMIR.

²⁴⁸ Article 49(4) of EMIR.

²⁴⁹ Article 9(1) of EMIR.

²⁵⁰ Principle 4.5 of PFMI.

²⁵¹ Principle 4.5 of PFMI.

²⁵² Principle 6.6 of PFMI.

(d) They should regularly test the sufficiency of the liquid resources.²⁵³

(e) They should test and review the default rules and procedures to ensure they are practical and effective at least annually.²⁵⁴

C Recovery and Resolution Plan

Generally, CCP should adopt the recovery and resolution plan to address the scenarios which may prevent CCP from providing its critical services and affect the effectiveness of recovery and resolution tools.²⁵⁵ An efficient recovery and resolution plan may preclude disastrous fallout of TITF institutions.²⁵⁶ Even when CCP duly implement their risk management regime they still may face challenges and struggle to sustain their viability under market distress. That is when the recovery and/or resolution plan would be activated to deal with uncovered losses and illiquidity and ultimately to preserve the financial stability.

Due to the TITF nature of CCP, recovery and resolution plan has attracted broad consideration at both international and national levels. However, even at the international level, a comprehensive and detailed guidance for CCP's recovery and resolution plan is not yet available and still under consideration.²⁵⁷ Nonetheless, according to their joint work plan, CPMI, IOSCO and FSB have issued guidance on recovery and resolution plan for financial market infrastructures in general and working draft covering CCP in particular.²⁵⁸ It is expressly required that CCP and the relevant authorities should thoroughly consider the application of the further guidance of financial market infrastructures published by CPMI-IOSCO. FSB will publish a final report on CCP resilience and recovery and draft framework for supervisory stress testing within the first half of 2017.²⁵⁹ FSB aims to publish a more detailed proposal on CCP resolution in early 2017 for its finalisation by G20 Summit in July 2017.

At the regional level, the EU has considered regulations on the recovery and resolution plan of CCP since April 2015.²⁶⁰ European Commission is tentatively issuing their

²⁵³ Principle 7.9 of PFMI.

²⁵⁴ Principle 13.4 of PFMI.

²⁵⁵ Principles 4 and 7 of PFMI.

²⁵⁶ FSB "Essential Aspects of CCP Resolution (Discussion Note)" <http://www.fsb.org/wp-content/uploads/Essential-Aspects-of-CCP-Resolution-Planning.pdf> (FSB Essential Aspects) at 3.

²⁵⁷ Benoit Coeure, above n 2.

²⁵⁸ FSB "2015 CCP Workplan" (22 September 2015) Financial Stability Board <<http://www.fsb.org/2015/09/2015-ccp-workplan/>>.

²⁵⁹ At 2.

²⁶⁰ European Commission "Roadmap – Framework for resolution of financial institutions other than bank" <http://ec.europa.eu/smart-regulation/impact/planned_ia/docs/2015_fisma_029_cwp_ccp_resolution_of_non_bank_resolution_en.pdf>.

proposal on the recovery and resolution regime for CCP after the publication of the official guidance from CPMI, IOSCO and FSB.²⁶¹

As the leading authority in this area, CPMI – IOSCO expressly indicates that lessons learnt and expertise on the necessity, design, power and tools of resolutions regimes for financial institution will be applied to their preparation for guidance on recovery and resolution plan as far as possible.²⁶² With many unknowns and without hindsight, the establishment and development of R&R are being conducted in a cautious and non-descriptive approach. CPMI-IOSCO guidance is purported to facilitate CCP in choosing the most appropriate tools and measures for their own business operations.²⁶³ The main initiative for recovery is to ensure that CCP is properly prepared to recover from financial distress and do not require bail out from the government and tax payers.²⁶⁴ Regarding resolution, the purpose is to enable that CCP can be resolved and winded up quickly while their critical functions to the financial market's stability can be preserved.²⁶⁵ Public authority may play a paramount and irreplaceable role in the resolution plan because this process would the intervention of public authorities to take extraordinary actions for public interest.²⁶⁶

1 Recovery

The recovery framework must be comprehensive, effective, controllable and provide necessary incentives for both CCP and its clearing member.²⁶⁷ In practice, CPMI and IOSCO reviewed the risk management and recovery practices of 10 CCP worldwide. According to their assessment, while all CCP have established and review their risk and default management procedures properly, most of their recovery plans remain at early stages with certain serious problems and challenges.²⁶⁸ Many CCP have not completely established their recovery rules and framework as required under PFMI.²⁶⁹ Two out of ten do not have recovery or resolution plans at all and one of them does not have immediate plan to develop one. CPMI-IOSCO expects CCPs to remedy their gap and

²⁶¹ Steven Maijoor, above n 204.

²⁶² PFMI, at 15.

²⁶³ Steven Maijoor, above n 204.

²⁶⁴ European Commission, above n 261, at 1.

²⁶⁵ At 1.

²⁶⁶ At 1.

²⁶⁷ Principle 3 of PFMI.

²⁶⁸ Item 5.6.1 of CPMI-IOSCO "Implementation Monitoring of PFMI: Level 3 Assessment – Report on the Financial Risk Management and Recovery Practices of 10 Derivatives CCPs" <<https://www.iosco.org/library/pubdocs/pdf/IOSCOPD538.pdf>> (Assessment Report).

²⁶⁹ BIS "Resilience and Recovery of Central Counterparties: Further Guidance on the PFMI (Consultative Report)" <<http://www.bis.org/cpmi/publ/d149.pdf>> (Further Guidance on PFMI) at 5.

shortcomings as identified in the Assessment Report by 31 December 2016. The follow-up review of such actions will be conducted within 2017.²⁷⁰

Recovery plan is more imperative to CCP than any other financial institutions.²⁷¹ As central clearing is compulsory for certain financial products, the continuity of CCP clearing services, especially under market severe conditions, is crucial to prevent the market disruption and contagion of negative effects.²⁷² First, if a major CCP defaults, there are few or even none alternative institutions who can replace the failed CCP to clear its products.²⁷³ Secondly, the unique size and composition of CCP balance sheets make highly costly and challenging to bail out a failed CCP.²⁷⁴ Thirdly, if CCP are prudent and efficient in their risk monitor and management operations, they would ensure the smooth and safe operations for other types of financial services and the whole financial market.²⁷⁵

CCP recovery plan is more advantageous than other financial institutions because they can rely on contractual arrangements with its clearing member to obtain additional financial support.²⁷⁶ As CCP's participants agree to be bound against CCP's rules, including the procedure to make assessment call when all the prefunded default management resources have been exhausted, CCP are usually entitled to require additional payments from their clearing member, even under market distress.²⁷⁷ It is noteworthy that recovery plan must be prepared on the basis that all uncovered losses are going to be borne by CCP other relevant stakeholders, instead of government funding or central bank support.²⁷⁸

Recovery Report recommends numerous recovery tools for financial market infrastructures most of which are applicable to CCP.²⁷⁹ Overall, the recovery tools should be (i) comprehensive, (ii) effective, (iii) transparent, measurable, manageable and controllable, (iv) able to create appropriate incentive and (v) able to minimise negative impacts.²⁸⁰ While no recovery plan may entirely satisfy all of the characteristics, it is CCP's obligations to determine which plan may the most suitable and efficient for their

²⁷⁰At 2.

²⁷¹ Steven Maijor, above n 204.

²⁷² PFMI, at 14.

²⁷³ PFMI, at 14.

²⁷⁴ Steven Maijor, above n 204.

²⁷⁵ Steven Maijor, above n 204.

²⁷⁶ Steven Maijor, above n 204.

²⁷⁷ Steven Maijor, above n 204.

²⁷⁸ Item 2.3.1 of Recovery Report.

²⁷⁹ Item 4.1.2 of Recovery Report.

²⁸⁰ Item 3.3.1 of recovery report.

circumstances.”²⁸¹ As no recovery planning has been tested in practice, it is strongly advised for CCP not determine any priori tool but instead observe and adopt as various tools as possible. By doing that, it ensures that CCP would retain sufficient flexibility to be able to choose the optimal recovery tool applicable to each specific circumstance.²⁸²

(a) Allocate uncovered losses caused by participant default

Principle 4.7 requires CCP to explicitly state the rules and procedures for allocating uncovered credit losses and the repayment of any fund that CCP borrow from lenders. Cash call is a typical feature of CCP’s allocation of uncovered loss. Cash call may be made in proportion to the contribution to the default fund or to market to market value of the positions hold by the relevant clearing member. Although uncapped cash call is optimal to replenish the resources for uncovered losses, it may destabilise certain clearing member and exacerbate the financial distress. Conversely, if CCP impose capped cash, such mechanism needs to be supplemented by other loss allocation tool.²⁸³ However, even in the case of uncapped cash call, CCP still needs to retain the right to haircut claims against it to protect itself from the risk that a clearing member may fail to meet the cash call.²⁸⁴

CCP can further guarantee the enforcement of their cash call by requiring the clearing member to post collateral. To impose this arrangement, CCP must provide in their rules, among others, how and for what obligations such collateral will be used for and the extent to which the paid for assets of indirect participants are hold intact and protected.²⁸⁵

Variation margin gain haircut is another useful tool for CCP to allocate their loss. Accordingly, CCP can preserve or accumulate cash when they can avoid paying margin gap owned to their clearing member. on the other hand, they are still entitled to collect full payment for variation margin from their clearing member.²⁸⁶ The clearing member who suffered losses due to the implementation of variation margin gain haircut may be entitled to equity or debt issued by CCP.²⁸⁷

(b) Address uncovered liquidity shortfalls

²⁸¹ Item 3.3.2 of Recovery Report.

²⁸² Steven Maijoor, above n 204.

²⁸³ Item 4.2.9 of Recovery Report.

²⁸⁴ Item 4.2.4 of Recovery Report.

²⁸⁵ Item 4.2.11 of Recovery Report.

²⁸⁶ Duffie Darrell “Resolution of Failing Central Counterparties (17 December 2014) Stanford Graduate School of Business <<https://www.gsb.stanford.edu/faculty-research/working-papers/resolution-failing-central-counterparties>> at 4.

²⁸⁷ At 4.

According to Principle 7 of PFMI, CCP must maintain its ability, especially in extreme circumstances, to meet their liquidity requirements by maintaining sufficient liquid resources in all currency to effect same day, or if applicable, intraday and multiday settlement of payment obligations.²⁸⁸ Such stress scenarios may include a default of a clearing member or its affiliates which is likely to generate the largest liabilities for CCP in extreme but plausible market conditions.

The initial resources for liquidity shortfalls could be cash at the central bank of issue and at creditworthy commercial banks, committed lines of credit, committed foreign exchange swaps, committed repos, and liquid collateral.²⁸⁹ In addition, CCP may further bolster its liquidity resources by obtaining funding from their clearing member and/or third parties.²⁹⁰ In any case, it is of paramount importance for CCP to clearly define in their recovery plan the specific arrangements to obtain additional funding when necessary.²⁹¹

(c) Replenish financial resources

CCP must have rules and procedures for replenishing financial resources during a stress event in satisfaction of the minimum liquidity requirement to maintain safe and sound operations.²⁹² Again, cash call can be used to replenish the exhausted fund as how it is applied to allocate the uncovered losses.²⁹³ Another way to replenish financial resources is to raise additional equity capital.²⁹⁴

(d) Re-establish a matched book

Returning to a matched book is vital and helps to prevent CCP and their clearing member from further losses.²⁹⁵ It can be conducted either via voluntary or mandatory tools. Voluntary tool means CCP may sell the positions of a defaulting member to clearing member or other market participants, buy in any securities, currencies or other assets that the defaulter has sold out but failed to deliver or sell any securities, currencies or other assets that the defaulter has purchased but failed to pay.²⁹⁶ All the costs and losses from those processes are covered by the default fund

²⁸⁸ Principle 7 of PFMI.

²⁸⁹ Principle 7 of PFMI.

²⁹⁰ Principle 7 of PFMI.

²⁹¹ Further Guidance on PFMI, at 45.

²⁹² Item 4.1 of Recovery Report.

²⁹³ Item 4.4.12 of Recovery Report.

²⁹⁴ Item 4.6 of Recovery Report.

²⁹⁵ Item 4.5.1 of Recovery Report.

²⁹⁶ Item 4.5.2 of Recovery Report.

in the waterfall and recovery plan.²⁹⁷ It is strongly recommended that CCP promote incentives for their clearing member and other market participants to actively support the application of voluntary tool. However, under severe market distress, CCP may fail to close out or transfer the defaulter's positions via voluntary tool. In that case, it may apply mandatory tool which is to impose forced allocation or to tear-up contract.²⁹⁸

Subject to the specific rules of each CCP, forced allocation means to allocate the defaulter's positions to non-defaulting clearing member at a price determined by CCP.²⁹⁹ The clearing member who are likely to be subject to forced allocation are those holding positions related to opposite to the defaulter's positions or obtaining "fewer successful bids in the voluntary auctions".³⁰⁰ For the latter scenario, forced allocation can provide incentives for clearing member to actively participate in auctions and receive as many portfolio of the defaulter as possible.

To the necessary extent to return to the matched book, CCP may terminate (i) all of its contracts, whether matched or unmatched (complete tear-up), (ii) all contracts regarding a particular service, (iii) contracts which may offset the corresponding positions of the defaulters or (iv) contracts which may minimise the impact of netting sets.³⁰¹

Nevertheless, because of its negative implications, mandatory tool should only be used by CCP as the last resort after the failure of voluntary tool. Forced allocation may wrongly propagate the risks to clearing member who can neither control them nor transfer the unwanted positions due to market vitality.³⁰² Tear up contracts, especially complete tear-up, may equal the closure of the whole CCP and lead to their resolution.

(e) Allocate losses not related to participant default

In addition to losses caused by clearing member, CCP may need to recover from an extraordinary one-off loss or recurring losses from general business, custody and investment risk.³⁰³ This is the area where practices are still evolving. Most CCP

²⁹⁷ Item 4.5.2 of Recovery Report.

²⁹⁸ Item 4.5.3 of Recovery Report.

²⁹⁹ Item 4.5.6 of Recovery Report.

³⁰⁰ Item 4.5.6 of Recovery Report.

³⁰¹ Item 4.5.11 of Recovery Report.

³⁰² Item 4.5.10 of Recovery Report.

³⁰³ Item 4.6.1 of Recovery Report.

currently rely on insurance policies or capital injections from holding companies or shareholders.³⁰⁴

(f) Testing recovery plan

To ensure the feasibility and the effectiveness of recovery plan, CCP should review and revise its recovery plan at least annually or after any change to CCP's planning and rules which may affect the recovery plan.³⁰⁵ Some of them decided to set up "allocation arrangement to participants beyond a certain threshold".³⁰⁶

2 Resolution

All systemically important CCP need to prepare a resolution plans (living wills) to (i) restore market and public confidence, (ii) minimise contagion to CCP participants and other concerned parties (iii) avoid disruption to the market.³⁰⁷ Although resolution plan does not necessarily take place after the implementation of the recovery plan, it should be considered as the last resort and not an alternative to recovery. As the competent authority would likely administer any future resolution plan, CCP usually needs to inform the relevant authority of necessary information regarding their resolution planning.³⁰⁸

Compared to the recovery plan, regulatory guidance on the resolution planning is at a more preliminary stage. The primary resource for planning resolution at the moment is Key Attributes. The ultimate purpose of Key Attributes and other relevant guidance is to facilitate CCP resolution in an orderly and timely way without the need of government bail-out or spreading the negative impacts to the whole financial system.³⁰⁹ Nonetheless, it mainly describes the available resolution tools but does not explain how those tools should be used.³¹⁰ "There may be unforeseen circumstance sin which total distress costs can be lowered by winding down or restructuring a CCP with a procedure that overrides contracts, such as bankruptcy or a government administered resolution process."³¹¹

³⁰⁴ Item 5.6.1 of Assessment Report.

³⁰⁵ Item 7.2.8 of Further Guidance on PFMI.

³⁰⁶ Item 7.2.8 of Further Guidance on PFMI.

³⁰⁷ FSB Essential Aspect, at 11.

³⁰⁸ Principle 3.4 of PFMI.

³⁰⁹ FSB, above n 260.

³¹⁰ FSB Essential Aspects, at 4.

³¹¹ Duffie Darrell, above n 287, at 3.

In general, it is important to establish an efficient resolution plan based on presumption and preserve enough flexibility for further adjustment to specific circumstances. The resolution plan at least must enable CCP:³¹²

- (a) Return to a matched book;
- (b) Fully allocate outstanding losses;
- (c) Ensure the replenishment of financial resources; and
- (d) Support the continued and timely operation of critical functions.

It can be seen that recovery and resolution plan share some common tools, particularly those used to return to matched book, allocating losses and replenish exhausted resources. However, their implementation could be significantly different as recovery is performed by CCP while resolution is usually administered by the competent authority.³¹³ Therefore, it is crucial to estimate what are the appropriate benchmark and timing for CCP to apply internal and contract-based default management process or seek for government intervention and overriding failure resolution process.³¹⁴

VII CONCLUSION

Overall, the mandate central clearing has improved the stability and sustainability of the financial market.³¹⁵ In practice, CCP's benefit and capability to mitigate the counterparty risk is evident and proven through the financial crisis 2008. CCP can help to (i) simplify the complex interconnection among financial counterparties, (ii) reducing the amount and value of their outstanding exposures, (iii) liquidating positions in an orderly and timely process and (iv) relieves their participants from the counterparty risk.

On the other hand, there exists legitimate concern about the fact that CCP are pooling all the risks of the CDS market into themselves and growing into TITF institutions. As a result of their magnitude, a collapse of any TITF would allegedly cause disastrous impacts and interruption to the entire financial market. Nonetheless, it is noteworthy that CCP is, by definition, risk flat which means they are subject to credit and liquidity risk only if their participants default on their obligations. As Mark Twain says "put all your eggs in the one basket and watch that basket", mandate central clearing aims to prevent default risk from being dispersed sloppily across the market. Instead, the risk would be pooled into regulated locus and managed appropriately in accordance with all applicable regulations and guidance.

³¹² FSB Essential Aspect, at 11.

³¹³ Duffie Darrell, above n 287, at 3.

³¹⁴ At 3.

³¹⁵ Benoît Cœuré, above n 2.

In conclusion, although CCP simultaneously poses another type of systemic risk to the economy, their shortcomings and contagious fallouts are not insurmountable. They have been addressed and managed at international, regional and national level. The ultimate effectiveness of CCP mainly depends on two factors: (i) the credit health and resilience of their participants most of whom are also financial institutions and infrastructures and (ii) the incentives for CCP to take and distribute risks appropriately and safely. First and foremost, it is the obligations of policymakers and regulators to govern and supervise the financial market in a prudent, rigorous and consistent manner. International organisations including BCBS, CPMI, IOSCO and FSB have been working in collaboration not only to strengthen the overall financial system which would directly benefit CCP but also to equip CCP with comprehensive guidance on governance, recovery and resolution planning. Moreover, they have been promulgating numerous regulations which introduced necessary incentives and requirements to achieve and maintain CCP's safe and sound operation. All of such regulatory efforts would likely make the global financial system more stable and sustainable.

As the legal framework and the risk management practices of CCP have not been battle tested, it is impossible to reach any final and ex post conclusion on the ultimate efficiency of CCP. Nevertheless, considering the fact that CCP have prudently and successfully handled risks in the past and all regulatory efforts have been increasingly demonstrated, the shift to mandatory central clearing is likely the optimal movement to mitigate the counterparty risk and equip the financial market with a more viable and robust clearing infrastructure.

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