

Clearinghouses for Over-the-Counter Derivatives

COLLEEN M. BAKER

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WORKING PAPER

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INTRODUCTION

This paper focuses on a little-known, but long-standing financial market risk management institution known as a *clearinghouse*. It is also referred to as a “central counterparty clearinghouse” or “CCP.”¹ Clearinghouses are used for the back-office processing of several types of financial instruments, including securities, repurchase agreements, and both exchange-traded and over-the-counter (OTC) derivatives. As highly-connected, core nodes of the payment, clearing, and settlement (PCS) systems of financial markets, they are critical institutions. Although frequently referred to as the “plumbing” of financial markets, PCS systems are more akin to being the “central nervous system.”² Trade clearing – and clearinghouses – comes into play after a trade is agreed to (contracted) and prior to its final settlement.³ In the case of securities, this clearing window is generally short (1-3 days), but it can be quite lengthy in the case of OTC derivatives (potentially decades!).⁴ Importantly, the time between the execution of a derivatives trade and its final settlement is “*essential to the contract... the fundamental economic purpose of a derivatives transaction involves the reciprocal obligations of the parties over the life of the contract.*”⁵ Therefore, OTC derivative counterparties potentially confront significant counterparty credit risk (the risk of a party’s default or insolvency prior to final settlement). Herein lies the problem for which clearinghouses are seen to be the “cure.”⁶

Although OTC derivative clearinghouses remain unknown to most, their numbers are growing because of global policymakers’ post-financial crisis reforms. These changes to the OTC derivative markets “will fundamentally alter the topology of the world’s financial network.”⁷ Accordingly, this paper specifically focuses on these clearinghouses because of their critical importance as a result of these reforms and also because of the plethora of critical, unsettled policy issues surrounding these “super-

1 Technically, several different types of clearinghouses exist. This paper focuses specifically on central counterparty clearinghouses and uses the generic term “clearinghouse” to refer to these institutions.

2 Michael H. Moskow, President and CEO of the Federal Reserve Bank of Chicago, *Public Policy and Central Counterparty Clearing*, Speech at joint conference of the Federal Reserve Bank of Chicago and European Central Bank: Issues Related to Central Counterparty Clearing (April 4, 2006).

3 Tina P. Hasenpusch, *Clearing Services for Global Markets: A Framework for the Future Development of the Clearing Industry* 18 (2011).

4 *Id.*

5 Robert R. Bliss and Robert S. Steigerwald, *Derivatives Clearing and Settlement: A Comparison of Central Counterparties and Alternative Structures*, *Economic Perspectives*, Vol. 30, No. 4 (2006).

6 See generally Craig Pirrong, *The Clearinghouse Cure*, *Regulation*, Vol. 31, No. 4 (2009).

7 Craig Pirrong, *The Economics of Central Clearing: Theory and Practice* 34 (ISDA Discussion Paper Series, No. 1, 2011) [hereinafter *The Economics of Central Clearing*].

systemically important”⁸ institutions. International policymakers are depending upon clearinghouses to mitigate systemic risk. However, use of clearinghouses does not banish systemic risk. Clearinghouses merely “*transform systemic risk.*”⁹ In fact, as this paper explains, clearinghouses can decrease and increase systemic risk.¹⁰

Part I provides an overview of the exchange-traded and OTC derivative markets, their regulation prior to the recent financial crisis and subsequent passage of the Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank),¹¹ risks posed by and the eventual institutional collapses that occurred due to unregulated OTC derivative markets, and global policymakers’ post-financial crisis framework of reforms for the OTC derivative markets. Part II focuses on clearinghouses, the centerpiece of global policymakers’ post-financial crisis reforms to the OTC derivative markets. It discusses their history, structure, risk management function, ownership models, and regulation/supervision. Part III then turns to salient systemic risk and risk-management issues surrounding these institutions, including risk concentrations, the increasing interconnectedness of systemically important institutions, problems of market fragmentation, risk-management standards and practices, investment practices, and cybersecurity concerns. Part IV examines the most important, current area of policy focus surrounding these institutions: clearinghouse recovery and resolution. Part V highlights potential policy options going forward and concludes.

PART I: BACKGROUND CONSIDERATIONS

A. Exchange-Traded and Over-the-Counter Derivatives

Derivatives are not new; they have existed for thousands of years in basic forms.¹² Derivatives are financial contracts that derive their value from an underlying reference entity such as a financial asset, an asset bundle, a commodity, an interest rate, or practically “anything that can be quantified and objectively verified.”¹³

8 “Super-systemically important” is a term used by Benôit Coeuré, Member of the Executive Board of the European Central Bank, in *Ensuring an Adequate Loss-absorbing Capacity of Central Counterparties* at the Federal Reserve Bank of Chicago Symposium on Central Clearing (April 10, 2015).

9 Pirrong, *The Economics of Central Clearing*, *supra* note 7, at 2; *see also* Dietrich Domanski, Leonardo Gambacorta, and Cristina Picillo, *Central clearing: trends and current issues*, BIS Quarterly Review (Dec. 6, 2015) (noting that “Central clearing fundamentally alters the linkages and exposures in the financial system.”), at 60.

10 Pirrong, *The Economics of Central Clearing*, *supra* note 7, at 2.

11 Dodd-Frank Wall Street Reform and Consumer Protection Act, Pub. L. No. 111-203, 12 Stat. 1376 (2010). [hereinafter *Dodd-Frank*]

12 *See* Alastair Hudson, *Derivatives Law Course Materials, Dealing with Derivatives 1.1*, <http://www.alastairhudson.com/financelaw/derivativeslawcourse.pdf>. (noting the use of olive oil futures by the ancient Greeks).

13 Mark A. Guinn and William L. Harvey, *Taking OTC Derivative Contracts as Collateral*, 57 *Bus. Law.* 1127, 1129 (2002).

Essentially, derivatives are bets about a future state of affairs.¹⁴ They trade both on regulated exchanges and over-the-counter (OTC). Derivatives are used to hedge (provide insurance), speculate (make bets), or arbitrage (take advantage of asset mispricing in markets).¹⁵

Derivative exchanges are centralized venues in which a diversity of market participants buy and sell an exchange's product offerings, namely various futures and/or options. Examples include the Chicago Mercantile Exchange, Intercontinental Exchange, Deutsche Borse, and the London Stock Exchange. The products traded on derivatives exchanges are standardized as to their contractual terms, are generally of shorter time frames (maturities), are highly liquid, and are guaranteed by a clearinghouse.¹⁶ Given this product standardization and performance assurance, the externalities (external costs) and systemic risk of trading derivatives on exchanges is generally viewed as minimal. As of the end of December 2015, the size of the exchange-traded derivative markets was approximately \$6 trillion (\$4.4 trillion in futures and \$1.5 trillion in options).¹⁷

In contrast to exchange-traded derivatives, OTC derivatives – often generically referred to as swaps – are bespoke (flexible and customizable), less liquid (at times, highly illiquid), generally have longer time frames (potentially decades), and have historically relied upon individual counterparties to guarantee the performance of their respective contractual obligations.¹⁸ This latter consideration is known as a bilateral approach to clearing and settlement. It is an alternative to using a clearinghouse to complete the post-trade processing prior to final settlement. When bilateral clearing and settlement is combined with the potentially lengthy time frame of many OTC derivatives, counterparty credit risk – the risk that one's counterparty will default on its obligations or become insolvent – becomes a paramount concern to market participants, regulators, and, ultimately, the public. Counterparty credit risk, in addition to the interconnectedness of these highly-concentrated markets,¹⁹ creates significant

14 Lynn A. Stout, *How Deregulating Derivatives Led to Disaster, and Why Re-Regulating Them Can Prevent Another*, Lombard Street, Vol. 1, No. 7 (2009) (stating that “[Derivatives] are simple bets on the future – nothing less, and nothing more.”), at 5.

15 See generally John Hull, *Options, Futures, and Other Derivatives* (2009).

16 See Jon Gregory, *Central Counterparties* 16 (2014).

17 Bank for International Settlements, *Exchange-traded derivatives statistics* (June 6, 2016), <https://www.bis.org/statistics/extderiv.htm>.

18 See Gregory, *supra* note 16, at 16.

19 The Office of Comptroller of Currency, *Quarterly Report on Bank Trading and Derivatives Activities* (Third Quarter 2015) (noting that “The four banks with the most derivatives activity hold 90.8% of all derivatives, while the largest 25 banks account for nearly 100% of all contracts.”), at 10, <http://www.occ.treas.gov/topics/capital-markets/financial-markets/trading/derivatives/dq315.pdf>.

systemic risk (the risk that an institution's failure could catalyze domino-like collapses throughout financial markets and the economy). Due to the size of the global OTC derivative markets, this systemic risk potential is tremendous.

As of December 2015, the notional value of the OTC derivative markets was \$493 trillion,²⁰ which is many times the size of the exchange-traded derivative markets. This amount includes several categories of derivatives (notional amounts in trillions): interest rate (\$384), foreign exchange (\$70), credit (\$12), equity (\$7.1), commodity (\$1.3), and a catch-all, miscellaneous designation (\$17.7).²¹ Some examples of OTC derivatives use in practice include: a corporation using interest rate swaps to exchange a floating rate of interest for a fixed rate of interest on a debt obligation; an airline entering commodity swaps to hedge against oil price fluctuations; creditors buying credit derivatives to protect themselves against a debtor's default or insolvency; and global corporations using foreign exchange swaps to protect against currency fluctuations that could impact profits.

OTC derivatives - like exchange-traded derivatives - are generally considered risk management instruments. However, key differences exist between the creation and management of risk in financial markets and risks in the real economy. For example:

The hurricane is not more or less likely to hit because more hurricane insurance has been written. In the financial markets this is not true.

The more people write financial insurance, the more likely it is that a disaster will happen, because the people who know you have sold the insurance can make it happen.²²

Concerns about such potential manipulation have arisen in the context of credit default swaps.²³ Certain credit default swaps known as "naked CDS," in which the buyer lacks an actual economic interest in the underlying debt obligation, create zero-sum risk for the counterparties. Additionally, they create significant systemic risk for the finan-

20 Bank for International Settlements, *Statistical Release: OTC derivatives statistics at end-December 2015* (May 2016), http://www.bis.org/publ/otc_hy1605.pdf.

21 *Id.*

22 Michael Lewis, *How the Eggheads Cracked*, N. Y. Times Magazine, Jan. 24, 1999 (quoting John Meriwether, head of the hedge fund Long Term Capital Management, summarizing Professor Victor Haghani).

23 For an example of the sometimes perverse incentives surrounding occurrences of CDS credit events, see Matt Wirz, Matt Jarzemsky, and Tom McGinty, *Credit-Default Swaps Get Activist New Look*, Wall St. J., Dec. 24, 2014 (describing a situation in which a creditor declined to renew a company's loan unless the company missed an interest payment on debt for which the creditor held CDS protection).

cial system that would not otherwise exist.²⁴ As an illustration, the amount of CDS protection written on a corporation's debt is frequently several times the amount of its actual outstanding debt. The excess "credit protection" bought on this debt is arguably speculative (betting) activity and not risk management in any traditional sense.²⁵ However, some argue that this "credit protection" could represent imperfect hedges. Market participants might want "credit protection" for specific bonds on their balance sheet, but find themselves unable to perfectly hedge such debt with CDS. As an alternative, they might instead buy protection on bonds that are a close proxy for such instruments. In sum, derivatives can manage risk, but they can also create and/or transfer risk not otherwise present in the economic system.

Given concerns about counterparty credit risk in OTC derivative markets, the strong credit ratings of some large banks and financial institutions – such as Goldman Sachs, JP Morgan Chase, Citigroup etc. – have long provided such institutions with a competitive advantage as counterparties in these markets. This advantage is lost, however, with exchange-traded derivative contracts. The use of clearinghouses by exchanges mutualizes counterparty credit risk. Hence the post-financial crisis clearing mandates in OTC derivative markets (discussed below) extinguish much of the competitive advantage such institutions have long enjoyed in trading OTC derivatives. Therefore, clearinghouses are a potential source of competition to such institutions. At the same time, institutions with strong credit ratings are understandably reluctant to mutualize risk with – and therefore subsidize – less creditworthy institutions.

B. Derivatives Regulation Prior to Dodd-Frank

In the U.S., exchange-traded derivatives have long been regulated primarily by the Commodity Futures Trading Commission (CFTC) and, to a much lesser extent, by the Securities Exchange Commission (SEC). Pursuant to the Commodity Exchange Act,²⁶ the CFTC regulates futures and options markets. Included within this responsibility is the regulation of designated contract markets (exchanges), futures commission merchants, derivatives clearing organizations (clearinghouses), commodity

²⁴ Indeed, in November 2012, the E.U. prohibited naked CDS on European sovereign debt. Whether this ban was helpful or problematic was a source of controversy. See generally Ralph Atkins, *IMF Warns Europe Over Naked CDS Ban*, Fin. Times, April 11, 2013.

²⁵ See generally Henry Sender, *Radio Shack whodunit sends junk bond warning*, Fin. Times, Feb. 27, 2015.

²⁶ Commodity Exchange Act, Pub. L. No. 74-675, 49 Stat. 1491 (1936) (codified as amended).

pool operators, and other intermediaries.²⁷ The SEC primarily regulates securities markets. However, the SEC has limited regulatory authority in the exchange-traded derivatives space for options on securities and security futures.²⁸ Overall, the regulation of exchange-traded derivatives has been largely uncontroversial.

What has attracted attention, however, is the unusual, historically uneasy division of regulatory responsibility between the SEC and the CFTC in the derivative markets. This bifurcation of responsibilities for the regulation of securities and derivatives is anomalous when compared to other international regulatory regimes.²⁹ Prior to the passage of Dodd-Frank, this atypical arrangement had even been cited as a reason for the lack of regulation in OTC derivative markets.³⁰ At one point, these agencies even banned certain products – futures on individual stocks – from trading in the U.S. arguably because of their jurisdictional disagreements.³¹ Although commentators, policymakers, and academics have long called for the merger of the SEC and CFTC,³² this sensible change seems to be a challenge in the near future. Indeed, as discussed below, Congress chose in Dodd-Frank to continue and even to expand this shared regulatory approach in Dodd-Frank’s Title VIII by adding the Federal Reserve to this agency mix in regard to the supervision and regulation of financial market utilities such as clearinghouses. How seamless this “new cooperative supervisory framework”³³ will be in practice remains unclear.

Before Dodd-Frank, the OTC derivative markets were virtually unregulated in the U.S.³⁴ and elsewhere. In fact, in the Commodity Futures Modernization Act of 2000³⁵ (CFMA), Congress actually prohibited the regulation of OTC derivative markets by the CFTC or by the SEC. However, many OTC derivative markets participants, such

27 See U.S. Commodity Futures Trading Commission, Mission & Responsibilities <http://www.cftc.gov/About/MissionResponsibilities/index.htm>.

28 The Shad-Johnson Accord of 1982 between the SEC and CFTC provided that “the SEC would retain jurisdiction only over securities and options on securities” and the CFTC would have jurisdiction over “[m]ost other derivative products.” Jill Fish, *Top Cop or Regulatory Flop? The SEC at 75*, 95 Va. L. Rev. 785, 808 (2009). The SEC’s jurisdiction over security futures came later and is shared with the CFTC.

29 See Jerry W. Markham, *Super Regulator: A Comparative Analysis of Securities and Derivatives Regulation in the United States, the United Kingdom, and Japan*, 28 Brook. J. Int’l L. 319 (2003).

30 See *id.*

31 Editorial, *Lift the Ban on Single-Stock Futures*, Chicago Tribune, Oct. 6, 2000.

32 For example, see the U.S. Department of the Treasury, *Blueprint for a Modernized Financial Regulatory Structure* (March 2008), <https://www.treasury.gov/press-center/press-releases/Documents/Blueprint.pdf>.

33 Board of Governors of the Federal Reserve System, Securities Exchange Commission, and Commodity Futures Trading Commission, *Risk Management Supervision of Designated Clearing Entities* 3 (2011); see also Colleen Baker, *When Regulators Collide: Financial Market Stability, Systemic Risk, Clearinghouses, and CDS*, 10 Va. L. & Bus. Rev. 343 (2016) [hereinafter *When Regulators Collide*].

34 See Letter from Timothy M. Geitner, Secretary of the US Department of the Treasury, to Senator Harry Reid (May 13, 2009) (noting that OTC derivatives were “largely excluded or exempted from regulation”).

35 See Pub. L. No. 106-554 § 1(a)(5), 114 Stat. 2763, 2763A-366 (2000).

as commercial banks and other financial institutions (for example, investment bank broker-dealers), were themselves regulated by banking regulators (the Office of the Comptroller of Currency, the Federal Reserve, and state regulators) and by the SEC, respectively. With the passage of the CFMA, history was made. The CFMA “made pure bets, *for the first time in Anglo-Saxon legal history*, enforceable in court.”³⁶ These markets then experienced explosive growth: from \$94 trillion notional in June 2000³⁷ to \$684 trillion notional in June 2008.³⁸

C. Risks to the Financial System Posed by Unregulated OTC Derivatives

Scholars, such as Professor Lynn Stout, have argued that “the roots of the catastrophe [the financial crisis of 2007-08] lay not in changes in the markets, but changes in the law. . . . It was the deregulation of financial derivatives that brought the banking system to its knees.”³⁹ Others, such as financial economist Darrell Duffie, argue that derivatives “exacerbated” the financial crisis.⁴⁰ First, insurance companies such as American International Group (AIG) sold tremendous amounts of credit default swaps (CDS) on mortgage-related, collateralized debt obligations (CDOs).⁴¹ When the value of these CDOs decreased, the insurance companies who had sold CDS protection on these CDOs were negatively impacted as were the banks and financial institutions depending upon the protection provided by the CDS.⁴² Second, OTC derivative counterparties engaged in runs – a phenomenon similar to a traditional bank run – from failing investment banks such as Bear Stearns and Lehman Brothers.⁴³ Such “runs” likely contributed to market instability and also to regulators’ reluctance to let similar institutions fail.⁴⁴

One factor contributing to the crises of confidence sparking these runs was the lack of transparency in OTC derivative markets. Market participants lacked an understanding of their bilateral counterparties’ credit exposures to other OTC deriva-

36 Italics added. Rana Foroohar, *Makers and Takers: The Rise of Finance and the Fall of American Business* 193 (2016) (quoting Professor Lynn Stout).

37 See Press Release, Bank for International Settlements, *The global OTC market continues to grow* (Nov. 13, 2000).

38 See Bank for International Settlements, *OTC derivatives market activity in the first half of 2008* (Nov. 2008).

39 Stout, *supra* note 14, at 4.

40 Darrell Duffie, *How Should We Regulate Derivatives Markets?* (PEW Fin. Reform Project, Briefing Paper No. 5, 2009), at 5-6.

41 *Id.*

42 *Id.*

43 *Id.*

44 *Id.*

tive counterparties. Hence they had no way of truly understanding a counterparty's ultimate creditworthiness or their own indirect exposures to the credit risk of other market participants. Nevertheless, the OTC derivative markets grew expansively. And these direct and indirect counterparty credit risks created a vast, opaque, highly-interconnected web of systemically significant global banks and financial institutions.

The OTC derivative markets were also opaque to global regulators. Consequently, they had little understanding of either risk concentrations or institutional interconnections in these global markets. This opacity was one reason regulators feared letting large banks and financial institutions with significant OTC derivative activity fail during the recent financial crisis. A particular concern was the potential systemic consequences that could result:

...the crisis has highlighted how derivatives in general and CDS in particular created a web of mutual dependence that was difficult to understand, disentangle and contain in the immediate aftermath of a default. Therefore, the crisis has clearly shown that the characteristics of OTC derivative markets – the private nature of contracting with limited public information, the complex web of mutual dependence, the difficulties of understanding the nature and level of risks – increases uncertainty in times of market stress and accordingly poses risks to financial stability.⁴⁵

Systemic risk arising from collective action issues - such as those surrounding the payment, clearing, and settlement (PCS) of these instruments - was also a critical problem. The PCS systems necessary to mitigate the systemic risk posed by OTC derivatives trading are a cost. Market participants' incentives to pay for the infrastructure necessary to ensure the smooth functioning of these systems falls short of society's interest in financial market stability. For example, in 2005, the Federal Reserve Bank of New York, along with other domestic and international regulators, summoned fourteen of the world's largest banks and financial institutions – then known as the “Fourteen Families”⁴⁶ – to discuss a long-standing documentation problem in the rapidly expanding credit default swap (CDS) market. Confirmations of CDS transactions (the contract detailing a CDS's economic terms) were taking an average

45 Commission of the European Communities (Working Paper, *Ensuring Efficient, Safe, and Sound Derivatives Markets* §2.4 final, July 3, 2009), http://ec.europa.eu/internal_market/financial-markets/docs/derivatives/communication_en.pdf.

46 Frank Partnoy and David A. Skeel Jr., *The Promise and Perils of Credit Derivatives*, 75 U. Cin. L. Rev. 1019, 1026 (2007).

of thirteen days (in 2003, it was eighteen).⁴⁷ Regulators were highly concerned about the possibility of a major financial institution default or crisis occurring while this problem continued.⁴⁸ The systemic risk arose because “Banks have been too focused on their own profit interests and in grabbing a share of the rapidly expanding market and haven’t focused on operational issues.”⁴⁹ Such operational issues, however, are critical to financial market stability.

D. The Risks of Unregulated OTC Derivatives Materialize: American International Group

The era of unregulated OTC derivative markets came to a dramatic halt with American International Group’s (AIG) near collapse in September 2008. Only the U.S. government’s eventual assistance of over \$180 billion prevented AIG’s insolvency and the market chaos that would likely have ensued. Less than a year prior, AIG’s stock had traded at over \$50 a share.⁵⁰ In fact, AIG was a top ten 2007 Fortune 500 company with a market capitalization of \$150.7 billion.⁵¹ What happened? Unregulated credit default swaps (CDS).

CDS are similar to insurance, but had not been (and are not now) subject to the stringent, state-based, regulatory regimes that govern the insurance industry.⁵² Unlike insurance, the buyer of a CDS does not need to have an actual economic (insurable) interest in the credit obligation(s) on which the CDS contract is based. Yet as in the case of insurance, the seller of a CDS promises to pay the buyer if something negative (a credit event) happens to the credit obligation(s) underlying the contract. In return, the buyer makes periodic payments (similar to insurance premiums) to the seller.

AIG’s subsidiary, AIG Financial Products (AIGFP) had sold over \$500 billion of credit protection (insurance) via CDS. Stunningly, it had as much as \$2.7 trillion notional of OTC derivatives outstanding in 2008.⁵³ Much of this credit protection had been sold on “super senior risk tranches of diversified pools of loans and debt securities.”⁵⁴ Hence, some executives at AIGFP thought their CDS contracts akin to

47 John Dooley and Hamish Risk, *Fed Calls in Banks on Derivatives Paperwork Backlog (Update3)*, Bloomberg.com, Sept. 13, 2005.

48 *See id.*

49 *Id.* (quoting Alistair Milne, senior lecturer at Cass Business School, London).

50 William K. Sjostrom, Jr., *The AIG Bailout*, 66 Wash. & Lee L. Rev. 943, 946 (2009).

51 *Id.*

52 In fact, New York State amended its insurance laws to exclude CDS in 2004. *Id.* at 988.

53 Ed Nosal, *Clearing over-the-counter derivatives*, Federal Reserve Bank of Chicago Economic Perspectives, Vol. 35, No. 4 (2011), at FN2.

54 Sjostrom, *supra* note 50, at 952 (quoting AIG’s 2007 Annual Report).

“free money,”⁵⁵ saying that “It is hard for us, and without being flippant, to even see a scenario within any kind of realm of reason that would see us losing \$1 in any of those transactions.”⁵⁶ Additionally, AIGFP’s parent, American International Group (AIG), guaranteed these contracts. AIG used its strong credit rating and enormous balance sheet to its competitive advantage as an OTC derivative counterparty.⁵⁷ Given AIG’s sterling credit rating, AIGFP’s counterparties were lax in requiring the posting of collateral on these transactions. This was not an anomalous situation. The OTC derivative markets were (and arguably continue to be) under-collateralized.⁵⁸

As 2008 wore on, however, AIGFP’s counterparties increasingly reversed course. Concerns arose about AIGFP’s CDS related to mortgage-backed securities, leading to significant write-downs of its CDS portfolio and the eventual downgrade of AIG’s credit rating.⁵⁹ Ultimately, it was not payouts on AIGFP’s CDS contracts themselves that nearly toppled the largest insurer in the U.S., but rather the cash necessary to meet the collateral demands related to these contracts.⁶⁰ Were these demands to go unmet, cross-default clauses (a common contractual provision making an entity’s default on another obligation a default under the contract) in other AIG contracts would be triggered.⁶¹ Additionally, AIG Investments, AIG’s securities lending business (exchanging securities for cash which is in turn reinvested) was confronting a bank-like run of its own.⁶² Anxious counterparties were demanding the return of their funds, much of which had been invested in longer-term, now less liquid securities.⁶³

Therefore, on September 16, 2008, the U.S. government came to AIG’s rescue because it feared the potential repercussions of letting AIG, a multinational, highly-interconnected insurer, fail in a time of already significant market turmoil. Without the U.S. government’s intervention, AIG would have collapsed as it could no longer meet

55 *Id.* at 957 (quoting former AIGFP senior executives quoted in Carrick Mollenkamp et al., *Behind AIG’s Fall, Risk Models Failed to Pass Real-World Test*, Wall St. J., Nov. 3, 2008).

56 Anna Schechter, Brian Ross, and Justin Rood, *The Executive Who Brought Down AIG*, Abcnews.com, March 30, 2009 (quoting former AIGFP executive Joe Cassano in a 2007 investor call).

57 See Sjostrom, *supra* note 50, at 958.

58 See Manmohan Singh, *New Regulations and Collateral Requirements – Implications for the OTC Derivatives Market* Box 1 (SWIFT Institute Working Paper No. 2012-004, 2013) (noting that the combination of author’s research and BIS OTC derivatives data suggests under-collateralization of \$3-5 trillion dollars) [hereinafter *New Regulations and Collateral Requirements*].

59 See Sjostrom, *supra* note 50.

60 See *id.* at 960.

61 See Nosal, *supra* note 53.

62 See Sjostrom, *supra* note 50, at 960; see also Hester Pierce, *Securities Lending and the Untold Story in AIG* (Mercatus Center Working Paper No. 14-12, May 2014).

63 See *id.* at 960.

the liquidity needs associated with its OTC derivatives and securities lending activities.

In important ways, AIG's situation contrasted with that of the investment bank Lehman Brothers, which had filed for bankruptcy on September 15, 2008. In part, their stories became a cautionary tale of two collapses for global policymakers. When Lehman Brothers failed, it had "open [derivatives] positions with a notional value of US\$10 trillion"⁶⁴ with the famed LCH.Clearnet Group's clearinghouses. Remarkably, LCH.Clearnet used only part of Lehman Brother's initial margin (collateral) to manage its historic default. Neither Lehman Brother's default fund contributions nor the margin contributions of other members were necessary to closeout Lehman's positions.⁶⁵

The rest is history: "the Lehman episode confirmed that CCPs [clearinghouses] had become the 'must-have' accessory for treasury ministers and financial policy makers on both sides of the Atlantic."⁶⁶ The time for regulation of the OTC derivatives had finally arrived. Although OTC derivatives had had a role in "every major financial calamity"⁶⁷ for some time, they had nevertheless managed to escape a regulatory reckoning. And although these markets are now regulated, market participants continue "sizable risk-taking"⁶⁸ with credit derivatives – instruments at the very heart of the recent financial crisis.

E. International Regulatory Response to the Financial Crisis and AIG

As they navigated the "critical transition from crisis to recovery,"⁶⁹ leaders of the G-20 nations met in Pittsburgh in September 2009. Their discussions concluded with the release of a statement (Leaders' Statement) containing a section on "Strengthening the International Financial Regulatory System,"⁷⁰ including a framework of reforms for OTC derivative markets. Specifically, the G20 leaders agreed that:

64 Peter Norman, *The Risk Controllers: Central Counterparty Clearing in Globalised Financial Markets* 26 (2011).

65 *Id.* at 45; see also LCH.Clearnet, *CCP Risk Management, Recovery & Resolution* (White Paper, 2014), <http://www.lch.com/risk-collateral-management/risk-management-overview/ccp-risk-management-recovery-resolution>. Anecdotal evidence suggests, however, that the selling of a substantial amount of Lehman collateral in a short time period created some market instability. One argument for central bank liquidity provision to clearinghouses (see discussion in Part IV.C) is a concern about the impact of potential fire sales of a defaulted clearing member's collateral on market stability.

66 Norman, *supra* note 64, at 47. See generally Dietrich Domanski, Leonardo Gambacorta, and Cristina Picillo, *Central clearing: trends and current issues*, BIS Quarterly Review (Dec. 2015).

67 Frank Partnoy, Op-Ed., *Danger in Wall Street's Shadows*, N.Y. Times, May 15, 2009.

68 Jill Cetina, Mark Paddrik, Sriram Rajan, *Stressed to the Core: Counterparty Concentrations and Systemic Losses in CDS Markets* (Office of Financial Research Working Paper 16-01, March 2016).

69 G20 Leaders' Statement from their Pittsburgh Summit (Sept. 24-25, 2009), https://www.treasury.gov/resource-center/international/g7-g20/Documents/pittsburgh_summit_leaders_statement_250909.pdf.

70 *Id.*

All standardized OTC derivative contracts should be traded on exchanges or electronic trading platforms, where appropriate, and cleared through central counterparties [clearinghouses] by end-2012 at the latest. OTC derivative contracts should be reported to trade repositories. Non-centrally cleared contracts should be subject to higher capital requirements.⁷¹

The stated purpose of these reforms was “to improve transparency in the derivatives markets, mitigate systemic risk, and protect against market abuse.”⁷²

In the U.S., Title VII of Dodd-Frank, entitled Wall Street Accountability and Transparency, implemented the G20’s framework of reforms for the OTC derivative markets.⁷³ Title VII provides the CFTC with regulatory authority over swaps,⁷⁴ the SEC with regulatory authority over security-based swaps,⁷⁵ and both agencies joint regulatory authority over swaps with mixed characteristics.⁷⁶ Swaps and securities-based swaps that are required to be cleared must be submitted to derivatives clearing organizations⁷⁷ and to registered clearing agencies,⁷⁸ respectively. Swaps must generally be traded on exchanges or on swap (or security-based swap) execution facilities.⁷⁹ Swap or security-based swap execution facilities – both termed “SEFs” – are trading facilities created by Dodd-Frank.⁸⁰ All swaps⁸¹ and security-based swaps,⁸² – whether cleared or not – must be reported to swap data repositories (for example, DTCC Data

71 *Id.*

72 *Id.*

73 See Dodd-Frank, *supra* note 11; see also Chapter 4 of David Skeel, *The New Financial Deal: Understanding the Dodd-Frank Act and Its (Unintended) Consequences* (2011); Mark Roe, *Clearinghouse Overconfidence*, 101 Cal. L. Rev. 1641 (2013); and Richard Squire, *Clearinghouses as Liquidity Partitioning*, 99 Cornell L. Rev. 857 (2014).

74 Section 722 of Dodd-Frank, *supra* note 11.

75 Section 712(a)(2) of Dodd-Frank, *supra* note 11. The definition of “security-based swap” is found in Section 3(a) of the Securities Exchange Act of 1934. In general, it is a swap defined in Section 1a of the Commodity Exchange Act (which points to Section 3(a) of the Securities Exchange Act of 1934) or a transaction based on a narrow-based security index, individual security or loan, or an event (occurring or not, in whole or part) related to a security issuer or narrow-based security index issuers. See 15 U.S.C. §78c(a)(68).

76 Section 712(a)(8) of Dodd-Frank, *supra* note 11.

77 Section 723 of Dodd-Frank, *supra* note 11. The CFTC explains that a derivatives clearing organization is a “a clearinghouse, clearing association, clearing corporation, or similar entity that enables each party to an agreement, contract, or transaction to substitute, through novation or otherwise, the credit of the DCO for the credit of the parties; arranges or provides, on a multilateral basis, for the settlement or netting of obligations; or otherwise provides clearing services or arrangements that mutualize or transfer credit risk among participants.” Commodity Futures Trading Commission, *Derivatives Clearing Organizations*, <http://www.cftc.gov/industryoversight/clearingorganizations/index.htm>.

78 Section 763 of Dodd-Frank, *supra* note 11. The SEC explains that “Clearing Agencies are self-regulatory organizations that are required to register with the Commission. There are two types of clearing agencies -- clearing corporations and depositories. Clearing corporations compare member transactions (or report to members the results of exchange comparison operations), clear those trades and prepare instructions for automated settlement of those trades, and often act as intermediaries in making those settlements. Depositories hold securities certificates in bulk form for their participants and maintain ownership records of the securities on their own books.” Securities Exchange Commission, *Clearing Agencies*, <https://www.sec.gov/divisions/marketreg/mrclearing.shtml>.

79 Sections 723 and 763 of Dodd-Frank, *supra* note 11.

80 For additional information, see Commodity Futures Trading Commission, *Swap Execution Facilities (SEFs)*, <http://www.cftc.gov/IndustryOversight/TradingOrganizations/SEF2/index.htm>.

81 Section 727 of Dodd-Frank, *supra* note 11.

82 Section 763 of Dodd-Frank, *supra* note 11.

Repository or ICE Trade Vault).⁸³ Swaps dealers, security-based swap dealers, major swaps participants, and major security-based swap participants are required to register with the CFTC (for swap activity) or with the SEC (for security-based swap activity).⁸⁴

In the E.U., the G20's OTC derivatives reforms were implemented by Regulation (EU) No 648/2012 of the European Parliament and of the Council of 4 July 2012 on OTC Derivatives, Central Counterparties and Trade Repositories⁸⁵ - or as more commonly known, "EMIR" (European Market Infrastructure Reform).

PART II: CLEARINGHOUSE BASICS

This Part, and the remainder of this paper, focuses on the centerpiece of the G20's OTC derivatives market reforms: the requirement that standardized OTC derivatives use clearinghouses. As noted, derivatives exchanges have long used clearinghouses.⁸⁶ Indeed, clearing is becoming an increasingly important component of exchange revenues and even a motivation for institutional mergers.⁸⁷

A. Brief History of Derivatives Clearinghouses

Economists suggest that clearinghouses can be thought of "as a set of institutional arrangements that are designed to enhance contractual performance."⁸⁸ Private market actors created futures clearinghouses to manage the credit risk (default risk) associated with trading futures contracts.⁸⁹ During the duration of a future's contract, if the credit-worthiness of one's counterparty deteriorated - perhaps also providing it with an incentive to take on even more risk because of its limited liability - no self-

83 A list of Swap Data Repository Organizations can be found here: <http://sirt.cftc.gov/sirt/sirt.aspx?Topic=DataRepositories>. Information about Security-based Swap Data Repositories can be found here: <https://www.sec.gov/divisions/marketreg/security-based-swap-data-repositories.htm>. In practice, trade data repositories have proliferated globally - similar to the case of clearinghouses - although from an economic perspective, a single repository would be a first-best solution. Global regulators' ability to access the data in individual repositories - and therefore have a more complete picture of OTC derivative market risks - could increasingly become a challenge. See generally Committee on Payment and Settlement Systems and Board of the International Organization of Securities Commissions, *Authorities' Access to Trade Repository Data* (Aug. 2013).

84 Section 731 and 764 of Dodd-Frank, *supra* note 11.

85 Official Journal of the European Union, Regulation (EU) No. 648/2012 of the European Parliament and of the Council of 4 July 2012 on OTC derivatives, central counterparties and trade repositories (July 27, 2012), <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32012R0648&from=EN>.

86 See Randall S. Kroszner, *Can the Financial Markets Privately Regulate Risk? The Development of Derivatives Clearinghouses and Recent Over-the-Counter Innovations*, *Journal of Money, Credit and Banking*, Vol. 31, No. 3 (Aug. 1999), at 603.

87 For example, less than 20% of the revenues of the London Stock Exchange stem from trading activity. See Philip Stafford, *Exchange consolidation puts clearinghouse risk in the spotlight*, *Fin. Times*, March 4, 2016. Potential efficiencies in the clearing area are an important reason behind Deutsche Börse's bid to merge with the London Stock Exchange. See Alex Barker, *Exchanges merger will settle London versus Frankfurt fight*, *Fin. Times*, March 6, 2016.

88 Nosal, *supra* note 53.

89 See Kroszner, *supra* note 86.

help options existed to prevent a buildup of losses or risky behavior until the contract terminated.⁹⁰ In response, informal groups/clubs of traders developed, enabling the multilateral netting of transactions among members who had “agreed to accept each others’ contracts as substitutes.”⁹¹ Futures exchanges also developed rules for managing credit risk. These rules enabled exchanges to prohibit defaulters from trading, to review a trading firm’s books if concerns about its solvency arose, and to require that firms post margin for their trades.⁹²

In 1883, the Chicago Board of Trade established a clearinghouse,⁹³ but it did not perform a guarantee function. However, it did reduce the costs of netting contracts⁹⁴ and the posting of margin.⁹⁵ The clearinghouses of several European exchanges had assumed a guarantee role by the late 1800s.⁹⁶ Similarly, the Minneapolis Grain Exchange – a futures exchange – followed this path in 1891, along with a number of small U.S. exchanges.⁹⁷ In 1925, the Board of Trade Clearing Corporation became a central counterparty.⁹⁸ The reluctance of large institutions to give up the competitive advantage of their credit strength (and subsidize less creditworthy institutions) likely explains the historical delay.⁹⁹ As noted, a similar dynamic is present today surrounding use of clearinghouses for OTC derivatives. The Chicago Mercantile Exchange, established in 1919, had an internal clearinghouse.¹⁰⁰

B. Clearinghouse Structure and Risk Management Measures

A clearinghouse essentially steps into the middle of an OTC derivative trade and creates two new transactions through a legal process known as *novation*. The new transactions replace the original one and contractual privity no longer exists between the original buyer and seller (at least in regard to this transaction). Hence, in one of the new transactions, the clearinghouse takes the place of the buyer and is now counterparty

⁹⁰ *See id.*

⁹¹ *Id.* at 601.

⁹² *Id.*

⁹³ *Id.*

⁹⁴ *Id.* (noting that a Chicago Tribune news story stated that over a 14 week span, 260,000 checks had to be processed before the advent of the clearinghouse, but that this number was reduced to 26,986).

⁹⁵ *Id.* (noting that by 1897, Board of Trade participants had a mere hour to fulfill margin calls).

⁹⁶ *Id.* at 602.

⁹⁷ *Id.* at 601.

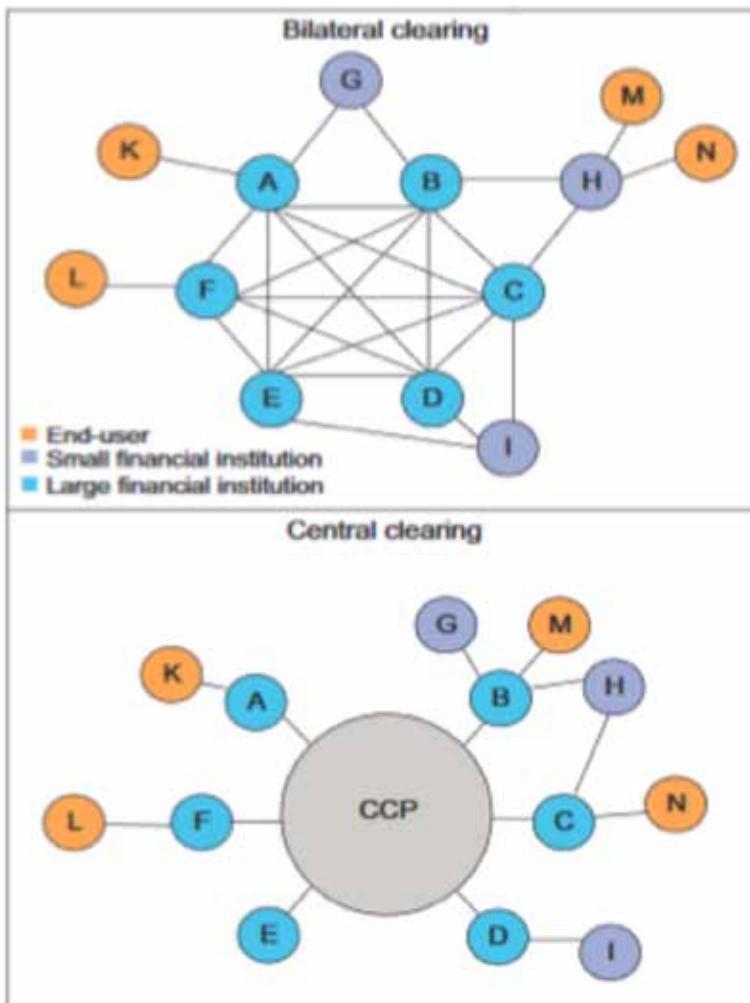
⁹⁸ *Id.* at 602.

⁹⁹ *Id.* (discussing the work of economist Craig Pirrong).

¹⁰⁰ *Id.* at 604.

to the original seller. In the second new transaction, the clearinghouse takes the place of the seller and it is now counterparty to the original buyer. The critical importance of this counterparty substitution process is that each original counterparty is now only directly exposed to the counterparty credit risk of the clearinghouse (though they have indirect credit exposure to the original counterparty through the clearinghouse's risk mutualization structure) (see Figure 1). The clearinghouse, of course, is exposed to the counterparty credit risk (performance risk) of each counterparty.

FIGURE 1¹⁰¹



101 Image from Reserve Bank of Australia, *Central Clearing of OTC Derivatives in Australia* (Discussion Paper of the Council of Financial Regulators, June 2011), <http://www.rba.gov.au/publications/consultations/201106-otc-derivatives/pdf/201106-otc-derivatives.pdf>.

The clearinghouse should not be exposed to market risk (in the absence of a clearing member default) because it will have a “matched book” as it is now on both sides of the original OTC derivative trade.

Clearinghouses are designed to be of unassailable credit quality. Their multiple layers of risk management measures are calculated to ensure this objective (see Figure 2). First, only members of the clearinghouse – clearing members – can directly clear transactions with (be a counterparty to) the clearinghouse. At times, the criteria for clearinghouse membership has been controversial. Some market participants (usually large banks and financial institutions) and clearinghouses advocated that clearing members be required to have significant minimum capital requirements – such as \$5 billion – which only the largest banks and financial institutions would be able to meet.¹⁰² These advocates argued that the promotion of systemic stability required such highly capitalized clearing members.¹⁰³ However, both CFTC and SEC regulations cap such minimum capital requirements for swaps (security-based swap) clearing at \$50 million.¹⁰⁴ Clearing members can clear trades for themselves and also clear (act as agents) for clients whose trades must be cleared. In the U.S., five banks clear (as principal or agent) over 70% of the OTC derivatives cleared.¹⁰⁵ Clearing members’ clients are indirectly linked to and exposed to the credit risk of the clearinghouse. Clearing members are required to meet specific financial requirements, agree to the clearinghouse’s rules (the Rulebook), and submit to monitoring by the clearinghouse of their creditworthiness and their portfolios. For example, LCH.Clearnet continuously monitors the internally determined credit scores¹⁰⁶ of its clearing members and adjusts margin and credit allowances accordingly.¹⁰⁷

Second, clearing members must post both initial and variation margin to the clearinghouse in cash or other acceptable collateral (government securities, agency

102 See Felix Chang, *Second-Generation Monopolization: Parallel Exclusion in Derivatives Markets*, Colum. Bus. L. Rev. (forthcoming) (noting a decrease in clearing member capital requirements from “\$1 trillion to \$100 million to now \$50 million”) [hereinafter *Second-Generation Monopolization*], http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2765193.

103 For discussion of the tension between competition and risk mitigation in financial markets, see generally Felix B. Chang, *The Systemic Risk Paradox: Banks and Clearinghouses Under Regulation*, 2014 Colum. Bus. L. Rev. 747 (2014) [hereinafter *The Systemic Risk Paradox*].

104 See 17 C.F.R. 39.12(a)(2)(iii) and 17 C.F.R. 240.17Ad-22(b)(7).

105 See Joe Rennison, *Post-crisis clearing rules block derivatives users from market*, Fin. Times, July 25, 2016. The five banks are: Morgan Stanley, Credit Suisse, Citibank, JPMorgan Chase and Wells Fargo.

106 LCH.Clearnet, *CCP Risk Management, Recovery & Resolution* (White Paper, 2014) (explaining that their internal credit scoring framework considers factors such as market data, external credit ratings, operational capacities, and financial analysis), <http://www.lch.com/risk-collateral-management/risk-management-overview/ccp-risk-management-recovery-resolution>.

107 See *id.*

securities, corporate bonds etc.).¹⁰⁸ Initial margin has been termed “the key aspect that defines the effectiveness of clearing.”¹⁰⁹ It essentially provides an insurance fund set aside so that a defaulting clearing member can still make payments on its obligations. This is known as a “defaulter pays” model.¹¹⁰ Initial margin’s purpose is to prevent losses to the clearinghouse from market price movements between the time of a clearing member’s default and the time necessary for the clearinghouse to rebalance its positions by auctioning the defaulter’s portfolio or entering into hedge trades.¹¹¹ This period is frequently longer for OTC derivatives than for exchange-traded derivatives.

Initial margin is generally based upon the composition of a clearing member’s portfolio rather than its credit rating.¹¹² The counterparty risk of the clearing member to the clearinghouse, however, is a combination of its credit quality and its portfolio. Some clearinghouses do link margin to credit quality, for example, as noted above with LCH.Clearnet. While linking initial margin to external credit ratings can reduce moral hazard and ensure increases of margin at times of crisis, it can also be destabilizing.¹¹³ Depending upon the composition of a clearing member’s positions, required initial margin might also include a concentration charge.¹¹⁴ Concentrated positions create significant risk for the clearinghouse both because of the impact of market price moves and default management processes.¹¹⁵ The amount of margin required by clearinghouses impacts the amount of trading (and hence, clearing) that ultimately occurs as margin is costly.¹¹⁶ Clearinghouses arguably have an incentive to minimize margin both to promote increased trading and to compete with other clearinghouses.

Variation margin is calculated at least daily, typically paid in cash, and reflects market to market changes in the value of a position. It is designed to ensure that a clearing member’s initial margin level remains constant.¹¹⁷ The daily payment of variation margin also prevents an accumulation of profits and losses between the clearinghouse

108 The 2015 ISDA Margin Survey states that the collateral amount reported for cleared derivatives was \$455 billion in 2014. International Swaps and Derivatives Association, *ISDA Margin Survey 2015* (Aug. 11, 2015), <http://www2.isda.org/functional-areas/research/surveys/margin-surveys/>.

109 Gregory, *supra* note 16, at 152.

110 Pirrong, *Economics of Central Clearing*, *supra* note 7.

111 See Manmohan Singh, *Limiting Taxpayer ‘Puts’ - An Example from Central Counterparties* (IMF Working Paper No. 14/203, Nov. 2014) [hereinafter *Limiting Taxpayer ‘Puts’*].

112 Gregory, *supra* note 16, at 155.

113 See *id.* at 156.

114 CME Group, *Clearing - Balancing CCP and Member Contributions with Exposures* (White Paper, Jan. 20, 2015), <http://www.cmegroup.com/education/balancing-ccp-and-member-contributions-with-exposures.html>.

115 See Pirrong, *Economics of Central Clearing*, *supra* note 7.

116 See *id.*

117 Ivana Ruffini, *Central clearing: Risks and customer protections*, Federal Reserve Bank of Chicago Economic Perspectives, 4Q (2015), at 92.

and its members.¹¹⁸ Therefore, should a clearing member default, the amount it might owe the clearinghouse should be minimized. During times of market stress, intraday margin calls (initial or variation) might be made to maintain clearinghouse stability. Such demands are pro-cyclical¹¹⁹ and could risk destabilizing clearing members. Higher levels of initial margin and frequent variation margin calls minimize clearing member credit risk from the clearinghouse's perspective. At the same time, increased margin calls create greater liquidity needs and risk for clearing members and can lead to their default. This tension arises because clearinghouses were created to serve a micro-prudential, not a macro-prudential function.¹²⁰ Risk-management measures helpful on a micro-level – such as intraday margin calls – are not necessarily equally helpful at the macro level.¹²¹

Third, all clearing members must contribute to a common default/guarantee fund. This resource will typically be used if a clearing member's posted margin, individual default fund contribution, and possibly the clearinghouse's own capital contribution, were to be insufficient to cover the obligations of a defaulted clearing member. The default fund is sized to cover extreme losses and frequently based upon what is known as a Cover1/Cover2 standard (referring to the number of defaulting clearing members it is designed to withstand).¹²² Historically, clearinghouses have seldom used their default funds.¹²³ However, historically, OTC derivative markets primarily used bilateral clearing and settlement. Given the greater size, product risk, and complexity involved in OTC derivatives clearing, it is unknown whether this history will continue going forward.¹²⁴ Some clearinghouses, such as LCH.Clearnet and CME, have default funds that are specific to asset classes.¹²⁵ This is designed to “minimize the risk of contagion between asset classes.”¹²⁶ It likely also reflects some market participants'

118 CME Group, *supra* note 114.

119 See Paul Tucker, *Are Clearing Houses the New Central Banks?* Federal Reserve Bank of Chicago Clearing Symposium (April 2014) [hereinafter *Are Clearing Houses*].

120 See Pirrong, *Economics of Central Clearing*, *supra* note 7, at 11 (noting that “Most CCPs were originally created by the members of futures organizations to serve the members’ interest by allocating and managing default risk more efficiently. That is, CCPs were not designed as macro-prudential institutions with responsibility to improve the safety and soundness of the broader financial system.”); see also Ben S. Bernanke, *Clearing and settlement during the crash*, Review of Financial Studies, Vol. 3, No. 1 (1990), at 143-144 (noting the difference between idiosyncratic risk and systemic risk and that insuring against all systemic risk would be too costly).

121 See Pirrong, *Economics of Central Clearing*, *supra* note 7.

122 See Gregory, *supra* note 16, at 178.

123 See *id.* at 177.

124 *Id.*

125 See LCH.Clearnet, *CCP Risk Management*, *supra* note 106.

126 *Id.* at 13.

disinclination to subsidize riskier assets (for example, CDS). CME has three distinct “financial safeguards packages” (a base category, interest rate swaps, and CDS) that cannot be intermingled (so, only the financial safeguards package(s) for the specific asset(s) the defaulting clearing member clears may be used).¹²⁷

Fourth, clearinghouses typically contribute some financial resources or capital to the default waterfall. As discussed in Part III, the appropriate amount of this contribution – or clearinghouse “skin in the game” – is controversial and the subject of much debate. In the U.S., there is no requirement that a clearinghouse contribute a minimum amount of its capital to the default waterfall (though such contributions are often made in practice).

Fifth, a clearinghouse’s Rulebook will likely permit the clearinghouse to make “capital calls” or additional assessments on clearing members in certain circumstances. This requires clearing members to make contributions to the clearinghouse in addition to their margin (initial and variation) and default fund contributions.

Sixth, a clearinghouse might also have external, backup arrangements in place to access additional funding. Such resources could include insurance - which is less common than previously,¹²⁸ but a significant new provider has entered the market¹²⁹ - and lines of credit. For example, the Options Clearing Corporation – a systemically significant financial market utility – has a syndicated bank line of credit of \$2 billion and a repo liquidity arrangement with CalPERS, which provides a \$1 billion backstop.¹³⁰

In extreme scenarios, a clearinghouse could reach the end of its default waterfall (use all of its financial resources), but still require additional funds to meet payment obligations. A central bank might lend to a clearinghouse (discussed below). The timing of such government intervention – as the clearinghouse proceeds through

127 See CME Group, *supra* note 114. Market participants suggest that careful consideration of the operation of such arrangements within the resolution context is critical. See The Clearing House and ISDA, *Considerations for CCP Resolution* (White Paper, 2016), <http://www2.isda.org/news/clearing-members-analyze-the-resolution-of-central-counterparties-in-new-white-paper>.

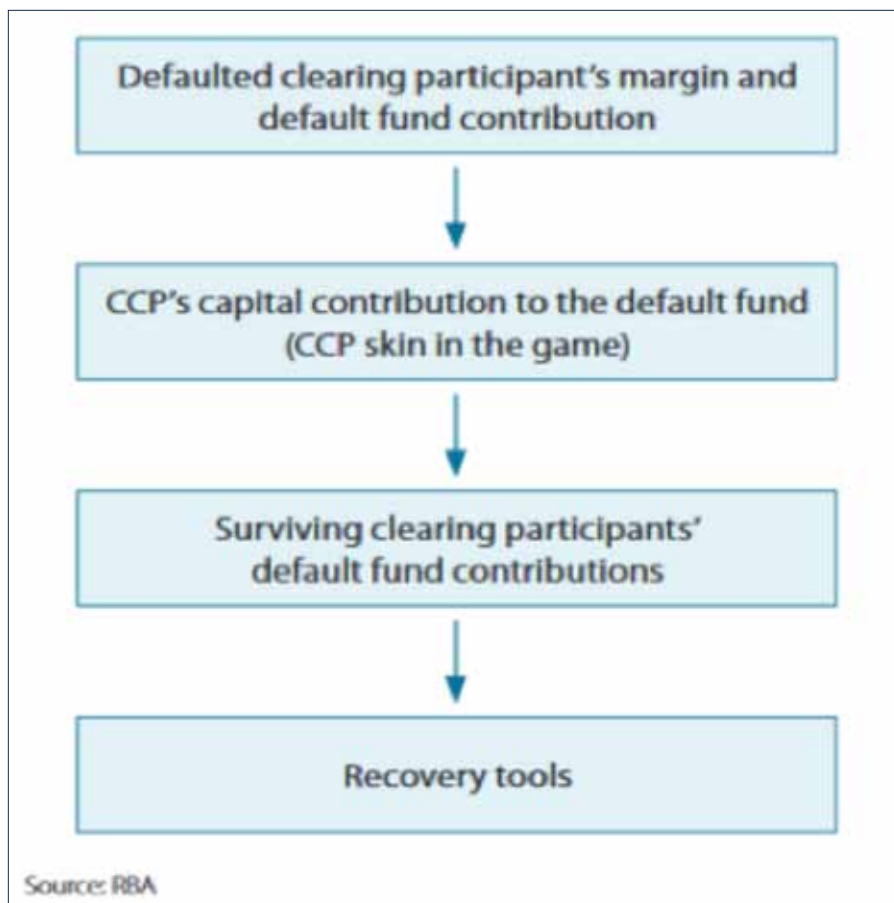
128 Norman, *supra* note 64, at 10 (noting that clearinghouses can bolster their financial resources through insurance agreements, but that this has become less common as the number of suppliers has decreased).

129 See Phillip Stafford, *Clearing houses get insurance policy*, Fin. Times, March 11, 2015 (noting that GCSA, a recent consortium of 20 global insurers, offers insurance products to clearinghouses). How well such insurance arrangements would work in a systemic crisis, however, is unclear. They could replicate the AIG situation, which suggested that a private lender of last resort is untenable in a systemic crisis. See generally Perry Mehrling, *The New Lombard Street: How the Fed Became the Dealer of Last Resort* (2010). As economist Simon Johnson noted “In a real panic, either you have access to the balance sheet of the government and the credibility of the central bank or you do not. There is no halfway house.” *Clearing houses could be the next source of chaos*, Fin. Times, June 17, 2014.

130 See Options Clearing Corporation, *Annual Report* (2015), <http://www.optionsclearing.com/about/corporate-information/annual-reports/>.

its default waterfall towards recovery and/or resolution – is unclear. Figure 2 illustrates a typical clearinghouse waterfall.

FIGURE 2 ¹³¹



C. Costs and Benefits of Clearinghouses

With their robust risk management structure, clearinghouses have historically had fortress-like strength. As discussed in Part III, however, clearinghouse failures have occurred.¹³² Nevertheless, their sterling reputation has been well-earned. They have

¹³¹ Image from Louise Carter and Megan Garner, *Skin in the Game – Central Counterparty Risk Controls and Incentives*, Reserve Bank of Australia Bulletin (June Quarter 2015), <http://www.rba.gov.au/publications/bulletin/2015/jun/pdf/bu-0615-9.pdf>.

¹³² For example, see Ruffini, *supra note* 117, at FN12 (noting that “Over the past 50 years, there have been several CCP failures associated with a market crisis – Paris, 1974; Kuala Lumpur, 1984; and Hong Kong, 1987”).

a longstanding record of success and provide many benefits to market participants. Such benefits include managing counterparty credit risk, multilateral netting, transactional efficiency, increased transparency, and facilitating clearing member client position portability.

Through their innovative contracting structure (discussed above), clearinghouses have long provided a private-market solution to the problem of counterparty credit risk in derivatives markets.¹³³ Clearinghouses also enable multilateral netting. With multilateral netting, a clearinghouse can offset the payment obligations of multiple counterparties (its clearing members) so that only counterparties' net payment obligations – typically a much smaller amount than their gross obligations – need to be exchanged with the clearinghouse.

For example, if A owes B \$90 and B owes C \$80 and C owes A \$100, a clearinghouse can net the payment obligations among these parties. As a result of this netting process, A receives \$10, B receives \$10, and C pays \$20 as illustrated in Figure 3 (below). This netting process reduces both counterparty credit risk and liquidity risk. Multilateral netting can also improve margin efficiencies¹³⁴ and facilitate clearing members' ability to exit positions through entering offsetting trades.¹³⁵ It should also reduce the number of positions needing to be replaced in the event of a clearing member default, which promotes market and price stability.¹³⁶ Overall netting benefits, however, depend upon a clearinghouse's scale (how much of the market it clears) and scope (the number of market products it clears).¹³⁷ This consideration makes clearinghouses akin to a natural monopoly.

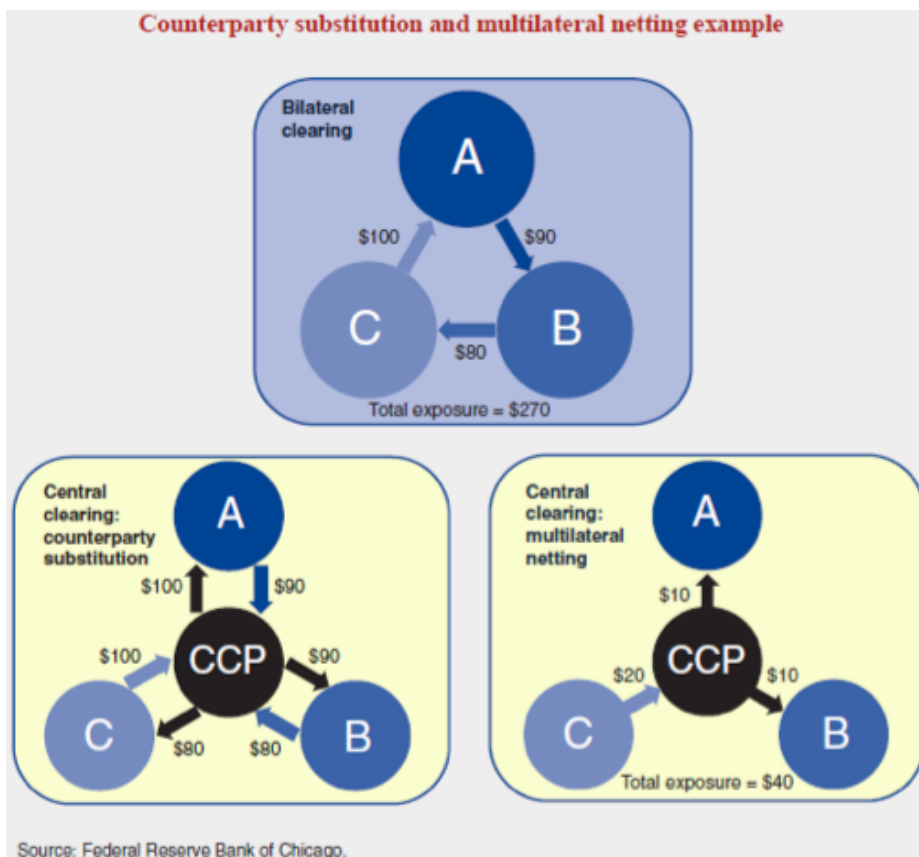
¹³³ See generally Kroszner, *supra* note 86.

¹³⁴ See Ruffini, *supra* note 117 (noting that multilateral clearing is not necessarily always more efficient than bilateral clearing).

¹³⁵ Bliss and Steigerwald, *supra* note 5.

¹³⁶ Pirrong, *Economics of Central Clearing*, *supra* note 7.

¹³⁷ *Id.*

FIGURE 3¹³⁸


Clearinghouses reduce transaction costs for clearing members through the centralization of information collection, monitoring, and risk management.¹³⁹ They also promote transparency in OTC derivative markets in several ways. Clearinghouses increase regulators' ability to understand position concentrations and counterparty credit risk exposures. They also increase the transparency of position valuations and related margin requirements.¹⁴⁰ Market participants have criticized clearinghouses as insufficiently transparent, particularly in regard to data on their risks.¹⁴¹ To promote transparency surrounding financial market infrastructures such as clearinghouses,

¹³⁸ Image from Ruffini, *supra* note 117.

¹³⁹ See generally Colleen Baker, *The Federal Reserve As Last Resort*, U. Mich. J. L. Reform 69 (2012).

¹⁴⁰ See Ruffini, *supra* note 117, at 92.

¹⁴¹ Patrick Jenkins, Philip Stafford, and Tom Braithwaite, *Banks Warn of Risk at Clearing Houses*, Fin. Times, July 7, 2013; see also Payments Risk Committee, *Recommendations for Supporting Clearing Member Due Diligence of Central Counterparties* (White Paper, Feb. 5, 2013), https://www.newyorkfed.org/medialibrary/microsites/prc/files/report_130205.pdf.

CPMI-IOSCO released “Principles for financial market infrastructures: disclosure framework and assessment methodology”¹⁴² in 2012 and “Public quantitative disclosure standards for central counterparties,”¹⁴³ in 2015.

A clearinghouse also facilitates the transfer of a defaulted clearing member’s client positions. This is known as “position portability.” It enables client positions to be transferred to a non-defaulted clearing member rather than being closed out. This capability should reduce transactions costs, prevent adverse pricing impacts, and decrease the possibility of runs on a clearing member.¹⁴⁴ In sum, position portability decreases the likelihood that a client’s funds and trading will be impacted by its clearing member’s default.¹⁴⁵

However, use of clearinghouses also has costs. Netting between OTC derivatives required to be cleared and those bilaterally cleared and settled is disrupted.¹⁴⁶ The global fragmentation of the clearinghouse landscape also disrupts netting efficiencies.¹⁴⁷ And while clearinghouses reduce certain information costs (such as credit assessment, monitoring, and enforcement) for clearing members,¹⁴⁸ they create others. For example, because weaker financial institutions benefit more from a clearinghouse’s mutualization of risk than more creditworthy financial institutions, adverse selection issues arise.¹⁴⁹ Of course, mandating the central clearing of standardized OTC derivatives overcomes this “lemons problem.”¹⁵⁰ Adverse selection issues also arise with regard to the products cleared. Clearing members are likely to have a greater understanding of a product’s risks than clearinghouses.¹⁵¹ Hence clearing members will be incentivized to trade greater quantities of those products whose risk is underpriced by the clearinghouse (and vice versa).¹⁵²

142 Bank for International Settlements, *Principles for financial market infrastructures: disclosure framework and assessment methodology* (Dec. 2012), <http://www.bis.org/cpmi/publ/d106.htm> [hereinafter *PFMI*].

143 Bank for International Settlements, *Public quantitative disclosure standards for central counterparties* (Feb. 2015), <http://www.bis.org/cpmi/publ/d125.htm>.

144 See Pirrong, *Economics of Central Clearing*, *supra* note 7.

145 See *id.*

146 See Manmohan Singh, *Making OTC Derivatives Safe* (IMF Working Papers, March 2011), <http://www.imf.org/external/pubs/ft/wp/2011/wp1166.pdf>.

147 See generally Samim Ghamami and Paul Glasserman, *Does OTC Derivatives Reform Incentivize Central Clearing?* (Office of Financial Research Working Paper, July 2016).

148 Bliss and Steigerwald, *supra* note 5.

149 See Tucker, *Are Clearing Houses*, *supra* note 119.

150 See *id.*

151 Pirrong, *Economics of Central Clearing*, *supra* note 7.

152 *Id.*

Clearinghouses also create moral hazard problems in at least two ways.¹⁵³ First, individual clearing members are likely to be less concerned about counterparty credit risk or the risks they themselves are assuming since a clearinghouse mutualizes risk.¹⁵⁴ Second, to the extent that significant clearinghouses are seen as too big to fail, both clearinghouses and their members could become less diligent about risk management because of the presumed implicit government backstop.¹⁵⁵

D. Clearinghouse Regulation

OTC derivatives clearinghouses are regulated primarily by the CFTC,¹⁵⁶ and also by the SEC. The CFTC regulates *derivatives clearing organizations* (which can be “a clearinghouse, clearing association, clearing corporation, or similar entity”¹⁵⁷). As a prerequisite to clearing futures, options on futures, options on commodities, or swaps, a clearinghouse must generally register with the CFTC as a derivatives clearing organization (DCO), a self-regulatory organization.¹⁵⁸ Section 5b of the Commodity Exchange Act delineates core principles to which each DCO must adhere.¹⁵⁹ These principles address areas such as: compliance, financial resources, participant and product eligibility, risk management, settlement, funds treatment, default protocols, rule enforcement, system precautions, record keeping and reporting, antitrust considerations, legal risk, information availability, governance, conflicts of interests, and governing boards.¹⁶⁰ Examples of clearinghouses registered with the CFTC include: the Chicago Mercantile Exchange, Inc., Ice Clear Credit LLC, LCH.Clearnet LLC, and Nodal Clear LLC.¹⁶¹

Prior to clearing securities-based swaps, a clearinghouse must register with the SEC pursuant to Section 17A of the Securities Exchange Act of 1934.¹⁶² Such clearinghouses are self-regulatory agencies and termed registered “clearing agencies” (which

153 See Tucker, *Are Clearing Houses*, *supra* note 119.

154 *Id.*

155 *Id.*

156 In the U.S., the CFTC regulates 90% of OTC derivatives in terms of notional amounts. See FN6 of Financial Stability Board, *OTC Derivatives Market Reforms, Tenth Progress Report on Implementation* (Nov. 4, 2015).

157 U.S. Commodity Futures Trading Commission, *Clearing Organizations*, available at: <http://www.cftc.gov/IndustryOversight/ClearingOrganizations/index.htm>.

158 7 U.S.C. §7a-1.

159 7 U.S.C. §7a-1(c)(2).

160 See 7 U.S.C. §7a-1(c)(2)(a)-(r).

161 For a list of clearinghouses registered with the CFTC, see <http://sirt.cftc.gov/sirt/sirt.aspx?Topic=ClearingOrganizations>.

162 See generally 17 U.S.C. §78q-1.

includes both clearing corporations (clearinghouses) and securities depositories).¹⁶³ Examples of clearinghouses registered with the SEC include: the Options Clearing Corporation, ICE Clear Credit, and the Chicago Mercantile Exchange. Clearinghouses for security-based swap transactions are required to comply with the SEC's rules and regulations for such institutions.¹⁶⁴

The above examples of registered clearinghouses illustrate that some clearinghouses such as the Options Clearing Corporation, Chicago Mercantile Exchange, and ICE Clear Credit are registered with both the SEC and the CFTC. These dually-registered institutions have also been designated by the Financial Stability Oversight Council (FSOC) as systemically significant financial market utilities pursuant to Dodd-Frank's Title VIII on *Payment, Clearing, and Settlement Supervision*.¹⁶⁵ For such clearinghouses, Dodd-Frank calls for either the CFTC or SEC to be designated as the "supervisory agency."¹⁶⁶

Dodd-Frank provides the supervisory agency with the authority to prescribe enhanced risk management standards for these institutions (in consultation with the Federal Reserve and the FSOC).¹⁶⁷ In doing so, the agency must consider "existing prudential requirements" and also "relevant international standards"¹⁶⁸ The Principles for Financial Market Infrastructures (PFMI) established in 2012 by the Committee on Payment and Settlement Systems of the Bank for International Settlements (BIS) and the Technical Committee of the International Organizations of Securities Commissions (IOSCO)¹⁶⁹ are the most important international standards for financial market infrastructures such as clearinghouses. These twenty-four principles address legal considerations, governance issues, risk management (including general, credit, liquidity, and operational risks), settlement, central securities depositories and exchange-of-value settlement systems, default management, access, efficiency, transparency,

163 A securities depository, such as the Depository Trust Company, a subsidiary of the Depository Trust & Clearing Corporation and also a systemically significant financial market utility, is essentially a warehouse for securities' certificates and the related maintenance of securities' ownership records.

164 See generally 17 U.S.C. §78q-1 and 17 C.F.R. Part 240.

165 See Section 804 of Dodd-Frank, *supra* note 11. To date, the FSOC has designated eight financial market utilities as systemically significant: <https://www.treasury.gov/initiatives/fsoc/designations/Pages/default.aspx#FMU>. Some of these institutions, for example the Clearing House Payments Company LLC and CLS Bank International, are regulated by the Federal Reserve. See http://www.federalreserve.gov/paymentsystems/designated_fm_u_about.htm.

166 Dodd-Frank directs the agencies to make this determination. In the event that they cannot agree among themselves, then the FSOC makes this determination. See Section 803 of Dodd-Frank; see also Colleen Baker, *When Regulators Collide*, *supra* note 33.

167 Section 805 of Dodd-Frank, *supra* note 11.

168 *Id.*

169 See PFMI, *supra* note 142.

and related areas. The PFMI are “recognized, supported, and endorsed”¹⁷⁰ by U.S. regulatory agencies such as the SEC, CFTC, and Federal Reserve. However, their implementation remains incomplete.¹⁷¹

As noted in Part I, Dodd-Frank’s Title VIII created a new cooperative supervisory structure – among the CFTC, SEC, and Federal Reserve – for financial market utilities such as clearinghouses. Within this framework, the Federal Reserve has authority to review the risk management standards of clearinghouses whose supervisory agency is the SEC or the CFTC;¹⁷² to participate in the examination of such institutions;¹⁷³ and also to take emergency enforcement actions against such institutions after consultation with its supervisory agency and an affirmative vote by the Financial Stability Oversight Council (FSOC).¹⁷⁴ If the Federal Reserve determines that such risk management standards are inadequate, it must first give written notice to the relevant supervisory agency (SEC or CFTC). The agency must either take action in response to the Federal Reserve’s determination, and notify the Federal Reserve and the FSOC of its intended steps, or offer a detailed objection to the Federal Reserve’s determination.¹⁷⁵ The FSOC is to then vote upon whether the supervisory agency’s response is sufficient or whether it will prescribe risk management standards to address any insufficiencies uncovered.¹⁷⁶

E. Ownership Structure and Governance

Clearinghouses can have a variety of ownership structures. A key consideration is how ownership structure impacts the alignment of risk-management incentives among

170 For example, see Federal Reserve System, *Federal Reserve Policy on Payment System Risk* (July 2015), https://www.federalreserve.gov/paymentsystems/files/psr_policy.pdf and 17 C.F.R. §39.40, entitled Consistency with the Principles for Financial Market Infrastructures.

171 See Committee on Payments and Market Infrastructures and Board of the International Organization of Securities Commissions, *Implementation Monitoring of PFMI: Level 2 Assessment Report for Central Counterparties and Trade Repositories – United States* (Feb. 2015) (noting that “The US jurisdiction has made good progress towards completely and consistently implementing the majority of the Principles applicable to systemically important CCPs. Specifically, the final and in-force regime for SIDCOs [systemically important DCOs], administered by the CFTC, has been found to be complete and consistent with the Principles in most respects. Similarly, the assessment team (AT) has further concluded that both the CCA [covered clearing agency] regime proposed by the SEC and the regime for designated FMUs proposed by the Board would implement the majority of the Principles [PFMI] that are applicable to CCPs in a complete and consistent way once finalised and in force. There are nevertheless some areas in which the relevant authorities could improve the completeness of the regimes and their consistency with the Principles. Accordingly, the AT has made a number of recommendations for each of the three regimes. Broadly, the AT recommends that the relevant US authorities consider adopting more-detailed requirements or guidance in order to clarify the intention of the relevant regimes and bring some aspects into closer alignment with the Principles.”), <http://www.bis.org/cpmi/publ/d126.pdf>.

172 See Section 805 of Dodd-Frank, *supra* note 11.

173 See Section 807 of Dodd-Frank, *supra* note 11.

174 See Section 807 of Dodd-Frank, *supra* note 11.

175 See Section 805 of Dodd-Frank, *supra* note 11.

176 See Section 805 of Dodd-Frank, *supra* note 11.

the associated stakeholders.¹⁷⁷ Most clearinghouses are within a for-profit, exchange group structure.¹⁷⁸ However, at least five governance structures for clearinghouses have existed.¹⁷⁹ First, clearinghouses can essentially be government mandated monopolies (explicitly or in practice) owned by clearing members and governed by clearing members and the regulator(s).¹⁸⁰ Such a “regulated utility” is focused on efficient clearing at minimal cost.¹⁸¹ Examples of such clearinghouses include those within the structure of the Depository Trust & Clearing Corporation (DTCC) and the Options Clearing Corporation.¹⁸²

Second, clearinghouses can be state-owned entities governed by its management and clearing members (usually because the state is part/whole owner of the national securities market).¹⁸³ This is an uncommon structure, but present in China.¹⁸⁴ However, the post-financial crisis clearing mandates and the increasing importance of systemically significant clearinghouses have reinvigorated discussion of this approach¹⁸⁵ (as discussed in Part IV).

Third, clearinghouses can be non-mutualized, for-profit firms.¹⁸⁶ The clearinghouse guarantees trades (relying upon its own and external resource arrangements) and assumes governance responsibilities.¹⁸⁷ However, clearing members do not mutualize the risk of clearing (no default fund exists) and have an insubstantial governance role.¹⁸⁸ The International Commodities Clearing House was an example of this structure.¹⁸⁹

Fourth, clearinghouses can be mutualized entities, a common approach in the time of mutualized derivative exchanges (mass demutualization began in 1993).¹⁹⁰

177 See author’s forthcoming research, *Clearinghouse Ownership Structure, Recovery and Resolution* (working title), arguing that much of the current discussion about clearinghouse recovery and resolution falls short by taking clearinghouse ownership structure as a given and failing to link this foundational issue to recovery and resolution frameworks.

178 See generally Dietrich Domanski, Leonardo Gambacorta, and Cristina Picillo, *Central clearing: trends and current issues*, BIS Quarterly Review (Dec. 2015) (noting that “In 83% of the cases, CCPs are directly owned or managed by the company operating the stock exchange [citation to graph omitted]”).

179 The discussion of these ownership structures and their characteristics comes from Robert Cox and Robert Steigerwald, “*Incomplete demutualization*” and *financial market infrastructure: central counterparty ownership and governance after the crisis of 2008-9*, *Journal of Financial Market Infrastructures*, Vol. 4, No. 3 (March 2016).

180 *Id.*

181 *Id.*

182 *Id.*

183 See *id.*

184 *Id.*

185 See generally *id.* (noting Paul Tucker’s 2014 speech at a Federal Reserve Bank of Chicago conference on clearing).

186 See *id.*

187 *Id.*

188 *Id.*

189 *Id.*

190 *Id.*

In this structure, clearing members with exchange memberships are the owners and are responsible for clearinghouse governance and risk management.¹⁹¹ The Board of Trade Clearing Corporation was an example of this structure.¹⁹²

Fifth, clearinghouses can be demutualized structures in which the owners are an exchange group’s shareholders or independent shareholders and the clearing members mutualize the risk of a clearing member(s)’ default.¹⁹³ This arrangement takes a “hybrid” approach to clearinghouse governance using various types of committees composed of management and clearing member participants.¹⁹⁴ This structure has been termed “incomplete demutualization” because there is no mutualization of ownership profits among clearing members (profits go to shareholders), but default risk remains mutualized among clearing members.¹⁹⁵ This structure creates a misalignment between the incentives of those sharing the profits (the shareholders) and those sharing any losses (the clearing members).¹⁹⁶ Intercontinental Exchange Inc.’s clearinghouses are an example of this structure.¹⁹⁷

Most of today’s clearinghouses have this fifth structure as illustrated in Figure 4.

FIGURE 4¹⁹⁸

CCP	Governance structure
Chicago Mercantile Exchange, Inc. (CME)	Owned by the CME Group, a publicly listed company.
ICE Clear Credit L.L.C / ICE Clear Europe (ICE)	Operated by Intercontinental Exchange, a publicly listed company.
Eurex Clearing	Operated by Deutsche Börse, a publicly listed company.
Korea Exchange	Publicly listed company (CCP is not a separate legal entity).
LCH.Clearnet Group Ltd	LCH.Clearnet Group Ltd is majority owned by the London Stock Exchange, with the remainder being owned by its users and other exchanges. The London Stock Exchange is a publicly listed company.
National Stock Exchange India	NSE is owned by financial institutions, banks, insurance companies and other stock exchanges.
BM&FBovespa	The CCPs for the different markets are entities within the exchange group BM&FBOVESPA, which is a publicly listed company.
Japan Securities Clearing Corporation	Owned by the Japan Stock Exchange, other exchanges in Japan and users.

Source: websites of individual CCPs.

¹⁹¹ *Id.*

¹⁹² Cox and Steigerwald, *supra* note 179.

¹⁹³ *See id.*

¹⁹⁴ *Id.*

¹⁹⁵ *Id.*

¹⁹⁶ *Id.*

¹⁹⁷ Cox and Steigerwald, *supra* note 179.

¹⁹⁸ Image from Froukelien Wendt, *Central Counterparties: Addressing their Too Important to Fail Nature* (IMF Working Paper, Jan. 2015), <https://www.imf.org/external/pubs/ft/wp/2015/wp1521.pdf>.

However, a fundamental tension exists between the profit motive of privately-owned clearinghouses and the social role of systemically significant clearinghouses. Indeed, “[t]here is an obvious conflict of interest between the public role these firms [clearinghouses] play and the normal duties their boards owe their shareholders.”¹⁹⁹ To promote robust risk management, strong alignment must exist between control over clearinghouse governance and receipt of economic gains/losses. Whether the current global clearinghouse landscape sufficiently addresses this concern is unclear.

PART III: ISSUES OF CLEARINGHOUSE RISK MANAGEMENT AND SYSTEMIC RISK

The G20’s post-financial crisis clearing mandates have transformed both the landscape of the global OTC derivatives market and its associated risks. As of this writing, twelve (of twenty-four) Financial Stability Board²⁰⁰ jurisdictions have implemented rules to make clearing determinations for upwards of 90% of their OTC derivatives.²⁰¹ Although major jurisdictions now have clearing mandates in place, numerous related, unsettled, risk-management and policy issues remain. Additionally, understanding how best to manage the systemic risks associated with the new market structure is only beginning. Accordingly, this Part examines current, critical issues surrounding clearinghouse risk management and related systemic risk concerns.

A. Increased Concentration of Risk

As a result of the clearing mandates, an increased volume (concentration) of OTC derivatives is being cleared within individual clearinghouses. Industry estimates state that 70% plus of new OTC derivative transactions are cleared.²⁰² Therefore, a single institution – the clearinghouse – is now centralizing and assuming a vast amount of counterparty credit risk that was previously largely dispersed among a small, concentrated group of global banks and financial institutions.

The number of systemically significant clearinghouses is very small. Nearly 60% of the cleared transactions volume reported to the Bank for International Settlements

199 Stephen Lubben, *Failure of the Clearinghouse: Dodd-Frank’s Fatal Flaw?* 10 Va. L. & Bus. Rev. 127 (2015).

200 The Financial Stability Board, established in 2009, is a group of international financial regulators focused on promoting stability in global financial markets. See <http://www.fsb.org/about/>.

201 Financial Stability Board, *OTC Derivatives Market Reforms: Tenth Progress Report on Implementation* (Nov. 4, 2015), <http://www.fsb.org/2015/11/otc-derivatives-market-reforms-tenth-progress-report-on-implementation/>.

202 The Clearing House and ISDA, *Considerations for CCP Resolution* (White Paper, May 2016), <https://www.theclearinghouse.org/issues/articles/2016/05/20160524-tch-and-isda-study-on-cc-resolution>.

by global members of the Committee on Payments and Market Infrastructures cleared *at only two clearinghouses* as of the end of 2014.²⁰³ As of this writing, there has been a proposal for the merger of Deutsche Borse and the London Stock Exchange. Their clearinghouses - purportedly a fundamental aspect of the merger's strategy - would be linked and this combination would then be responsible for €150 billion of customer funds.²⁰⁴ The clearinghouses of the London Stock Exchange (LCH.Clearnet included), CME Group, Intercontinental Exchange, and the London Metal Exchange together had on average approximately \$114 billion of daily initial margin in 2015.²⁰⁵

Similarly, the number of clearing members of significant clearinghouses is small, and smaller still is the number that clear for clients.²⁰⁶ For example, Bank for International Settlements researchers note that: “[e]very systemically important bank participates in many CCPs, often in multiple jurisdictions...The large CCPs that clear most of the available over-the-counter (OTC) derivatives have a relatively small number of clearing members...”²⁰⁷

At the end of 2014, about half of all interest rate swaps and a fifth of credit default swaps were cleared.²⁰⁸ The percentages are much higher for new transactions: about 80% of new interest rate swaps are cleared and 70% of new credit default swaps based on credit indices are cleared.²⁰⁹ Most cleared OTC interest rates derivatives clear through LCH.Clearnet's SwapClear.²¹⁰ Currently, this amount is greater than 95%.²¹¹ Most cleared credit default swaps are cleared through Intercontinental Exchange's ICE Clear Credit and Ice Clear Europe.²¹² In 2013, this combined number was approximately 98.6%.²¹³ Few products in the additional OTC derivative categories of equities, commodities, and foreign exchange are currently cleared.

Without doubt, the clearing landscape is highly concentrated. This is not surprising because: “Central clearing is subject to strong *economies of scale and scope*

203 Italics added. Domanski et. al., *supra* note 178, at 63.

204 See Philip Stafford, *Deutsche Borse and LSE plan to link clearing houses*, Fin. Times, April 20, 2016.

205 Philip Stafford, *BoE set to review market risk managers*, Fin. Times, March 6, 2016.

206 Arshadur Rahman, *Over-the-counter (OTC) derivatives, central clearing and financial stability*. Bank of England Quarterly Bulletin Q3 (2015). The author notes that as of his writing, LCH Swapclear had 97 clearing members and ICE Clear Europe had 21 clearing members.

207 Domanski et. al., *supra* note 178, at 62.

208 See Rahman, *supra* note 206, at 286-7. The author notes that regulators have largely focused their clearing mandates on CDS index contracts, ‘Plain vanilla’ interest rate swaps, basis swaps, overnight index swaps, and forward rate agreements.

209 See *id.* at 287. These numbers are for end of 2013 through first-half of 2015.

210 Li Lin and Jay Surti, *Capital Requirements for Over-the-Counter Derivatives Central Counterparties* (IMF Working Paper 13/3, Jan. 2013).

211 LCH.SwapClear, *Clearing Volumes: Global Service*, <http://www.swapclear.com/what/clearing-volumes.html>.

212 Lin and Surti, *supra* note 210.

213 Chang, *Second-Generation Monopolization*, *supra* note 102, at 27.

arising from netting economies and diversification effects. These scale and scope economies favor the use of a small number of ‘utility’ CCPs.”²¹⁴ Systemically significant clearinghouses are akin to natural monopolies. Any serious problems at these institutions would likely impact (and possibly shut-down) the entire market for the product(s) they clear, in addition to broader financial markets.

Given these considerations, the post-financial crisis clearing landscape could actually increase systemic risk in important ways. And once again, government backstops could be necessary in a financial crisis. Importantly,

Loading risk on to any private entity is not the same thing as having state-backed deposit insurance or a central banking liquidity backstop. In fact, this is why clearing houses made way for central banks more than 100 years ago. In a real panic, either you have access to the balance sheet of the government and the credibility of the central bank or you do not. There is no halfway house.²¹⁵

AIG’s situation was akin to and warns of the risks associated with such half-way houses. Through its CDS activities, AIG had essentially become a private market backstop to much of the market-based credit system.²¹⁶ As a result of the clearing mandates, a small number of systemically significant clearinghouses are becoming mostly private-market backstops of the cleared OTC derivative markets or “systemic bulwark[s].”²¹⁷ However, when the performance of these bulwarks will be most needed is when they will be most financially vulnerable.²¹⁸ The AIG problem has arguably not been resolved, but rather relocated to systemically significant clearinghouses, entities now tasked with mitigating systemic risk to promote financial market stability (a public good). For this reason, it is highly foreseeable that the assistance of central banks could be needed once again. Indeed, economists have termed clearinghouses “an officially sanctioned form of credit protection” comparable to the housing GSEs (including the associated mispricing of risk).²¹⁹

In contrast, some clearinghouses have argued that they do not concentrate system-

214 Pirrong, *Economics of Central Clearing*, *supra* note 7, at 3.

215 Simon Johnson, *Clearing houses could be the next source of chaos*, *Fin. Times*, June 17, 2014.

216 See generally Perry Mehrling, *The New Lombard Street: How the Fed Became the Dealer of Last Resort* (2010).

217 Pirrong, *Economics of Central Clearing*, *supra* note 7.

218 *Id.* at 37.

219 Johnson, *supra* note 215.

ic risk, rather this is a “misconception” within industry discussions.²²⁰ Instead, clearing members are responsible for the potential concentration of risk and the clearinghouse’s job is to monitor such potential risk concentrations by its clearing members.²²¹

B. Fragmentation of the Clearing Landscape

The number of clearinghouses necessary from an economic perspective is distinct from the number of clearinghouses necessary from a practical perspective. In theory, a single global clearinghouse that cleared all OTC derivative products and had access to central bank liquidity in all relevant currencies should effect the greatest netting, and would be an ideal solution (particularly from a netting perspective).²²² However, this ideal is impossible in practice for several reasons, including that these global markets are regulated by national authorities of limited jurisdiction and because of related political economy issues. For example, some policymakers want certain OTC derivatives – particularly those denominated in their home currency – and their financial institutions to be required to clear transactions within their jurisdiction.²²³

Indeed, the U.K. took the European Central Bank to court over the latter’s “location policy,” which required clearinghouses clearing significant amounts of Euro-denominated products to be located in the eurozone, and it won. Nevertheless, given the recent Brexit vote, the future location of Euro-denominated clearing is again becoming a subject of much debate.²²⁴ This jurisdictional fragmentation of clearing impacts netting, potentially increases collateral requirements, and requires regulatory coordination that has often proved challenging in practice. Economists argue that such global fragmentation creates additional risk and costs because such “jurisdictional considerations are likely to result in the survival of multiple, under-scaled or under-diversified CCPs.”²²⁵

C. Increased Systemic Interconnectedness

In addition to the significant concentration of OTC derivatives risk in systemically significant global clearinghouses, substantial concentrations of OTC derivatives risk

220 CME Group, *supra* note 114, at 2.

221 CME Group, *supra* note 114.

222 Singh, *Making OTC Derivatives Safe*, *supra* note 146.

223 See generally Colleen Baker, *When Regulators Collide*, *supra* note 33.

224 For example, see John Dizard, *Clearing houses should not be a bargaining tool in Brexit talks*, *Fin. Times*, July 10, 2016 and Philip Stafford, *LSE Chief Plays Down Euro Clearing Leaving London*, *Fin. Times*, Aug. 4, 2016.

225 Pirrong, *Economics of Central Clearing*, *supra* note 7, at 15.

remain within the banks and financial institutions that are the clearing members of these clearinghouses. For example, as of the first-quarter of 2016, U.S. banks still primarily used bilateral settlement for their credit derivative transactions.²²⁶ As of June 2015, only 31% of the total global credit default swaps market was cleared.²²⁷ The riskiest, most complex and illiquid OTC derivatives – likely also the most dangerous from a financial stability perspective – are likely to remain uncleared for the foreseeable future²²⁸ (though such transactions should be subject to margin and reporting requirements). As one commentator notes: “[t]his leads to the question of why, if an OTC derivative represents an ‘intolerable’ risk for a CCP, it would it [sic] be left in a (supposedly more dangerous) bilateral market.”²²⁹

Ironically, AIG’s near collapse due to its CDS activities, acted as a primary catalyst behind the global clearing mandates. Yet economists note that AIG’s problematic CDS would not have been eligible for clearing.²³⁰ To be clearing eligible, an OTC derivative product needs to be standardized, have significant trading volume, ample liquidity, and robust pricing available.²³¹ Otherwise, the clearinghouse will encounter difficulties pricing such contracts, disposing of them upon clearing member default, and robustly managing their risk.²³²

Much of the risk related to these uncleared OTC derivative positions is concentrated among large banks and financial institutions.²³³ A critical problem this creates is that it fragments institutions’ netting of their OTC derivative contracts. This leads to an increase in collateral requirements and deadweight losses as a result of a decreased ability to net transactions.²³⁴ It also means that significant counterparty credit risk – a crucial source of financial market systemic risk – remains in the bilateral OTC derivative market.

226 This statement is derived from the fact that as of end-March 2016, the OCC states that only “20.5% of investment grade and 16.8% of non-investment grade transactions were centrally cleared.” These numbers represent all transactions (old and new). Office of the Comptroller of Currency, *Quarterly Report on Bank Trading and Derivatives Activities First Quarter 2016* (June 2016).

227 Bank for International Settlements, *Statistical Release: OTC derivative statistics at end-June 2015* (Nov. 2015), available at http://www.bis.org/publ/otc_hy1511.pdf. This percentage has increased over time and presumably will continue to do as a greater percentage of newly entered transactions.

228 See generally Gregory, *supra* note 16, at 237.

229 *Id.* at 237.

230 See Darrell Duffie, *How Should We Regulate Derivatives Markets?* (PEW Financial Reform Project, Briefing Paper No. 5, 2009).

231 Rahman, *supra* note 206, at 287.

232 *Id.*

233 See Timothy Massad, Chairman of the CFTC, Keynote Remarks before the Institute of International Bankers Annual Washington Conference (March 7, 2016).

234 See Singh, *New Regulations and Collateral Requirements*, *supra* note 58.

In sum, substantial amounts of OTC derivatives remain uncleared and are likely to remain so for the foreseeable future,²³⁵ and systemically important banks and financial institutions will continue to bilaterally clear and settle much of their OTC derivatives activity, especially some of their riskiest transactions. Importantly, these same institutions will now also be among the largest clearing members at multiple systemically significant clearinghouses around the world. Therefore, significant interdependencies have now been created among a very small number of systemically significant global clearinghouses and systemically significant banks and financial institution clearing members (see Figure 5). As economist Craig Pirrong states:

all major financial institutions will be interconnected via their linkages (direct and indirect) to CCPs. *It is therefore profoundly incorrect to assert that clearing mandates reduce the interconnectedness of the financial system*; these mandates reconfigure, but do not eliminate, interconnections between systemically important financial institutions (“SIFIs”).²³⁶

Other economists echo this perspective.²³⁷ Also, clearing members can act as agents for clients required to clear their OTC derivative transactions, a relationship which creates additional systemic linkages. An additional source of interdependency and connection is because certain clearing members provide critical services to clearinghouses:

Take, for example, a bank holding company with multiple material subsidiaries that are all active at a single CCP. One subsidiary could act as the CCP’s primary custodian, another could be a clearing member with a large number of positions at the CCP, and a third could be part of a lender consortium that has agreed to provide the CCP with short-term funding in the event of a liquidity shortfall. If an idiosyncratic event threatens the stability of the bank holding company and its material subsidiaries, the CCP’s operations and ability to meet its obligations could be severely impacted.²³⁸

Figure 5 illustrates the possible systemic consequences and financial market rami-

235 Timothy Massad, Chairman of the CFTC, stated in a recent speech that “There will always be a large part of the [OTC derivatives] market that is not cleared...” *supra* note 233.

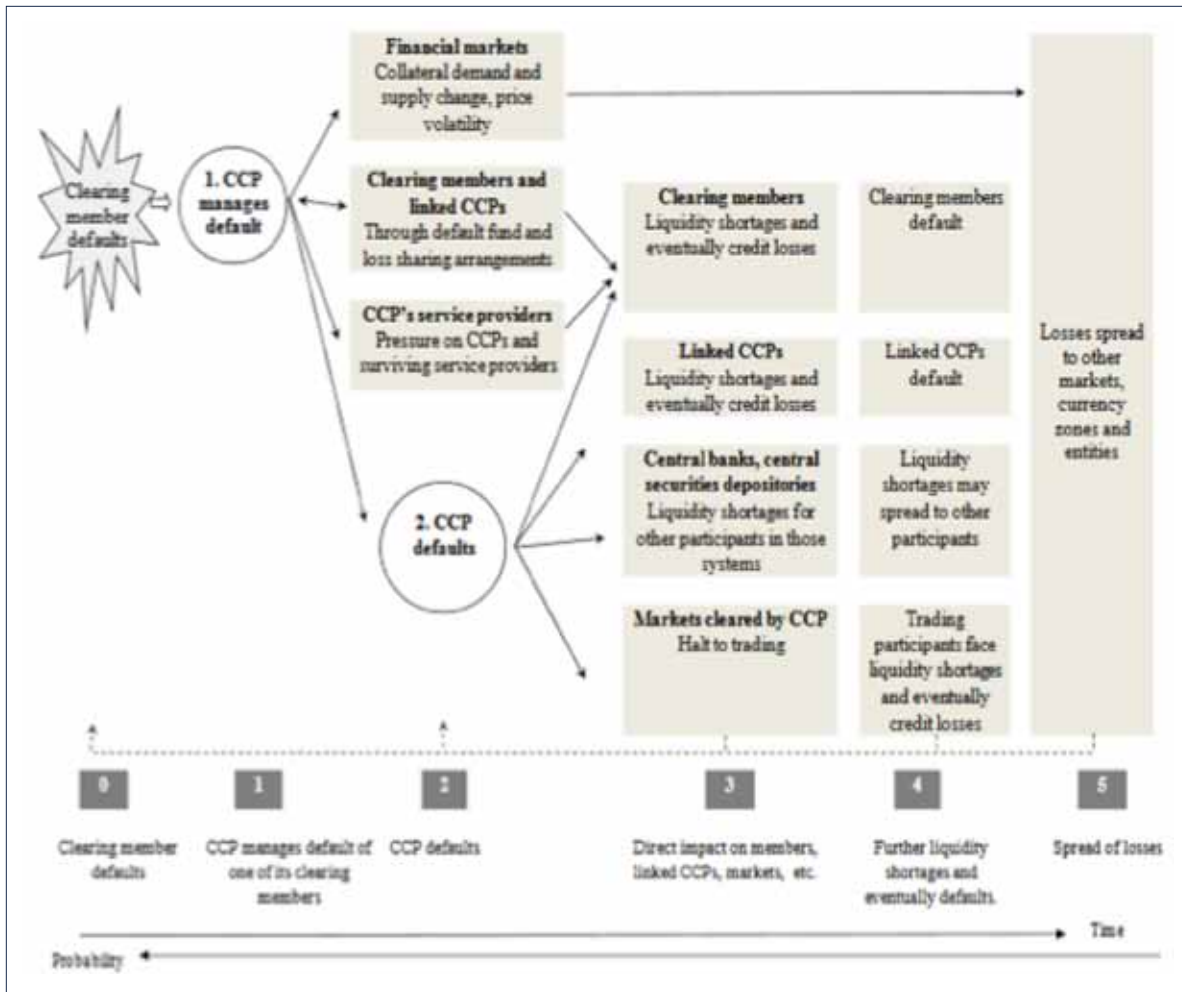
236 Emphasis added. Pirrong, *Economics of Central Clearing*, *supra* note 7, at 35.

237 See generally Singh, *New Regulations and Collateral Requirements*, *supra* note 58.

238 Mark P. Wetjen, CFTC Commissioner, *Ensuring the Promise of a Centrally Cleared, Global Swaps Market: Next Steps*, Remarks before the FIA Derivative Conference (Dec. 4, 2014).

fications that could occur beginning with the default of a significant clearing member.

FIGURE 5 ²³⁹



In sum, the clearing mandates have not only increased the concentration of credit risk within clearinghouses, but they have also intensified the global systemic connections among a small group of systemically important clearinghouses, banks, and financial institutions.²⁴⁰

²³⁹ Image from Froukelien Wendt, *supra* note 198.

²⁴⁰ See Domanski et. al., *supra* note 178, at 59 (noting “more and more connections in the global financial system run through CCPs”).

D. Cross-margining

Another critical source of interconnection among clearinghouses and their clearing members is cross-margining arrangements. Margin is expensive. Cross-margining agreements are designed to minimize a clearing member's initial margin contribution by basing this calculation on a portfolio of off-setting, at most weakly correlated, potentially hedged, positions in contrast to a margin calculation on an individual product basis.²⁴¹ Reduced margin requirements should provide cost savings to clearing members. Cross-margining arrangements can be among: products in the same or different asset classes; exchange-traded and OTC transactions; affiliated clearinghouses in different jurisdictions; and unaffiliated clearinghouses.²⁴² Examples of cross-margining arrangements in place include those among: CME and ICE Clear Credit for certain credit derivatives;²⁴³ ICE and DTCC for certain OTC derivatives and exchange-traded products;²⁴⁴ and among the Options Clearing Corporation, CME, and ICE Clear Credit (US).²⁴⁵

Cross-margining should reduce initial margin requirements and costs. Yet it also increases systemic interconnections, in addition to increasing the complexity of both margin models²⁴⁶ and default/insolvency scenarios. Financial models can be inaccurate. Clearinghouses chose their own models for margin calculations (as discussed below), which could lead to underestimation of margin. Any underestimate of initial margin needs would be problematic for an individual clearinghouse. The risk of insufficiently margined cross-margined accounts would be highly problematic. Were a significant under-calculation of initial margin to occur for a cross-margined account, the result would be a critical reduction in the amount of financial resources available to one or more clearinghouses in the event of the clearing member's default. This risks the clearinghouse's ability to manage a clearing member's default (should it occur), and ultimately risks the stability of the other clearing members and the clearinghouse.

Furthermore, in the event of a clearing member's default or insolvency, the ex-ante contractual division of initial margin (whether underestimated or not) of the

²⁴¹ See Gregory, *supra* note 16, at 170-174.

²⁴² *Id.* at 171.

²⁴³ *Id.* at 173.

²⁴⁴ *Id.*

²⁴⁵ See Options Clearing Corporation, *Cross Margin Programs*, <http://www.optionsclearing.com/clearing/clearing-services/cross-margin.jsp>.

²⁴⁶ Gregory, *supra* note 16, at 171.

clearing member's margin among clearinghouses (whether affiliated or not) could come under stress. Presumably, because cross-margining should be based upon off-setting positions, at most only one clearinghouse at a time should need access to this margin. However, financial models and correlations break-down, particularly in a financial crisis. Were one clearinghouse to grab margin at the expense of another – whether contractually entitled to it or not – there would be little recourse other than a suit for contract breach.²⁴⁷ Hence, a clearinghouse dependent upon certain margin allocations to manage a clearing member default could face a short fall of its anticipated financial resources in a time of crisis. This scenario would be highly problematic among clearinghouses within the same jurisdiction. It would be impossibly problematic for clearinghouses in different jurisdictions.²⁴⁸ Finally, if margin haircutting (discussed below) were used to stabilize a distressed clearinghouse, the interaction of this recovery/resolution tool and any cross-margining arrangements could be complex.

E. Margins

The policy issues related to initial margin in the OTC derivatives clearing landscape extend beyond cross-margining arrangements. Inadequate transparency of clearinghouse margin models and related considerations has been a concern.²⁴⁹ Clearinghouses have resisted calls for additional transparency, saying such sensitive data disclosure could have adverse operational and market confidence implications.²⁵⁰ The CFTC requires derivatives clearing organizations to publicly disclose their margin setting methodology.²⁵¹ The SEC also requires similar public disclosures.²⁵²

As noted, clearinghouses individually determine, based upon their chosen calculation methodology, initial margin requirements for clearing members. To date, a

247 The particular risks of a cross-margining arrangement would depend upon the details of the cross-margining agreement. The author is unaware of publically available documentation of these arrangements. In its 2015 Annual Report, the CME notes that in some of its cross-margining arrangements – such as with the OCC – performance bond deposits are held jointly. In other arrangements – such as with the Fixed Income Clearing Corporation – performance bond deposits are held separately. CME Group, Inc. *2015 Annual Report* (Feb. 2016), <http://www.cmegroup.com/investor-relations/annual-review/2015/>.

248 See generally Craig Pirrong's blog post on cross-margining arrangements for the proposed merger between the London Stock Exchange and the Deutsche Börse, *The Rube Goldberg Approach to Integrating CCPs: A Recipe for Disaster*, April 2, 2016, <http://streetwiseprofessor.com/?p=9902>.

249 See Phillip Stafford, *BoE Urges more transparency in clearing*, Fin. Times, May 16, 2014; see generally Wetjen, *supra* note 238 (discussing increased transparency in the clearinghouse space).

250 See Phillip Stafford, *BoE Urges more transparency in clearing*, Fin. Times, May 16, 2014.

251 See 17 C.F.R. §39.21(c)(3).

252 See 17 C.F.R. §240.17Ad-22(e)(23).

standardized regulatory approach to the calculation of initial margin across clearinghouses (nationally or globally) does not exist. This lack of standardization could be problematic. For example, margin requirements could be a source of competition among clearinghouses.²⁵³ Indeed, research on clearinghouses for financial futures suggests that competition could play a role in determining margin requirements.²⁵⁴ As most are part of for-profit group structures, clearinghouses are also likely to decrease margins in normal markets to increase growth, but significantly increase margins when markets become chaotic.²⁵⁵ Such pro-cyclical practices could itself create market instability.

Hence, a subject of current policy debate is whether (and if so, the extent to which) clearinghouse margin models should be standardized. *Principle 6: Margin* of the PFMI states that “A CCP should cover its credit exposures to its participants for all products through an effective margin system that is risk-based and regularly reviewed.”²⁵⁶ It also provides guidance concerning this standard. A CCP Workplan (Workplan),²⁵⁷ issued by the chairpersons of the FSB SRC, FSB RESG, BCBS, CPMI, and IOSCO in 2015, proposed an evaluation of several areas of the PFMI, including the calculation of initial margin. The Workplan recommends evaluating whether the PFMI standards for calculating initial margin are “sufficiently granular and robust.”²⁵⁸ Relatedly, some policymakers have recommended mandating minimum margin requirements for clearinghouses.²⁵⁹

The implementation of a standardized margin model - which included cross-margining arrangements and the clearing of a product at multiple clearinghouses²⁶⁰ - could be beneficial. It should provide greater transparency to regulators, to clearing members and their clients, and to additional external parties interested in assessing the financial strength of a clearinghouse. It would also promote uniformity of margin requirements among clearinghouses, which would presumably alleviate any margin-

253 Domanski et al., *supra* note 178, at 73; *see also* Tucker, *Are Clearing Houses*, *supra* note 119.

254 *See* Domanski et al., *supra* note 178, at 73 (summarizing research of N. Abruzzo and Y.H. Park, *An empirical analysis of futures margin changes: determinants and policy implications*, Board of Governors of the Federal Reserve System, Finance and Economics Discussion Series, No. 86, Oct. 2014).

255 *See* Tucker, *supra* note 119.

256 PFMI, *supra* note 142.

257 *See* Chairs of the FSB SRC (Financial Stability Board Standing Committee on Supervisory and Regulatory Cooperation), FSB RESG (the Financial Stability Board Resolution Steering Group), BCBS (Basel Committee on Banking Supervision), CPMI (Committee on Payments and Markets Infrastructures), and IOSCO (International Organization of Securities Commissions), 2015 CCP Workplan (April 15, 2015), <http://www.fsb.org/wp-content/uploads/Joint-CCP-Workplan-for-2015-For-Publication.pdf> [hereinafter *2015 CCP Workplan*].

258 *See id.*

259 *See* Tucker, *Are Clearing Houses*, *supra* note 119.

260 If clearing members are clearing the same product at multiple clearinghouses, margin requirements could be underestimated by individual clearinghouses. *See* Domanski et al., *supra* note 178, at 73.

based competition. On the other hand, any problems or flaws in a standardized margin model would then proliferate throughout the domestic and/or global clearinghouse landscape. Market participants would seek out and exploit any arbitrage opportunities such imperfections created. It could also slow potential improvements of such models and related efficiency developments in the margin arena. And clearinghouses are not identical. They clear different products with varying risk profiles and have diverse sizes, interconnectedness, regulatory regimes, locations, ownership and governance models, risk profiles etc. Hence, a single approach to margining could be a problematic.

Additionally, it would be challenging to implement highly-uniform, initial margin methodologies across global clearinghouses at a sufficiently granular level. This would require consensus among a number of international jurisdictions and agreement at a highly general level would have little value. Even if a sufficiently precise global margin calculation methodology were to be agreed upon, the potential for calculation discrepancies in practice could remain. Therefore, an alternative to a standardized model or “one size fits all” approach could be to create minimum standards for clearinghouse margin models.²⁶¹

F. Cover1/Cover2 Standard

The financial resources necessary for a clearinghouse to be sufficiently prepared for the default of a significant clearing member(s), including initial margins, is a critical consideration. *Principle 4: Credit Risk* of the PFMI provides what has become known as the “Cover 1/Cover 2” standard. To meet the Cover 1 standard, a clearinghouse must have financial resources sufficient to manage the default of the largest clearing member (and any affiliates) to which it has the greatest credit exposure in “extreme but plausible market conditions.”²⁶² The “Cover 2” standard - primarily oriented to globally systemic clearinghouses and those clearing complex products such as CDS - requires a clearinghouse to have the financial resources to manage the default of its two largest clearing members (and any affiliates) to which it has the greatest credit exposure in “extreme but plausible market conditions.”²⁶³ Importantly, the phrase

²⁶¹ See Coeuré, *supra* note 8.

²⁶² PFMI, *supra* note 142.

²⁶³ *Id.*

“extreme but plausible” lacks “a consistent interpretation.”²⁶⁴ Hence, as in the case of margin calculations and stress testing (discussed below), the actual practices of clearinghouses in calculating Cover 1/Cover 2 standards could vary. In the U.S., the CFTC requires its clearinghouses to meet a Cover 2 standard.²⁶⁵ The SEC also requires clearinghouses clearing security-based swaps to meet a Cover 2 standard.²⁶⁶

In considering the adequacy of the Cover 1/Cover 2 Standard, it is important to remember that clearinghouses confront both idiosyncratic (individually-based) and systemic (market or economy wide) risk.²⁶⁷ This distinction is crucial. “CCPs are risk poolers, not insurance providers.”²⁶⁸ Clearinghouse risk management – as in the case of insurance generally – is not calculated to manage a systemic crisis.²⁶⁹ Researchers at the Bank for International Settlements caution that:

The CCPs own liquid assets and backup liquidity lines made available by banks may provide effective insurance against liquidity shocks resulting from the difficulties of one or a few clearing members. But they can hardly provide protection in the event of a systemic shock when a large number of clearing participants – potentially including the providers of liquidity lines – become liquidity-constrained, thereby triggering domino effects.²⁷⁰

In a financial crisis – such as the recent one of 2007-08 – multiple systemically important banks and financial institutions could be in distress at the same time. These institutions are also likely to be important clearing members at numerous clearinghouses around the world. For example, JP Morgan Chase is a clearing member at over 70 clearinghouses internationally.²⁷¹ Additionally, some of these institutions are likely to also be important service providers to one or more clearinghouses as discussed above (for example, for settlement or backup lines of credit).²⁷² Hence, the stability of

264 Alexandra Heath, Gerard Kelly, Mark Manning, Sheri Markose, Ali Rais Shaghghi, *CCPs and network stability in OTC derivatives markets*, *Journal of Financial Stability* (forthcoming).

265 See 17 C.F.R. 39.33(a).

266 See 17 C.F.R. 240.17Ad-22(b)(3). Although meeting SEC requirements, the Options Clearing Corporation – a systemically significant financial market utility – recently faced a potential downgrade of its credit rating because its resources met a Cover 1 rather than the Cover 2 standard of its peers. See Philip Stafford, *US clearer OCC faces credit rating cut from S&P Global*, *Fin. Times*, May 18, 2016.

267 See generally Ben S. Bernanke, *Clearing and settlement during the crash*, *Review of Financial Studies*, Vol. 3, No. 1 (1990).

268 See Coeuré, *supra* note 8.

269 See generally Bernanke, *supra* note 267.

270 Domanski et al., *supra* note 178, at 68.

271 See Sam Fleming and Philip Stafford, *JPMorgan Tells Clearers to Build Bigger Buffers*, *Fin. Times*, Sept. 11, 2014.

272 See 2015 CCP Workplan, *supra* note 257.

multiple clearinghouses around the world could be under stress at the same time.²⁷³

Researchers explain:

From an international perspective, risks can be correlated across CCPs in several jurisdictions. Given the overlapping memberships of many CCPs, liquidity problems at one CCP may well coincide with similar issues at others. A participant bank unable to meet obligations – possibly defaulting and entering resolution – could be a global player active in many centrally cleared financial markets and could therefore be a participant in several CCPs. In the extreme case, the default of common clearing members could threaten the resilience of several CCPs at the same time.²⁷⁴

Such global interdependencies among clearinghouses, their clearing members, and other institutions are an important consideration in thinking about the amount of financial resources necessary to confront the default of a significant clearing member(s).

Increasingly, there are questions about whether the Cover 2 standard might ultimately be insufficient.²⁷⁵ It clearly could be in a systemic crisis. Hence, as this is being written, global policymakers are reviewing the adequacy of the Cover 1/Cover 2 Standard. For example, the Workplan recommends evaluating whether the PFMI's Cover 1/Cover 2 standard is adequate.²⁷⁶

However, tying the level of financial resource sufficiency (Cover) to a specific number of clearing member defaults could inadvertently encourage runs on a clearinghouse.²⁷⁷ Once clearing member defaults approach the stated limit, surviving clearing members will know that the clearinghouse's resources are nearing exhaustion and, therefore, might be incentivized to run from the clearinghouse.²⁷⁸ Any such runs would obviously create significant additional stress for the clearinghouse. Therefore, instead of focusing on the appropriate level of financial cover, an alternative path might be to focus on whether clearinghouses should become regulated utilities or other options

273 See generally JPMorgan Chase & Co., *What is the Resolution Plan for CCPs?* (White Paper, Sept. 2014), <https://www.jpmorganchase.com/corporate/About-JPMC/document/resolution-plan-ccps.pdf>.

274 Domanski et al., *supra* note 178, at 68-69.

275 Coeuré, *supra* note 8 (noting that "Authorities could also conclude that the standards themselves are not sufficiently strict and that there is a need for CCPs to bolster the arrangements that may be used in a pre-recovery stage. This might require CCPs to cover their exposures beyond the "cover 2" standard currently set by the PFMI for systemically important CCPs.").

276 2015 CCP Workplan, *supra* note 257.

277 Pirrong, *Economics of Central Clearing*, *supra* note 7.

278 *Id.*

that explicitly recognize the reality that clearinghouses are almost certain to need government assistance to withstand a systemic crisis.

G. Clearinghouse Capital

A component of the financial resources aggregated to meet the Cover 1/Cover 2 standard generally includes a clearinghouse's own funds or "skin in the game." Clearinghouses have regulatory capital requirements in some jurisdictions such as in the E.U., but there is no similar requirement in the U.S.²⁷⁹ When, if, and in what amounts a clearinghouse's funds should be part of its default waterfall is currently a highly-controversial topic. Most clearinghouses are part of publicly-traded group structures (such as in the case of CME Clearing and the clearinghouses of Intercontinental Exchange). Hence, similar to other financial intermediaries, they have an incentive to undercapitalize themselves as limited liability ultimately caps potential shareholder losses.²⁸⁰ Economists have remarked that clearinghouse capital "tends to be quite modest compared with their prefunded resources, their gross exposures and the scale of their potential losses."²⁸¹ However, the ownership structure of a clearinghouse - whether it is a publicly-traded institution or member-owned institution - is an important consideration to this issue.

Not surprisingly, clearinghouses generally argue against the necessity of additional capital or the need for mandated capital requirements. Clearinghouses state that they are primarily risk managers.²⁸² Furthermore, if a clearinghouse were to contribute too much capital to its default waterfall, then this excess cushion would risk distorting the risk management incentives of its clearing members,²⁸³ thereby creating moral hazard issues. For example, the CME has stated that if it

were to increase its capital contribution to the waterfall to cover the shortfall for the largest potential defaulting clearing member, this would

279 Note that recently finalized rules by the SEC require certain clearinghouses (those designated by the FSOC or clearing products with complex risk profiles) to have equity-funded liquid net assets sufficient to cover the greater of: 1) six months of operating expenses, or 2) its recovery or orderly wind-down. See 17 C.F.R. §240.17Ad-22(e)(15)(ii). The CFTC requires systemically significant and subpart C clearing organizations to have capital sufficient to cover twelve months of operating expenses. 17 C.F.R. §39.11(a)(2) And also equity resources sufficient to cover their recovery and wind down (resolution) plans. 17 C.F.R. §39.39(2).

280 Lubben, *supra* note 199, at 148.

281 Domanski et al., *supra* note 178, at 70.

282 See CME Group, *supra* note 114.

283 See Thomas Murray Data Services, *Skin-in-the-game-How much skin should a CCP put in, if a CCP puts in Skin?* (March 17, 2014), <http://ds.thomasmurray.com/opinion/ccp-focus-skin-game-%E2%80%93-how-much-skin-should-ccp-put-if-ccp-puts-skin>.

allow clearing members to increase their risk exposures by over 40% for the same level of default fund contributions they make today, with CME subsidizing the additional risk with its own funding and reducing the clearing members' skin in the game relative to their risk.²⁸⁴

Additionally, an excessive contribution of capital by the clearinghouse would increase the clearinghouse's exposure to clearing member defaults, which could ultimately adversely impact clearinghouse stability.²⁸⁵

In contrast, clearing members generally support additional amounts of clearinghouse capital within the default waterfall.²⁸⁶ They are concerned that without sufficient "skin in the game," clearinghouses will not have the proper incentives to robustly manage risk.²⁸⁷ Clearing members have suggested that clearinghouses contribute a certain percentage of the default/guarantee fund – for example, 10%²⁸⁸ – to the default waterfall or contribute an amount equivalent to that paid by the clearing member making the largest contribution to the guarantee/default fund.²⁸⁹

In practice, most clearinghouses contribute a certain amount of their own financial resources within their default waterfall(s).²⁹⁰ For example, the CME notes that

CME Clearing has long advocated for meaningful, funded, first-loss contributions to the CCP waterfall, in advance of the mutualized clearing member default fund, and has demonstrated this commitment with its own dedicated capital. CME Clearing maintains capital contributions to each waterfall equal to at least the average of the default fund requirements calculated for its clearing members.²⁹¹

Even if a clearinghouse contributes to its default waterfall, the amount of such funding and its placement within the waterfall can vary.²⁹² In general, such funds are allocated for use after the use of a defaulting clearing member's margin and default fund

284 CME Group, *supra* note 114.

285 See LCH.Clearnet, *supra* note 106.

286 See Philip Stafford, *Clearing houses may face new capital rules*, Fin. Times, Nov. 24, 2014; Philip Stafford, *Clearing house recovery plan urged*, Fin. Times, Oct. 15, 2014; and Mike Kentz, *ICE to boost default funds*, Reuters.com, March 16, 2015.

287 JPMorgan Chase, *supra* note 273.

288 *Id.* (advocating that clearinghouses contribute the greater of 10% of their default fund or an amount equivalent to the contribution made by the largest clearing member to the default fund).

289 Wetjen, *supra* note 238.

290 Thomas Murray Data Services, *supra* note 283 (noting that "For some years now, Skin-in-the-Game has become global best practice, with the vast majority of CCPs placing some capital ahead of non-defaulting clearing members.").

291 CME Group, *supra* note 114.

292 See Wetjen, *supra* note 238.

contribution and before the use of the default fund contributions of non-defaulting clearing members²⁹³ as in the case of the CME. Indeed, economists have argued that such placement is needed to incentivize robust risk management.²⁹⁴

International policymakers have suggested mandating a minimum requirement for a clearinghouse's capital contribution to its default waterfall.²⁹⁵ Some have also noted the possibility of extending the "total loss absorbing capacity" or "TALC" minimum requirement for systemically significant banks to clearinghouses.²⁹⁶ In the E.U. (under EMIR), clearinghouses are required to have at least 25% of their own, minimum capital requirement in their default waterfall ahead of the capital of non-defaulting clearing members.²⁹⁷ LCH.Clearnet argues that this capital requirement is significant and effects an "appropriate alignment" of incentives.²⁹⁸

In discussing clearinghouse capital, it is important to remember that clearinghouses can become distressed as a result of a clearing member(s) default and also because of operational, business, or investment issues. Importantly, however, the financial resources (except any clearinghouse capital) of the default waterfall are not generally available to a clearinghouse in these latter circumstances. In demutualized ownership structures, clearing members primarily bear the risk of clearing member default(s) whereas the clearinghouses itself bears its operational, business, collateral, and liquidity risks.²⁹⁹ For this reason, the E.U. requires clearinghouses to hold capital against the risks of their operational, business, and investment activity risks.³⁰⁰ In the U.S., there is currently no comparable clearinghouse requirement. Hence, some policymakers have suggested that clearinghouses should be required to clearly state how they would pay for any non-clearing member default related losses.³⁰¹

293 See Louise Carter and Megan Garner, *supra* note 131. The authors note that although many clearinghouses have taken this route, it is not universal. For example, Japan Securities Clearing Corporation (JSCC) contributes a first level of capital and then an additional level concurrent with the use of non-defaulting clearing members default fund contributions.

294 Pirrong, *Economics of Central Clearing*, *supra* note 7; see also Darrell Duffie, *Resolution of Failing Central Counterparties*, in *Making Failure Feasible* (eds. Thomas Jackson, Kenneth E. Scott, and John B. Taylor, 2015).

295 See Wetjen, *supra* note 238; see also Philip Stafford, *Clearing houses may face new capital rules*, *Fin. Times*, Nov. 24, 2014.

296 See Philip Stafford, *Clearing houses may face new capital rules*, *Fin. Times*, Nov. 24, 2014.

297 Coeuré, *supra* note 8. A recent news report cited Steven Maijoor, Chairman of the European Securities and Markets Authority, as saying that clearinghouses would not be required by ESMA to put additional skin in the game. Philip Stafford, *European clearers pass first continent-wide stress tests*, *Fin Times*, April 29, 2016.

298 LCH.Clearnet, *supra* note 106.

299 *Id.*

300 *Id.*

301 Wetjen, *supra* note 238, states that "...I believe that all CCPs should be required to articulate...how they would cover losses that are not related to a participant default."

H. Stress Testing

Another area of clearinghouse risk management lacking standardization and extensive transparency is clearinghouse stress-testing. The general purpose of stress tests is to test the clearinghouse's resiliency in various scenarios to credit and liquidity risk. Importantly, liquidity risk can morph into credit risk in the clearinghouse context.³⁰² As in the case of margin methodology calculations, no standardized stress testing framework exists to vet the strength of global clearinghouses' financial resources or liquidity arrangements.³⁰³ For example, the PFMI discusses and recommends stress testing. And regulators such as the SEC and CFTC require daily stress testing of a clearinghouse's financial resources.³⁰⁴ But individual clearinghouses are generally responsible for key determinations such as stress-testing scenarios and models (including the parameters and assumptions). Policymakers have suggested that greater standardization of stress testing frameworks might be appropriate.³⁰⁵ Some clearing members have also advocated for "regulatory-driven, transparent and rigorous stress tests."³⁰⁶ Certain systemically important clearinghouses such as LCH.Clearnet have recently published white papers on potential approaches to standardized clearinghouse stress testing.³⁰⁷

The Workplan recommends a review of clearinghouse stress testing practices and the possibility of a standardized stress-testing framework, potentially with a supervisory component.³⁰⁸ In practice, regulators are becoming increasingly involved in clearinghouse stress tests.³⁰⁹ The European Markets and Securities Authority (ESMA) began annual clearinghouse stress testing at the end of April 2016³¹⁰ and announced that the tested clearinghouses had passed their basic tests.³¹¹ Importantly, however,

302 See David Marshall and Robert Steigerwald, *The Role of Time Critical Liquidity in Financial Markets*, Federal Reserve Bank of Chicago Economic Perspectives 2Q (2013).

303 See generally 2015 CCP Workplan, *supra* note 257.

304 See 17 C.F.R. §240.17Ad-22(e)(4)(vi)(A). This SEC regulation applies to clearinghouses designated by the FSOC as systemically significant and also to those clearing products with complex risk profiles. Similarly, the CFTC's 17 C.F.R. §39.36(a)(1) applies to systemically significant and subpart C derivatives clearing organizations.

305 See Wetjen, *supra* note 238.

306 JPMorgan Chase, *supra* note 273, at 5.

307 LCH.Clearnet, *Stress this House: A Framework for the Standardised Stress Testing of CCPs* (White Paper, March 2015), <http://www.lch.com/documents/731485/2007685/Stress+this+house+new.pdf/>.

308 2015 CCP Workplan, *supra* note 257.

309 See Katy Burne, *Central Bankers in Europe Put Clearinghouses to the Test*, Wall S.J., Feb. 4, 2016 (noting the Bank of England, the German Bundesbank, and the Federal Financial Supervisory Authority's involvement in exercises simulating hypothetical clearing member defaults at SwapsClear and Eurex Clearing). In a recent speech, Timothy Massad also stated that the CFTC, in conjunction with other international regulators, are looking at issues related to clearinghouse "recovery, resolution and crisis management planning" such as stress-testing, *supra* note 233.

310 Philip Stafford, *Europe to conduct clearing house stress tests*, Fin. Times, April 14, 2016.

311 Philip Stafford, *European clearers pass first continent-wide stress tests*, Fin. Times, April 29, 2016; see also Viktoria Dendrinou, *European Clearinghouses Deemed Capable of Withstanding Stress*, Wall S.J., April 29, 2016.

these stress tests did not include liquidity risk.³¹² The CFTC also recently reported results of clearinghouse stress tests.³¹³ Similarly, these stress tests did not include liquidity risk.³¹⁴ Liquidity risk is likely the most significant risk in the clearinghouse context. Stress tests should incorporate the fact that demands by clearinghouses for significant amounts of liquidity are likely to occur in times of market stress when liquidity is scarce.³¹⁵

A standardized stress test for clearinghouses could be beneficial. It should promote a greater understanding of the financial robustness of significant clearinghouses across the global landscape. It would likely also lead to greater transparency of such tests and also improve clearing member's ability to assess the risk of their clearinghouse exposures.³¹⁶ Without a standardized approach, however, additional transparency could be counterproductive because it would be difficult to make comparisons among clearinghouses using diverse testing methodologies, assumptions, risk scenarios etc.³¹⁷ Standardization could also hamper improvements and innovations in the testing process, in addition to providing an incentive for clearinghouses to “teach to the test” rather than to focus on overall improvements to risk management.³¹⁸

In both the U.S. and the E.U., systemically significant banks are subject to periodic stress testing by their supervisory authorities.³¹⁹ Given their systemic importance, it seems appropriate similarly to subject clearinghouses to regulator-driven testing. Unlike in some other jurisdictions (for example, the E.U.), the U.S.'s current approach to bank stress testing does not include network considerations.³²⁰ Policymakers have suggested connecting clearinghouse stress testing to stress testing for global banks.³²¹ Undoubtedly, significant clearinghouses, global banks and financial institutions are

312 See Philip Stafford, *European clearers pass first continent-wide stress tests*, *Fin. Times*, April 29, 2016; see also Viktoria Dendrinou, *European Clearinghouses Deemed Capable of Withstanding Stress*, *Wall S.J.*, April 29, 2016.

313 See *CFTC Staff Issues Results of Supervisory Stress Test of Clearinghouses*, Nov. 16, 2016, <http://www.cftc.gov/PressRoom/PressReleases/pr7483-16>.

314 *Id.*

315 See generally Craig Pirrong, *On Net, This Paper Doesn't Tell Us Much About What We Need to Know About the Effects of Clearing*, *Streetwise Professor Blog*, Aug. 20, 2016 (noting that “The main concern about clearing and collateral mandates (including variation margin) is that they can cause huge increases in the demand for liquidity precisely at times when liquidity dries up.”).

316 Banks such as JPMorgan Chase state that “it remains challenging to understand how resources are sized since CCPs do not share their stress scenarios and associated inputs and methodologies with members or members' clients.” JPMorgan Chase, *supra* note 273.

317 Wetjen, *supra* note 238.

318 *Id.*

319 Section 165(i) of Dodd-Frank, *supra* note 11, mandates stress testing for non-bank financial institutions supervised by the Federal Reserve and certain bank holding companies.

320 Cetina et al., *supra* note 68.

321 See Coeuré, *supra* note 8.

highly interconnected as discussed above. Hence, it is crucial to understand how a stressed clearinghouse(s) could impact the global banking system (and vice versa).

I. Living Wills

Dodd-Frank requires resolution plans or “living wills” for financial institutions supervised by the Federal Reserve and bank holding companies with assets greater than \$50 billion.³²² Living wills are designed to provide regulators a blueprint for resolving such institutions. A similar requirement would seem appropriate to assist authorities in the resolution of a significant clearinghouse.³²³ The Bank of England is focused on developing living wills for clearinghouses in its jurisdiction.³²⁴ Clearinghouse crisis management, recovery, and resolution is a policy priority among international policymakers. Significant clearinghouses are in the midst of discussions with policymakers about these issues.³²⁵ Such conversations should include living wills.

J. Investment Practices

Clearinghouse investment practices are a critically important risk management consideration. The distress, default, or insolvency of a clearinghouse’s investment counterparty could trigger its own distress.³²⁶ Such investment also creates market exposure for clearinghouses because invested principal amounts must be returned to clearing members (and their customers) regardless of any decrease in an investment’s value.³²⁷ Both the CFTC and the SEC regulate clearinghouses’ investment of the margin collateral of clearing members and their clients. These regulations require that investments be made “in instruments with minimal credit, market, and liquidity risks”³²⁸ and “in a manner which minimizes the risk of loss or of delay in the access.”³²⁹ Market participants have urged the SEC to provide “additional guidance” for clearinghouse

322 See Dodd-Frank Section 165(d), *supra* note 11.

323 Market participants have also advocated “living wills” for clearinghouses, in addition to “play books” for regulators. See The Clearing House and ISDA, *supra* note 202.

324 See Philip Stafford, *BoE set to review market risk managers*, Fin. Times, March 6, 2016.

325 See Massad, *supra* note 235 (noting that regulators are “working with the major clearinghouses to review their recovery plans and rule changes, and are engaged in discussion with them and other market participants on how significant problems would be handled”).

326 See The Bank of England, *Financial Stability Report* (Dec. 2011) (noting that the investment of clearinghouse margin and default fund resources creates risk).

327 See *id.*

328 17 C.F.R. §39.15(e). This regulation applies to derivatives clearing organizations. A similar regulation for SEC-regulated clearing agencies can be found at 17 C.F.R. 240.17Ad-22(d)(3).

329 17 C.F.R. §39.15(c). This regulation applies to derivatives clearing organizations.

investment practices.³³⁰ In Regulation 1.25, the CFTC has somewhat narrowed such investment discretion for customer funds – and the funds of significant clearinghouses³³¹ – by delineating permitted investments (including provisions addressing money market mutual funds and repurchase agreements), related general terms and conditions, concentration limits, maturity considerations, and similar issues.³³²

Clearinghouse investment not only creates risk, but also increases both the interconnectedness of the financial system and the likelihood that a clearinghouse will need central bank assistance in a crisis. For example, under CFTC Regulation 1.25, a clearinghouse can invest up to 25% of its segregated assets in an individual money market mutual fund family.³³³ This represents a potentially enormous sum. Investments in money market mutual funds by derivatives clearing organizations are generally limited to those where a redemption of interest would be paid by the following business day.³³⁴ However, clearinghouses require time-critical liquidity (often in terms of hours). Such next day liquidity would almost certainly be too late in a crisis. Additionally, CFTC Regulation 1.25 lists many exceptions to this next business day requirement that would permit further redemption delays, including emergencies and an order by the SEC.³³⁵ In sum, distress by a significant money market mutual fund investment counterparty would represent a critical risk to the clearinghouse's stability. In turn, a significant redemption by a clearinghouse could risk a money market mutual fund's stability.

K. Cybersecurity

Finally, policymakers' focus on the cybersecurity of clearinghouses is escalating rapidly. As noted, risks to a clearinghouse's stability include not only a clearing member(s) default, but also potential operational, business, or investment issues. A successful cyberattack could threaten a clearinghouse's critical operations. In June 2016, the Committee on Payments and Market Infrastructures and the International Organi-

330 See letter from The Clearing House to the Securities Exchange Commission (May 27, 2014) (arguing that “the Commission should provide additional guidance regarding the specific protections a covered clearing agency must employ to safeguard participants' collateral and invest such collateral in instruments with minimal credit, market and liquidity risk”), <https://www.sec.gov/comments/s7-03-14/s70314-18.pdf>.

331 See 17 C.F.R. §39.36(f). This regulation applies to systemically significant and subpart C derivatives clearing organizations.

332 See 17 C.F.R. §1.25 and 17 C.F.R. §39.15(e).

333 17 C.F.R. §1.25(b)(3)(ii).

334 17 C.F.R. §1.25(c)(5)(i).

335 See 17 C.F.R. §1.25(c)(5)(ii).

zation of Securities Commissions released *Guidance on cyber resilience for financial market infrastructures*.³³⁶ This guidance is intended to supplement (not replace) PFMI standards related to operational risk, including cyber risk.³³⁷ Importantly, it recommends that financial market infrastructures such as clearinghouses be able to recover and resume essential operations within two hours of a cyberattack operational disruption and perform same-day completion of settlement obligations “in the case of extreme but plausible scenarios.”³³⁸

PART IV: CLEARINGHOUSE RECOVERY AND RESOLUTION

This Part explores what happens if, despite enhanced risk-management measures, a systemically significant clearinghouse becomes distressed or fails due to a clearing member(s)’s default, operational issues, or investment problems. Accordingly, this discussion now turns to a top policy focus in the clearinghouse context: recovery and resolution.

A. The Reality of Clearinghouse Distress and Failure

Although a rare event, clearinghouses have failed.³³⁹ For example, in December 1987, the Hong Kong Futures Exchange Clearing Corporation failed.³⁴⁰ Its impact was significant: “[b]asically, Hong Kong’s securities markets all stopped, affecting households and firms well beyond the community who had had positions in stock-index futures.”³⁴¹ And just months before, during the October 1987 market crash, the Federal Reserve provided significant liquidity assistance to the U.S. banking system and strongly encouraged banks to lend (for example, to clearing members). Economist Craig Pirrong explains that:

[t]he closest that US CCPs have come to default in modern times occurred when some large members of futures and options CCPs members [sic] faced acute funding strains during the Crash of 1987. To alleviate these

336 See Committee on Payments and Market Infrastructures and the International Organization of Securities Commissions, *Guidance on cyber resilience for financial market infrastructures* (June 2016), <http://www.bis.org/cpmi/publ/d146.htm>.

337 *Id.*

338 *Id.* Note that the CFTC already requires systemically significant and subpart C derivatives clearing organizations to be able to recover within two hours from an operational disruption. See 17 C.F.R. §39.34(a).

339 See Pirrong, *Economics of Central Clearing*, *supra* note 7.

340 *Id.*

341 Tucker, *Are Clearing Houses*, *supra* note 119.

strains, the Federal Reserve (indirectly) provided liquidity to broker-dealers and futures commissions merchants. Absent such liquidity, there was a serious risk of CCP failure.³⁴²

In December 2013, a Korean securities firm on the Korea Exchange defaulted due to derivatives related losses.³⁴³ To manage this default, the clearinghouse ultimately used the funds of non-defaulting clearing members, which got their attention.³⁴⁴ Clearing members realized that such losses, though small, could similarly occur at the many other international clearinghouses where they were also members.³⁴⁵ Even if relatively small, simultaneous losses at multiple global clearinghouses – recall that JP Morgan Chase is a clearing member at over 70 clearinghouses around the world – could be highly significant. Additionally, some non-defaulting clearing members took several months to meet capital calls (that were due within a month) by the Korea Exchange clearinghouse.³⁴⁶ Hence, even if a clearinghouse has the right to make additional assessments/capital calls on non-defaulting clearing members to manage a clearing member default, clearing members might not meet their obligations in a timely manner. This would almost certainly be highly problematic for the clearinghouse.

B. Introduction to Recovery and Resolution

Given the global clearing mandates and the resultant increased concentration of risk in significant clearinghouses, few doubt that the failure of a significant international clearinghouse could be “catastrophic.”³⁴⁷ Not surprisingly, therefore, policymakers have stated that “[b]ecause FMUs [financial market utilities such as clearinghouses] provide critical services to the industry, experiencing a major disruption that could lead to resolution—or dissolution—is *unacceptable*.”³⁴⁸ Clearinghouses and market

342 Pirrong, *Economics of Central Clearing*, *supra* note 7, at 40.

343 Wetjen, *supra* note 238. Importantly, economists have cited this situation as an example of insufficient transparency in the default waterfall. See Singh, *Limiting Taxpayer Puts*, *supra* note 111.

344 Wetjen, *supra* note 238.

345 *Id.*

346 Darrell Duffie, *Resolution of Failing Central Counterparties*, in *Making Failure Feasible* (eds. Thomas Jackson, Kenneth E. Scott, and John B. Taylor, 2015). [hereinafter *Resolution*].

347 See for example Coeuré, *supra* note 8.

348 Emphasis added. Sarah Dahlgren, Executive Vice President of the Financial Institution Supervision Group of the Federal Reserve Bank of New York, *More resilient, better managed, less complex – strengthening FMUs and linkages in the system*, Speech at the Securities Industry and Financial Markets Association Conference (April 29, 2014).

participants likewise argue that continuity of essential clearing services is critical.³⁴⁹ Resolution risks loss of critical clearing services, financial contagion to systemically significant clearing members and others, and fire sales (of collateral and/or derivative contracts),³⁵⁰ and market closures (for the product(s) cleared).³⁵¹ Increasingly, continuity of services is seen as the “default objective of resolution.”³⁵² This arguably blurs the lines between traditional notions of recovery and resolution.

As of this writing, international policymakers are focused on clearinghouse recovery and resolution. Recovery and resolution should not be viewed as distinct. An unsuccessful recovery effort would almost certainly be followed by resolution. In the case of a significant clearinghouse, either process would require substantial cross-border cooperation as most have operations in multiple jurisdictions. For example, LCH.Clearnet Group operates in the U.S., UK, and France, it has clearing members from more than twenty nations, and it clears multiple asset classes in multiple currencies.³⁵³ Though critical, however, international regulatory coordination has not always been seamless in the clearinghouse arena.³⁵⁴ Coordination could also be required with: the recovery/resolution plans of clearing members;³⁵⁵ linked clearinghouses, particularly if shared financial exposures exists;³⁵⁶ and the potential simultaneous execution of recovery/clearing processes by other clearinghouses.³⁵⁷

Procedures for both clearinghouse recovery and resolution are still early-stage, particularly in the latter case. Only one example of a clearinghouse resolution – the Hong Kong Futures Guarantee Corporation – exists,³⁵⁸ but it involved financial futures. The resolution of an OTC derivatives clearinghouses has been termed “unchartered

349 For example, see JPMorgan Chase, *supra* note 273 (stating that “[m]aintaining critical operations of the CCP should be the driving principal in default”); see also LCH.Clearnet, *supra* note 106, at 24 (arguing that “The objective of the resolution authorities should be to provide continuity of clearing services.”).

350 See Duffie, *Resolution*, *supra* note 346.

351 Pirrong, *Economics of Central Clearing*, *supra* note 7.

352 The Clearing House and ISDA, *supra* note 202, at 5.

353 LCH.Clearnet, *supra* note 106.

354 For example, it took the EU and the U.S. several years to negotiate the recognition of the equivalence of their respective clearinghouses. See *EU, U.S. Reach Agreement on Derivatives Oversight*, Wall S.J., Feb. 10, 2016; see also Baker, *When Regulators Collide*, *supra* note 33; Sean J. Griffith, *Substituted Compliance and Systemic Risk: How to Make a Global Market in Derivatives Regulation*, 98 Minn. L. Rev. 1291 (2014); and Yesha Yadav and Dermot Turing, *The Extra-Territorial Regulation of Clearinghouses* (Vanderbilt Law and Economics Research Paper No. 15-24, Sept. 2015).

355 LCH.Clearnet, *supra* note 106; also see generally The Clearing House and ISDA, *supra* note 202.

356 Committee on Payments and Market Infrastructures and Board of the International Organization of Securities Commissions, *Recovery of financial market infrastructures* §2.4.14 (Oct. 2014) [hereinafter *Recovery of FMI*].

357 *Id.* at §2.5.4.

358 See Cox and Steigerwald, *supra* note 179, at FN18 (stating that “To date, there has only been one known resolution proceeding involving a CCP: the Hong Kong government’s ad hoc effort to restore the Hong Kong Futures Guarantee Corporation in 1987.”).

territory.”³⁵⁹ Thus far, proposals for recovery and resolution processes share many commonalities such as use of variation margin haircutting and contract tear-up (discussed below). A key distinction between these approaches is whether a clearinghouse’s contractual arrangements are followed or whether a superseding external administrative resolution procedure occurs.³⁶⁰ Indeed, policymakers have referred to recovery as “the ability of an FMI [for example, a clearinghouse] to recover from a threat to its viability and financial strength so that it can continue to provide its critical services without requiring the use of resolution powers by authorities.”³⁶¹

In the U.S., systemically significant clearinghouses regulated by the CFTC or by the SEC must have recovery and wind-down (resolution) plans.³⁶² The U.S. arguably does not yet have a statutory framework for clearinghouse resolution.³⁶³ In the U.K., clearinghouses are required to have both recovery plans and loss allocation rules (for losses due to clearing member default and non-default occurrences).³⁶⁴ The E.U. Commission is formulating legislative proposals for clearinghouse resolution.³⁶⁵ The PFMI require that clearinghouses have recovery or orderly wind-down plans.³⁶⁶ The Workplan recommends considering “more granular standards or guidance” for clearinghouse recovery and listed “resilience, recovery planning, and resolvability” as “substantive priorities” for clearinghouses.³⁶⁷ The Financial Stability Board has formulated “Key Attributes of Effective Resolution Regimes for Financial Institutions,” including specific guidance on the resolution of financial market utilities such as clearinghouses.³⁶⁸

C. Clearinghouse Recovery

Several tools exist to assist the recovery of a distressed clearinghouse. Such measures can be grouped into five categories: 1) “Tools to allocate uncovered losses caused by participant default,” including additional assessments, variation margin haircutting,

359 Singh, *Limiting Taxpayer Puts*, *supra* note 111.

360 See Duffie, *Resolution*, *supra* note 346.

361 Recovery of FMI, *supra* note 356, at 1.1.1.

362 See 17 C.F.R. §39.39 and 17 C.F.R. §240.17Ad-22(e)(3)(ii).

363 As discussed below, the author does not think that Dodd-Frank’s Title II Orderly Liquidation Authority is applicable to clearinghouses.

364 The Bank of England, *The Bank of England’s Supervision of Financial Market Infrastructures – Annual Report* (March 2016), <http://www.bankofengland.co.uk/publications/Documents/fmi/annualreport2016.pdf>.

365 Coeuré, *supra* note 8.

366 See Principle 3: Framework for the Comprehensive Management of Risks of the PFMI, *supra* note 142.

367 2015 CCP Workplan, *supra* note 257.

368 Financial Stability Board, *Key Attributes of Effective Resolution Regimes for Financial Institutions* (Oct. 2014) [hereinafter *Key Attributes*].

use of initial margin, and other options using clearing member collateral and clearinghouse capital; 2) “Tools to address uncovered liquidity shortfalls,” involving sourcing liquidity from clearing members or external third-parties; 3) “Tools to replenish financial resources,” including additional assessments and recapitalization; 4) “Tools for CCPs to re-establish a matched book following participant default,” including involuntary allocation of contracts or termination of contracts; and 5) “Tools to allocate losses not caused by participant default,” including the clearinghouse’s capital, recapitalization, insurance, other options.³⁶⁹

This fifth category is critical. If a clearinghouse’s distress is the result of business, operational, legal, or investment problems, it must have sufficient financial resources (capital) of its own to address such issues.³⁷⁰ Clearinghouses typically have very little capital. Hence, clearinghouses should consider entering insurance and/or indemnity arrangements, in addition to having a recapitalization plan, to manage such risks.³⁷¹ Otherwise, the clearinghouse will likely require government assistance because it cannot use the resources of its clearing members to cover such losses.

It would be helpful for all clearinghouses to clearly delineate recovery tools and their anticipated use within their rulebooks.³⁷² This should provide additional certainty to clearing members regarding possible recovery procedures and increase their ability to manage such risk. Emergency provisions within a clearinghouse’s rulebook should still provide it with significant flexibility to deviate from such anticipated uses if necessary. A delicate balance exists between the breathtaking flexibility provided to some clearinghouses by their emergency rulebook provisions and clearing members’ reasonable needs for transparency and predictability. Seven commonly discussed risk-management options to facilitate recovery or resolution are discussed below.³⁷³

First, a clearinghouse could make additional capital calls or “assessments” on its clearing members to increase available financial resources. Clearing member(s) who

369 Recovery of FMI, *supra* note 356, at 4.1.2.

370 The SEC requires clearinghouses designated by the FSOC or those clearing products with more complex risk profiles to have recovery and orderly wind-down plans that cover “credit losses, liquidity shortfalls, losses from general business risk, or any other losses.” 17 C.F.R. 240.17Ad-22(e)(3)(ii).

371 See Recovery of FMI, *supra* note 356.

372 Duffie, *Resolution*, *supra* note 346, at 7, notes that “When the default guarantee fund is revealed to be inadequate, and when it is deemed appropriate to attempt recovery through further contractual loss sharing rather than resolution, there seems to be no persuasive reason to switch to a preference for unequal and unpredictable loss sharing.”

373 For more background on such tools, see generally Recovery of FMI, *supra* note 356.

fail to pay such assessments would be in default.³⁷⁴ The amount of such assessments is typically linked to a clearing member's default fund contribution. However, such capital calls can also be for uncapped amounts,³⁷⁵ which could incentivize a clearing member's clients to run.³⁷⁶ Although typically delineated in a clearinghouse's rulebook, it is unclear how helpful such assessments would be in a financial crisis. When markets are in turmoil, bank and financial institution liquidity – clearing members' liquidity – is likely to be under severe strain. Meeting additional assessment obligations would increase any liquidity strains such institutions were already experiencing, possibly triggering their own default. Such assessments could also incentivize clearing members to strategically breach their arrangements with the clearinghouse.³⁷⁷ Hence, it is foreseeable that regulators might even discourage a clearinghouse from making such assessments. Multiple international clearinghouses could make additional assessments simultaneously.³⁷⁸ Were this to happen, institutions who were clearing members at multiple of these clearinghouses would almost certainly experience liquidity strains.

Second, a clearinghouse could haircut (hold back) any variation margin gains it owed to clearing members to increase its financial resources. However, clearing members with variation margin losses would still be required to pay such funds to the clearinghouse. Assuming it held onto all such gains, the clearinghouse should be able to cover the loss created by a clearing member in default.³⁷⁹ Additional costs might be involved however in reestablishing a matched book.³⁸⁰ A clearinghouse unable to rebalance its positions through this method could be insolvent and not just illiquid.³⁸¹ Variation margin haircutting is similar to a bankruptcy approach because a clearinghouse's creditors (those owed variation margin) would receive less than the full value of their claim (if anything at all).³⁸² Figures 6-7 illustrate this similarity.³⁸³ It demonstrates a case in which the default of clearing member "D" leaves the clear-

374 CME Group, *supra* note 114.

375 JPMorgan Chase, *supra* note 273.

376 Pirrong, *Economics of Central Clearing*, *supra* note 7.

377 See generally Nosal, *supra* note 53, at 141 (discussing the possibility that financially vulnerable counterparties might decide to strategically breach their contracts in order to "allow it to 'live' for another day or become stronger").

378 See JPMorgan Chase, *supra* note 273.

379 See Recovery of FMI, *supra* note 356, at 4.2.18.

380 See *id.* at 4.2.22.

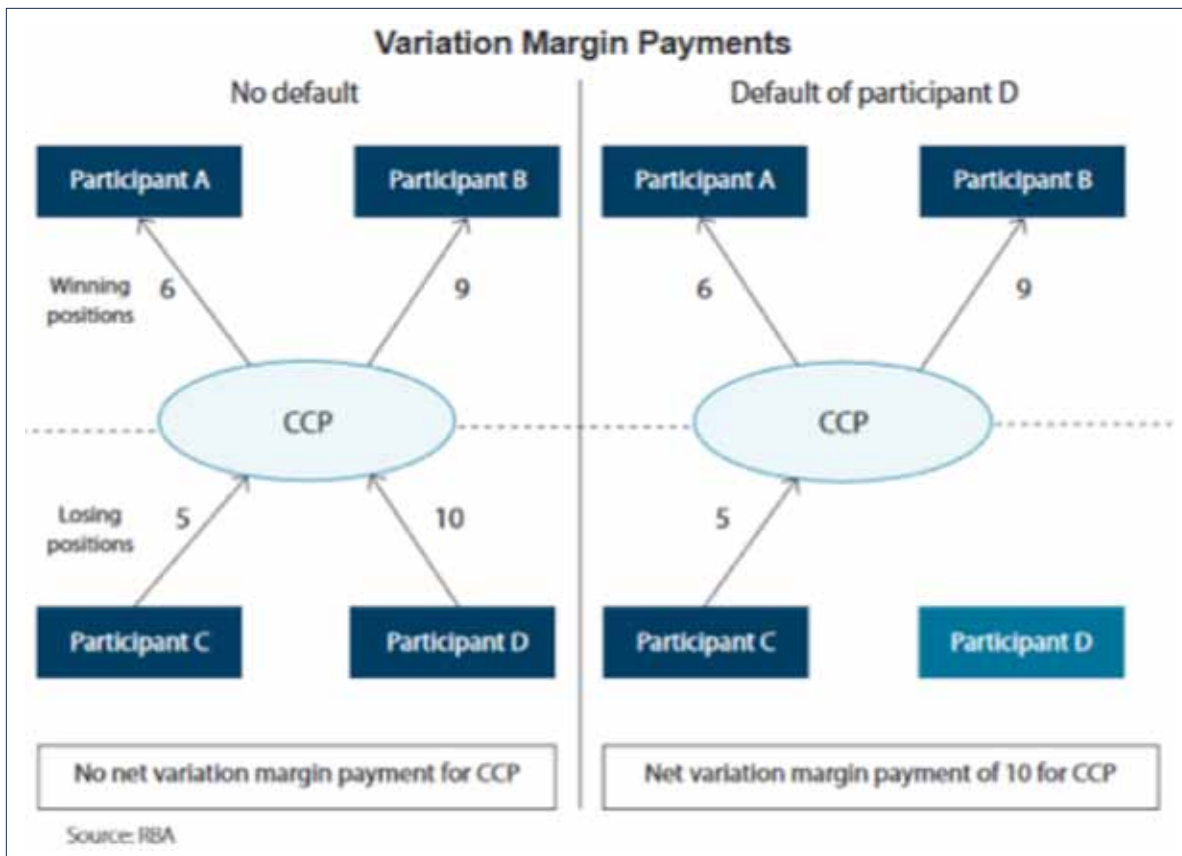
381 Singh, *Limiting Taxpayer Puts*, *supra* note 111.

382 Pirrong, *Economics of Central Clearing*, *supra* note 7.

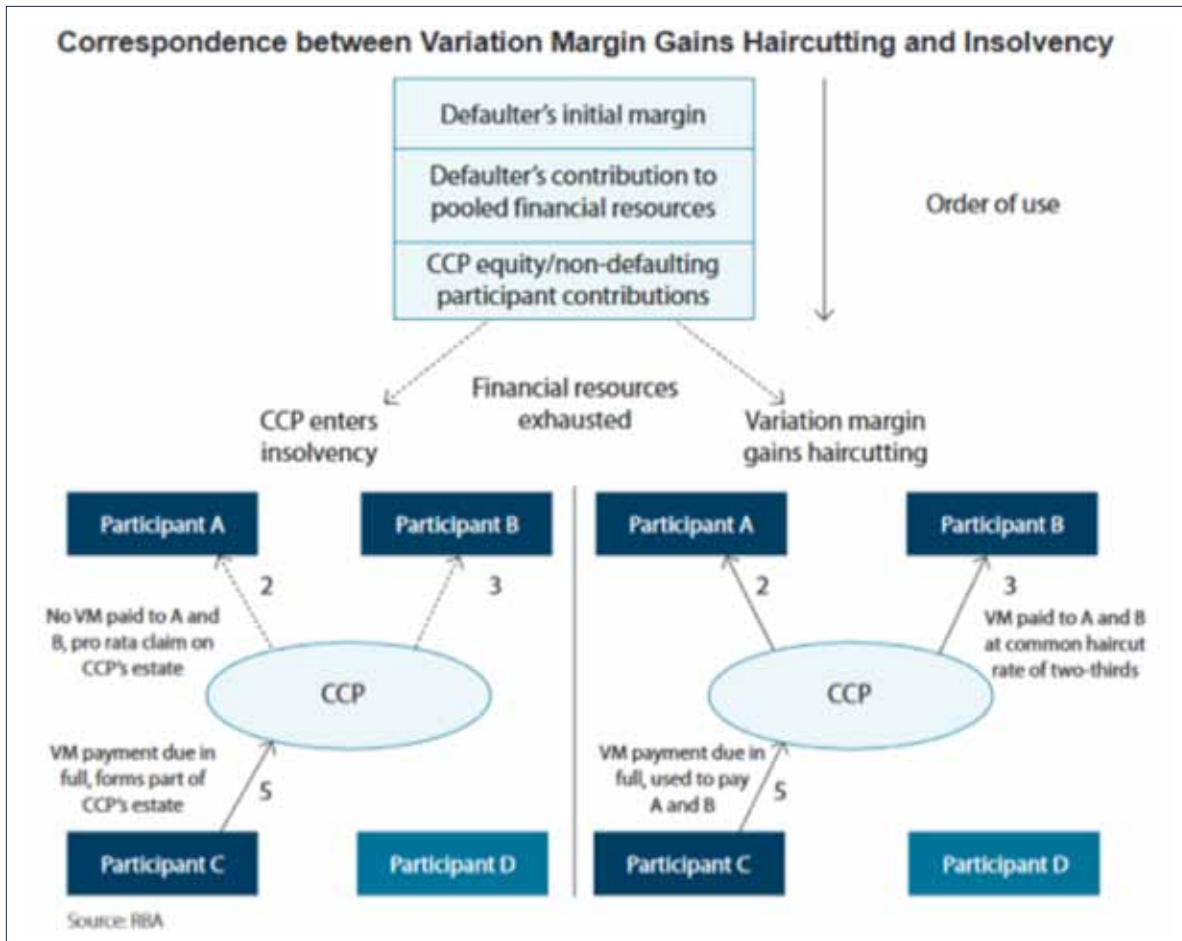
383 Figures 6-7 and its illustrative example is from Matt Gibson, *Recovery and Resolution of Central Counterparties*, Bulletin of the Reserve Bank of Australia (Dec. 2013).

inghouse with a shortfall of 10 units of incoming variation margin. Nevertheless, the clearinghouse has 15 units of variation margin obligations to pay to clearing members “A” and “B.” Therefore, the clearinghouse haircuts the variation margin owed to clearing members A and B by two-thirds to cover this loss.

FIGURES 6-7³⁸⁴



384 *Id.*



An advantage of variation margin haircutting is that it does not require clearing members to supply additional liquidity and it limits their losses. The possibility of variation margin haircutting could also give clearing members an additional incentive to focus on clearinghouse governance and risk management practices to avoid such losses.³⁸⁵ However, this approach does have disadvantages. Losses from such haircuts would be unequal and random, impacting a clearing member’s ex-ante risk management ability.³⁸⁶ Clearinghouses could compensate such losses with debt or equity.³⁸⁷ Additionally, a clearing member relying upon the receipt of its variation margin gains

³⁸⁵ See Singh, *Limiting Taxpayer Puts*, *supra* note 111.

³⁸⁶ See Coeuré, *supra* note 8.

³⁸⁷ Duffie, *Resolution*, *supra* note 346; see also *Recovery of FMI*, *supra* note 356, at 3.4.7 (noting that “Participants may be more willing to share in losses if the FMI [for example, a clearinghouse] provides them with some form of compensating instrument proportionate to the size of the loss they incur.”)

to meet other payment obligations could face liquidity strains and potential default risk without receipt of such funds. Such liquidity stress could lead to asset liquidations, potentially creating fire sales having adverse pricing effects, impacting clearinghouse margin valuations and ultimately even clearinghouse stability.³⁸⁸

Where permitted by law, a clearinghouse could haircut initial margin to increase its financial resources.³⁸⁹ Such haircuts could be proportionate to a clearing member's contribution to the clearinghouse's total pool of initial margin. Clearing members would then need to replenish their initial margin to required levels or reduce their positions.³⁹⁰ Clearinghouses and clearing members purportedly dislike this approach.³⁹¹ For example, a recent joint paper by The Clearing House and ISDA states that "Under no circumstances should initial margin...haircutting...be permissible in CCP resolution (or by CCPs as a recovery tool)."³⁹²

Third, clearing members could voluntarily (or involuntarily) assume some (or all) of a defaulted clearing member's portfolio.³⁹³ Voluntary allocations could occur through an auction or through ex-ante agreements (though there would be a risk of breach). A clearinghouse could also create economic incentives to encourage such voluntary assistance.³⁹⁴ If clearing members assume a defaulted clearing member's portfolio, this should minimize (or eliminate) the number of positions needing to be closed-out to manage the default and also minimize any impact on pricing. Involuntary allocations could be problematic because clearing members generally clear (or have expertise in) certain products and are positioned to perform related risk management measures.³⁹⁵

Fourth, clearinghouses could "tear-up" some/all of their contracts³⁹⁶ by a closeout of some/all open contracts at a specified price. This step could return the clearinghouse to a matched book, but it could be a problematic solution. A partial tear-up could

388 See JPMorgan Chase, *supra* note 273.

389 Recovery of FMI, *supra* note 356, at 4.2.24, notes that "In many jurisdictions, the legal or regulatory frameworks protect initial margin from being used to cover obligations other than those of the participant that posted it."

390 *Id.* at 4.2.25.

391 See Duffie, *supra* note 346 (stating that "It is not clear why many CCPs and clearing members prefer to use VMGH [variation margin gains haircutting] or tear-ups rather than to adjust their clearing agreements so as to allow legal end-of-waterfall access to initial margin funds").

392 The Clearing House and ISDA, *supra* note 202.

393 See Coeuré, *supra* note 8.

394 Recovery of FMI, *supra* note 356, at 4.5.3.

395 See Coeuré, *supra* note 8.

396 2015 CCP Workplan, *supra* note 257.

disrupt clearing members' netting of their positions.³⁹⁷ Additionally, neither clearing members nor their clients might have any control over which contracts were torn up, but would nevertheless face replacement cost risk.³⁹⁸ A tear-up of contracts (partial or complete) would risk widespread market disruptions.³⁹⁹ Given the small number of systemically significant clearinghouses, a complete tear-up of contracts could essentially closeout the entire market for a product(s). The impact would resemble the closure/wind-down of the clearinghouse, falling short of the goal of recovery: the continuation of critical services.⁴⁰⁰

Fifth, a clearinghouse could have ex-ante funding arrangements in place with third parties to assist in its recovery or resolution. For example, clearinghouses could enter into insurance agreements or sell bail-in securities.⁴⁰¹ Some clearinghouses have argued, however, that bail-in arrangements would not work well in the clearinghouse context because their capital structure has traditionally not used debt and relied on highly liquid assets.⁴⁰² Additionally, it is unclear that a robust market would exist for such instruments.⁴⁰³ Banks or financial institutions with a close connection to a clearinghouse(s) – such as clearing members – should not be permitted to buy such instruments (were they to be available) or provide insurance to the clearinghouse.

Sixth, a clearinghouse could use the margins of clearing members' clients (indirect clearing participants). The advantages to this approach would be similar to those found in haircutting the margin of clearing members. However, this solution would also have serious disadvantages. The clients of clearing members have no contractual relationship with the clearinghouse or role in its governance.⁴⁰⁴ Hence, this approach would create concerns about moral hazard, fairness, and potential future litigation. Were this solution to be elected, it should be adopted ex-ante so that clearing members' clients are on notice of this risk and able to undertake appropriate risk management.

Finally, central bank liquidity could be made available to assist solvent clearinghouses. The line between liquidity and solvency in a financial crisis, however, is often

397 Recovery of FMI, 356, at 4.5.12.

398 *Id.* at 4.5.18-19.

399 Coeuré, *supra* note 8.

400 See Recovery of FMI, *supra* note 356, at 4.5.16.

401 Coeuré, *supra* note 8.

402 LCH.Clearnet, *supra* note 106.

403 See Coeuré, *supra* note 8.

404 *Id.*

unclear.⁴⁰⁵ Time-critical payments, such as the daily exchange of variation margin, must be made both by clearing members and by the clearinghouse. Clearinghouses are designed to manage counterparty credit risk, but their highly structured risk management practices increase liquidity risk.⁴⁰⁶ Indeed, Federal Reserve Bank of Chicago research has explored the extent to which efforts to minimize settlement risk [risk of counterparty default] “transform credit risk into liquidity risk.”⁴⁰⁷ For example, if a clearing member misses a payment deadline, the clearinghouse can declare it to be in default. Hence, the clearing member’s credit (default) risk has morphed into liquidity risk.⁴⁰⁸

Global policymakers have clearly stated that in creating recovery plans, clearinghouses should not count on central bank liquidity assistance.⁴⁰⁹ At the same time, “central banks are working towards a regime that ensures that there are no technical obstacles for the timely provision of emergency liquidity assistance by central banks to solvent and viable CCPs, without pre-committing to the provision of this liquidity.”⁴¹⁰ In the U.S., Dodd-Frank’s Title VIII makes central bank liquidity available under certain conditions to financial market utilities (such as clearinghouses) that have been designated as systemically significant by the Financial Stability Oversight Council.⁴¹¹ Title VIII also enables the Federal Reserve to grant accounts and services to such institutions.⁴¹² The Federal Reserve Bank of Chicago has extended these to three designated clearinghouses: the Options Clearing Corporation, ICE Clear Credit, and CME Clearing.⁴¹³ The Bank of England has also granted clearinghouses access to central bank liquidity.⁴¹⁴ And the Deutsche Bundesbank has provided a liquidity facility to Eurex Clearing.⁴¹⁵

Central bank liquidity assistance could be helpful for several reasons. As noted, a

405 Singh, *Limiting Taxpayer Puts*, *supra* note 111.

406 See generally Marshall and Steigerwald, *supra* note 302.

407 Marshall and Steigerwald, *supra* note 302, at 40.

408 See Marshall and Steigerwald, *supra* note 302.

409 For example, see Recovery of FMI, *supra* note 356, at 2.3.1.

410 Financial Stability Board, *Statement by the Economic Consultative Committee of the Financial Stability Board on Appropriate Liquidity Arrangements*, http://www.fsb.org/wp-content/uploads/r_120615.pdf.

411 See Section 806 of Dodd-Frank, *supra* note 11; see also Baker, *The Federal Reserve As Last Resort*, *supra* note 139.

412 See Section 806 of Dodd-Frank, *supra* note 11.

413 Gregory Meyer and Philip Stafford, *Derivatives houses to open accounts with Federal Reserve*, *Fin. Times*, April 28, 2016. As of November 2016, there is an approximate combined total of \$20 billion dollars in these interest-bearing accounts (currently, the annual rate is 0.5%) for clearinghouses at the Federal Reserve. The Federal Reserve has also authorized accounts for the clients (such as “hedge-funds, asset managers and pension plans”) of clearing members. Katy Burne, *Clearinghouses Park Billions in New Fed Accounts*, *Wall S.J.*, Nov. 23, 2016.

414 Rahman, *supra* note 206, at 291.

415 See Eurex Clearing, *FAQs*, <http://www.eurexclearing.com/clearing-en/resources/faqs/>.

clearinghouse must make time-critical variation margin payments to clearing members regardless of whether it has received offsetting variation margin from a defaulted clearing member. It might need additional liquidity resources to manage a clearing member(s) default. There could be a loss of confidence in a clearinghouse, sparking a run by clearing members. The clearinghouse would need to return clearing member's margin collateral, which could necessitate a quick liquidation of investments potentially at fire-sale prices impacting asset markets.⁴¹⁶ Similarly, the rapid liquidation of a defaulted clearing member(s)'s collateral could also result in asset fire sales impacting the collateral values of non-defaulted clearing members and other market participants.⁴¹⁷ Recall that a decrease in collateral values could result in a clearinghouse calling for additional margin from clearing members.⁴¹⁸ Clearing members unable to meet such requirements would be in default. The default of a significant number of clearing members would threaten the stability of the clearinghouse itself. Central bank liquidity, however, could ameliorate such cascading issues.

These and related scenarios in the clearinghouse context suggest that central bank assistance rather than rapid liquidation of collateral and positions in a crisis would be more conducive to clearing member, clearinghouse, and, ultimately, financial market stability. Of course, risks are also associated with the availability of central bank liquidity assistance, especially the problem of moral hazard.⁴¹⁹ Furthermore, IMF economist Manmohan Singh explains that:

CB [central bank] backstopping of CCPs is shifting the potential taxpayer bailout from Wall Street to entities such as ICE, CME or LCH. Clearnet/Swapclear. This transition is increasingly opaque to the ordinary taxpayer, especially since moving derivatives from SIFIs' books to those of CCPs is mired in convoluted arguments and impenetrable technical jargon.⁴²⁰

U.S. taxpayers are at risk of bailing out both domestic and foreign clearinghouses. For example, one concern behind the European Central Bank's "location policy" (see III.B) was that it not be expected to bail out a U.K. clearinghouse clearing significant

⁴¹⁶ See Singh, *New Regulations and Collateral Requirements*, *supra* note 58.

⁴¹⁷ See generally Rahman, *supra* note 206, at 293.

⁴¹⁸ See Pirrong, *Economics of Central Clearing*, *supra* note 7.

⁴¹⁹ See generally Baker, *The Federal Reserve As Last Resort*, *supra* note 139; also see generally Colleen Baker, *The Federal Reserve's Use of International Swap Lines*, 55 *Ariz. L. Rev.* 603 (2013).

⁴²⁰ Singh, *Making OTC Derivatives Safe*, *supra* note 146, at 19.

amounts of Euro-denominated products. Relatedly, provisions of Dodd-Frank clearly suggest the possibility of the Federal Reserve providing liquidity assistance (and hence a possible bailout) to a foreign clearinghouse.⁴²¹ However, there has been little (if any) public policy discussion about this potential risk.

The possibility of central bank liquidity assistance highlights the link between a clearinghouse's collateral policy and a central bank's collateral policy (its practice regarding the collateral it will accept to secure lending).⁴²² If clearinghouses restrict the collateral they accept to the highest quality, most liquid assets, then they are more likely to encounter liquidity shortfalls.⁴²³ Clearing members would find it more difficult to meet any increased collateral demands and possibly default. A clearing member(s) default would increase the possibility of a clearinghouse ultimately needing central bank assistance. Clearinghouses – including systemically significant ones – are increasingly accepting a broader range of collateral such as corporate bonds.⁴²⁴ If clearinghouses accept less liquid collateral, this could also increase their eventual need for central bank liquidity assistance. In a crisis, such collateral is likely to be even less liquid and more difficult to sell in the market. The stability of the clearinghouse could require the central bank to become the buyer of last resort for such collateral. Yet if a central bank accepts such assets as collateral for discount window lending, this creates risks for itself and, ultimately, for taxpayers. It also risks ultimately incentivizing the creation of junk assets.⁴²⁵ Indeed, in a financial crisis, the difference between a solvent and insolvent institution (whether bank, non-bank financial institution, or clearinghouse) arguably is whether the central bank will accept an institution's assets to secure discount window lending. Hence, central bank's collateral policy, particularly in the area of clearinghouses, is critically important to differentiate between temporary liquidity and a bailout.

421 Section 1103 of the Dodd-Frank Act clearly suggests this possibility. It requires that information about swap line transactions with non-governmental third parties be publicly disclosed after two years. For additional discussion, see generally Colleen Baker, *The Federal Reserve's Use of International Swap Lines*, 55 ARIZ. L. REV. 603 (2013).

422 See Pirrong, *Economics of Central Clearing*, *supra* note 7. Depending upon their collateral policy, central banks could accept a wide range of clearinghouse collateral – everything from cash, U.S. securities, corporate bonds, or even derivatives payables.

423 *Id.*

424 For example, see generally Patrick Jenkins, Philip Stafford, and Tom Braithwaite, *Banks Warn of Risk at Clearing Houses*, *Fin. Times*, July 7, 2013.

425 See generally Martin Wolf, *Central banks should not rescue fools*, *Fin. Times*, Aug. 28, 2007. Interestingly, the European Central Bank has recently started a corporate bond buying program and “companies are creating new debt especially for the central bank to buy.” See Christopher Whittall, *Seller's Paradise: Companies Build Bonds for European Central Bank to Buy*, *Wall. St. J.*, Aug. 21, 2016.

D. Clearinghouse Resolution

In general, a clearinghouse resolution could occur through liquidation, a recapitalization of the clearinghouse, or a transfer of its assets to a viable clearinghouse or bridge institution.⁴²⁶ However, it is highly doubtful that a systemically significant clearinghouse would undergo a traditional liquidation (selling of assets, payment to creditors, and closure of the business) because they are clearly too important to fail.⁴²⁷ Indeed, policymakers,⁴²⁸ economists and expert commentators have explicitly stated that clearinghouses are “too important to fail.”⁴²⁹ And depending upon the availability of a substitute clearinghouse to assume a failed clearinghouse’s critical services is generally “not a practical recovery option”⁴³⁰:

For many centrally cleared products, the market is either vertically integrated with execution venues (i.e. in the futures market) or a single CCP is the only clearer for specific OTC derivatives, repo or securities products. In each case, in order to transact in these products, market participants are required to clear their transactions through a single CCP without an option to easily replace the risk in the event of a CCP failure.⁴³¹

Even were a substitute clearinghouse to be available, it could be in another jurisdiction. Depending upon a cross-border substitute would be problematic as it would likely entail complex legal and political challenges.⁴³²

Such realities suggest that a failing, systemically significant clearinghouse is likely to undergo some form of administratively-assisted resolution process that is more akin to a recovery of the clearinghouse’s operations. International supervisory/regulatory bodies,⁴³³ individual jurisdictions, and academic experts⁴³⁴ are still in the very early stages of proposing and formulating resolution frameworks. From the author’s perspective, the U.S. lacks a viable statutory resolution framework for OTC derivatives

426 See Duffie, *Resolution*, *supra* note 346.

427 In limited circumstances, a wind-down might be necessary because of considerations such as the clearinghouse’s inability to return to a match book, clearing members’ refusal to continue at the clearinghouse because of a loss in confidence, or risks to financial stability. The Clearing House and ISDA, *supra* note 202.

428 See Harry Wilson, *Clearing houses are the biggest risk, says Tucker*, *The Telegraph*, Oct. 8, 2013.

429 See Darrell Duffie, *Financial Market Infrastructure: Too Important to Fail in Across the Great Divide: New Perspectives on the Financial Crisis* (eds. Martin Neil Baily and John B. Taylor, 2014); see also Singh, *Limiting Taxpayer Puts*, *supra* note 111, (stating that “it is unlikely that any systemically important CCPs will be allowed to fail”).

430 Recovery of FMI, *supra* note 356, at 2.1.3.

431 JPMorgan Chase, *supra* note 273.

432 Pirrong, *Economics of Central Clearing*, *supra* note 7.

433 For example, Key Attributes, *supra* note 368, addresses *Resolution of financial market infrastructures and their participants* in Appendix II.

434 For example, see Duffie, *Resolution*, *supra* note 346 (outlining a clearinghouse failure resolution process).

clearinghouses. It is often assumed that Dodd-Frank’s Title II Orderly Liquidation Authority (OLA) is available to resolve a distressed clearinghouse,⁴³⁵ but its application is arguably unclear. OLA neither explicitly includes nor excludes clearinghouses within its coverage.⁴³⁶ However, OLA explicitly requires that funds (from borrowing or debt issuance) used to facilitate the orderly liquidation of an institution not exceed “10% of the total consolidated assets”⁴³⁷ of the institution and be repaid.⁴³⁸ Given the composition of most clearinghouse balance sheets, it is unclear that the amount of assets necessary to secure such liquidity would be available.⁴³⁹

In *Failure of the Clearinghouse: Dodd-Frank’s Fatal Flaw?*,⁴⁴⁰ Stephen J. Lubben argues that OLA does not apply to clearinghouses. He notes that clearinghouses do not appear to be encompassed within Dodd-Frank’s definition of “financial companies,” the types of institutions to which OLA applies.⁴⁴¹ Furthermore, even if they were, the FDIC – who is not otherwise involved in the regulation or supervision of clearinghouses – would then administer their resolution.⁴⁴² This seems nonsensical. Additionally, OLA does not mention the CFTC, which has an important regulatory/supervisory role in the clearinghouse context.⁴⁴³ Nevertheless, even if OLA technically applies to clearinghouses, regulators could forgo its use in practice.⁴⁴⁴ FDIC staff have indicated that OLA should apply to clearinghouses.⁴⁴⁵

In the U.S., a clearinghouse could file for bankruptcy protection. Yet legal scholars and economists have argued that neither OLA nor current bankruptcy law could efficiently resolve a clearinghouse in practice.⁴⁴⁶ Lubben explains that “the notion that a derivatives clearinghouse might file a regular bankruptcy petition is farcical, given that Congress previously decided to exclude derivatives...from the most impor-

435 For example, see JPMorgan Chase, *supra* note 273; *see also* Lubben, *supra* note 199, at FN8; *but see* Duffie, *Resolution*, *supra* note 346 (stating that OLA’s applicability “seems likely”).

436 Robert Steigerwald, *FMU Recovery and Resolution: “Orderly Liquidation” in the Shadow of the Bankruptcy Code* (Slides, Aug. 22, 2012) (on file with author).

437 Section 210(n) of Dodd-Frank.

438 *Id.*

439 Recall that clearing member margin and default fund contributions are not the assets of the clearinghouse and are generally only available for certain purposes.

440 *See supra* note 199.

441 Lubben, *supra* note 199, at 151.

442 Lubben, *supra* note 199.

443 Lubben, *supra* note 199, at 151.

444 Darrell Duffie, *Financial Market Infrastructure: Too Important to Fail* in *Across the Great Divide: New Perspectives on the Financial Crisis* (eds. Martin Neil Baily and John B. Taylor, 2014).

445 *See* Staff Presentation of CFTC and FDIC, DCO Resolution (June 27, 2016), http://www.cftc.gov/About/CFTCCcommittees/MarketRiskAdvisoryCommittee/mrac_meetings.

446 *See id.*

tant parts of the Bankruptcy Code, and because a clearinghouse would be required to liquidate in a chapter 7 bankruptcy.”⁴⁴⁷

Assuming that OLA does not apply to clearinghouses and that a traditional bankruptcy filing would be impractical, the U.S. lacks a statutory framework to resolve a failed clearinghouse. Until such a mechanism exists, clearinghouse resolution will likely occur through an ad hoc process or be a bailout in practice.⁴⁴⁸ Therefore, there is an urgent need in the U.S. for a resolution framework specifically designed for clearinghouses, including the unique features of their balance sheets. Economist Darrell Duffie explains that:

The bulk of the financial risk of a CCP is not represented by conventional assets and liabilities. Rather, a CCP is essentially a nexus of contracts by which its clearing members net and mutualize their counterparty default risk. In the normal course of business, the daily payment obligations of a CCP automatically sum to zero. Because of this, a CCP tends to have tiny amounts of equity and conventional debt relative to its largest potential clearing obligations. Most of the tail risk of a CCP is allocated to its clearing members.⁴⁴⁹

International regulatory bodies, such as the Financial Stability Board, have provided guidance for the resolution of financial market utilities such as clearinghouses in the event that: recovery efforts have failed; recovery efforts have not been timely enough; or relevant authorities view the recovery efforts as likely to be unsuccessful, a viable recovery is unlikely, or other threats to financial market stability exist.⁴⁵⁰ The overriding objective of this guidance is to promote financial stability and to ensure continuation of essential clearing services.⁴⁵¹ In general, it supports either enabling a clearinghouse to recover its viability and to resume services or the performance of these functions by another entity – such as a bridge institution – and the concomitant winding down of the failed clearinghouse.⁴⁵² Some commentators, however, doubt the viability of using bridge institutions in this context.⁴⁵³ Administrators could use tools

447 Lubben, *supra* note 199, at 129.

448 *See id.* at 130 (arguing that an “ad hoc statutory solution” and a bailout would essentially be equivalent in such circumstances).

449 Duffie, *Resolution*, *supra* note 346.

450 *See Key Attributes*, *supra* note 368.

451 *Id.*

452 *Id.*

453 *See Singh, Limiting Taxpayer Puts*, *supra* note 111.

similar to those in recovery processes to allocate losses and to dispose of contracts⁴⁵⁴ (through voluntary/involuntary allocation or termination/tear-up). In the resolution context, potential tools could also include: increased clearinghouse capital, creation of a resolution fund, or requiring additional funding from clearing members and/or clearinghouse owners.⁴⁵⁵ Within resolution frameworks, potential funding arrangements to enable a successful resolution are a paramount consideration.⁴⁵⁶

Answers to additional, critical questions are also important within the resolution context. For example, what should trigger the resolution process, which will in practice terminate the clearinghouse's management of its recovery?⁴⁵⁷ This is a difficult, but essential issue. Safeguarding financial market stability requires timely attention to a clearinghouse's balance sheet problems.⁴⁵⁸ Additionally, when (if ever) should a stay on clearing members' ability to terminate their relationship with the clearinghouse be enforced?⁴⁵⁹ Such stays would be designed to prevent runs on a clearinghouse. If the only clearinghouse clearing a specific product is in resolution, how could market participants fulfill a clearing requirements for this product?⁴⁶⁰ These and similar issues must be addressed in developing a robust clearinghouse resolution framework.

In sum, extensive international efforts are currently focused on developing contractual tools for clearinghouse recovery such as additional assessments of clearing members, variation margin (and possibly initial margin) haircutting, contractual tear-up (partial or full) etc. and also resolution frameworks for clearinghouses. Nevertheless, it is important to step back and consider whether despite such extensive recovery and resolution efforts, clearinghouses, market participants or regulatory authorities might choose alternate paths in a time of unusual and exigent circumstances. For example, using their extensive emergency provisions, clearinghouses could take unanticipated ad hoc actions to increase their stability or solvent clearing members could chose to run from a distressed or insolvent clearinghouse and confront the legal consequences (if any) in the years to come. Similarly, regulatory authorities could limit (or prevent) additional assessments, variation margin haircutting, or contractual tear-ups

454 See Key Attributes, *supra* note 368.

455 Coeuré, *supra* note 8.

456 See Appendix II-Annex 1 of Key Attributes, *supra* note 368.

457 Duffie, *Resolution*, *supra* note 346. Clearinghouse viability has been suggested as a trigger. See *The Clearing House and ISDA*, *supra* note 202.

458 Singh, *Limiting Taxpayer Puts*, *supra* note 143.

459 See Duffie, *Resolution*, *supra* note 346.

460 See Duffie, *Resolution*, *supra* note 346; also see *The Clearing House and ISDA*, *supra* note 202.

by clearinghouses or the triggering of resolution frameworks because of concerns about systemic stability. In the end, extensive government assistance might once again be relied upon to ensure financial market stability. Such possibilities suggest that consideration of foundational issues such as clearinghouse ownership and governance structures should be incorporated within recovery and resolution planning.

PART V: CONCLUDING CONSIDERATIONS AND POLICY OPTIONS GOING FORWARD

The fundamental issue at the heart of clearinghouse resolution is the need for the continuity of the critical services provided by systemically significant clearinghouses. In this respect, these institutions are comparable to public utilities because of their publicly-oriented infrastructure service role. In practice, however, clearinghouses are not public utilities. As noted above, they take a variety of ownership forms. In the case of private, for-profit clearinghouses – the majority of significant clearinghouses – their private-public roles are arguably in conflict.⁴⁶¹ Therefore, it is important to consider ownership and governance structures, in addition to other mechanisms, that could alleviate this conflict going forward.

Comparatively little attention has concentrated on clearinghouse ownership structures and governance arrangements (discussed in II.E). This concluding Part briefly highlights additional possibilities in this space. To the extent that efforts to address clearinghouse recovery and resolution fail to take such foundational considerations into account, they arguably risk falling short of a truly comprehensive examination of potential approaches that ensure both financial market stability and that the public does not share the downside – but not the upside – of OTC derivatives activity.

Stephen Lubben argues for the nationalization of a failing clearinghouse.⁴⁶² He proposes a related statutory framework and argues that such an arrangement should incentivize shareholders and clearing members to robustly manage risk.⁴⁶³ The nationalization process would be triggered by regulators (and, potentially, clearinghouse senior management) and use a “federally chartered bridge institution” structure to

⁴⁶¹ Lubben, *supra* note 199, at 113 (stating that “There is an obvious conflict of interest between the public role these firms play and the normal duties their boards owe their shareholders.”).

⁴⁶² Lubben, *supra* note 199.

⁴⁶³ *Id.* Similarly, the Financial Stability Board notes the possibility of the temporary nationalization of financial market utilities such as clearinghouses in jurisdictions allowing such legal arrangements. *See* Appendix II-Annex 1 of Key Attributes, *supra* note 368, at 7.2.

transfer the obligations of the clearinghouse and to a viable, new institution.⁴⁶⁴ Existing shareholders would be wiped out and the Federal Reserve would infuse capital at a penalty rate – in line with Bagehot’s famous dictum⁴⁶⁵ – in exchange for the clearinghouse’s equity.⁴⁶⁶ Clearing members could continue to clear their transactions with this new bridge institution (for a fee) until normal market functioning resumed.⁴⁶⁷ However, clearing members would be required to become members of the new clearinghouse, including making new margin and default fund contributions, to continue their direct clearing activities.⁴⁶⁸ In time, the Federal Reserve would exit its equity position.⁴⁶⁹

Instead of nationalization in a crisis, clearinghouses could be state-owned. A strong argument for this option would be that the government is likely to provide support to systemically significant OTC derivative clearinghouses in a financial crisis.⁴⁷⁰ However, the government routinely assists the private banking system in financial crises, but there have been few calls for its nationalization. Two important differences, however, are the small number of systemically significant clearinghouses compared to the number of banks and the near absence of substitutes for a failed clearinghouse. However, state actors, like private actors, also err and have incentives that can be different than those of their principal (the taxpayers).⁴⁷¹ The private market is likely to have more advanced risk management expertise, which should ideally promote clearinghouse stability. Finally, in the case of systemically significant clearinghouses, state actors would be unlikely to agree easily upon the clearinghouse’s home jurisdiction.⁴⁷²

An alternative to state ownership could be mandating utility regulation for clearinghouses.⁴⁷³ As noted, clearinghouses are akin to natural monopolies. Utility regulation has traditionally been used to manage the market failures associated with

464 Lubben, *supra* note 199.

465 Walter Bagehot, the author of the famed book on central banking *Lombard Street: A Description of the Money Market*, wrote that the lender of last resort should lend freely, to solvent institutions with good collateral at penalty rates. See Paul Tucker, Deputy Governor of Financial Stability, Bank of England, *The Repertoire of Official Sector Interventions in the Financial System: Last Resort Lending, Market-Making, and Capital*, Remarks at the Bank of Japan 2009 International Conference (May 27–28, 2009).

466 Lubben, *supra* note 199.

467 *Id.*

468 *Id.*

469 *Id.*

470 See generally Tucker, *Are Clearing Houses*, *supra* note 119. In his speech, Tucker compares and contrasts central banks and clearinghouses and their respective relationship to the state. He notes that “society has made different choices about how the State should be involved in two central financial institutions providing two different kinds of financial insurance to markets and the economy.”

471 See *id.*

472 *Id.*

473 *Id.* (arguing that clearinghouses should be regulated utilities).

natural monopolies.⁴⁷⁴ Indeed, the term “public utility” has been used to describe the National Securities Clearing Corporation,⁴⁷⁵ one of the eight designated systemically significant financial market utilities in the U.S. and subsidiary of the Depository Trust & Clearing Corporation. Paul Tucker has noted that “central-counterparties are purely utilities.”⁴⁷⁶

The term “financial market utility” is often used to refer to systemically significant OTC derivative clearinghouses. Indeed, under Dodd-Frank’s Title VIII,⁴⁷⁷ the Financial Stability Oversight Council has designated clearinghouses such as CME Clearing⁴⁷⁸ and ICE Clear Credit LLC, which are within publicly-traded, for-profit exchange group structures, as systemically significant “financial market utilities.” In these and other cases, the utility label is a misnomer. Such OTC derivatives clearinghouses are not utilities in a traditional sense. This is because:

[t]he revenue/benefits from OTC derivatives come from three sources: the origination fee *plus* netting on books *plus* the clearing fee. Banks will still keep all of the origination fee plus some of the netting (from OTC derivatives that do not clear). A utility has two characteristics: (a) a government backstop but (b) at negotiated “economic rents.” So for CCPs to be utilities, all three revenue pieces alluded to above (which compromise the total economic rent) should be negotiable...The comparison of CCPs as utilities is not apt unless it spans the full spectrum of “economic rents”.⁴⁷⁹

In today’s landscape, banks and financial institutions are keeping most of the profits (“economic rents”) from cleared OTC derivatives activity, but passing the risks to clearinghouses.⁴⁸⁰ Utility regulation of clearinghouses would include regulation of costs and fee structures, and public hearings for their renegotiation.⁴⁸¹ More importantly, “given that CCPs are not being treated as utilities, the size of the public backstop provided is very high, compared with a suboptimal amount of systemic risk reduc-

474 Chang, *The Systemic Risk Paradox*, *supra* note 103, at 808.

475 *Id.* at 751.

476 Harry Wilson, *Clearing houses are the biggest risk, says Tucker*, *The Telegraph*, Oct. 8, 2013. (quoting Paul Tucker, Deputy Governor, Bank of England).

477 See Section 804 of Dodd-Frank.

478 CME Clearing is a division of Chicago Mercantile Exchange, Inc., which is technically the designated entity.

479 Singh, *New Regulations and Collateral Requirements*, *supra* note 58.

480 Singh, *Making OTC Derivatives Safe*, *supra* note 146.

481 Chang, *The Systemic Risk Paradox*, *supra* note 103, at 808.

tion. This raises the question whether the public at large is being well served by the present non-utility regulatory models.”⁴⁸²

Mandating utility regulation for clearinghouses, however, could present several challenges. It has even been termed “untenable.”⁴⁸³ It “would be very difficult for regulators to effectively monitor and set rates.”⁴⁸⁴ And would clearinghouses subject to utility regulation maintain the highest levels of technical and risk management expertise and to access to external funding? The trend of court decisions and academic scholarship has been away from public utility regulation because of inefficiencies and greater reliance, in the case of natural monopolies, on competition.⁴⁸⁵ What if one jurisdiction – such as the U.S. – subjected its clearinghouses to utility regulation, but other jurisdictions declined to follow this path? What would be the competitive implications? As noted, systemically significant global clearinghouses are connected (directly or indirectly through clearing members). What would be the risk management implications of an interlinked, global web of clearinghouses where some were subject to utility regulation and others were not?

Another potentially troublesome aspect of private, for-profit clearinghouses that has received little attention is their role as “system risk managers.”⁴⁸⁶ “[t]hey are de facto regulators and supervisors for the markets they clear; and risk managers of their own balance sheet.”⁴⁸⁷ In the U.S., DCOs and clearing agencies are self-regulatory organizations. Historically, stock exchanges, also self-regulatory organizations, have faced questions about their role as both for-profit entities and market regulators, especially as most exchanges transitioned from mutualized to for-profit ownership structures.⁴⁸⁸ Some exchanges – such as the NYSE – restructured to separate their market and regulatory functions.⁴⁸⁹ Exchanges are still grappling with this issue. For example, purportedly, Singapore Exchange Ltd “will transfer its self-regulatory

482 Singh, *Making OTC Derivatives Safe*, *supra* note 146. One method for minimizing the provision of any public backstop would be to levy an ex-ante charge/insurance premium on systemically significant clearinghouses in recognition that in a financial crisis, they are almost certain to receive government assistance. See Baker, *The Federal Reserve As Last Resort*, *supra* note 139.

483 Chang, *The Systemic Risk Paradox*, *supra* note 103, at 809.

484 *Id.* at 809.

485 *Id.* at 810.

486 Paul Tucker, Deputy Governor, Financial Stability, Bank of England, *Clearing houses as System Risk Managers*, Speech at the DTCC-CSFI Post Trade Fellowship Launch (June 1, 2011).

487 *Id.*

488 See generally Technical Committee of the International Organization of Securities Commissions, *Regulatory Issues Arising from Exchange Evolution: Final Report* (2006).

489 See Roberta S. Karmel, *Is the Financial Industry Regulatory Authority a Government Agency?* (Brooklyn Law School Legal Studies Research Papers Working Paper Series No.86, Oct. 2007).

functions to a separate subsidiary company as part of its efforts to build on its credibility and tackle criticisms of its dual role as a profit-seeking company and market regulator.”⁴⁹⁰ As most clearinghouses are now publicly-traded, corporate entities, it seems reasonable to ask whether a separation of their profit-seeking and regulatory functions should similarly be separated to avoid the inherent conflict in these roles.

In the near future, the current clearinghouse landscape is likely to remain largely in place. Hence, it is important also to explore options on a more modest scale that might better align private, for-profit clearinghouses’ private interests with their public role. For example, the executive compensation structures of for-profit clearinghouses could be designed to discourage risk-taking and encourage promotion of financial stability (a public good).⁴⁹¹ As clearinghouses argue that they are in the business of managing risk, not taking risk, it should be unproblematic to adopt such compensation structures. Clearinghouses could also be subject to increased legislative accountability, including periodic reporting and testimony to Congress.⁴⁹²

In conclusion, the global, post-financial crisis clearing mandates have dramatically altered the structure of the OTC derivatives markets and their attendant risks. Clearinghouses can decrease and increase systemic risk in these markets. They have many benefits, including their ability to manage counterparty credit risk, increase market transparency, reduce transaction costs, and improve the efficiency of counterparty default management. At the same time, they do have important costs, especially the increased concentration and linkages among systemically important clearinghouses, banks, and financial institutions, and cybersecurity concerns, in addition to their too-big-to-fail status.

Therefore, global policymakers, market participants, and significant clearinghouses must continue to collaborate on today’s most pressing issue of clearinghouse recovery and resolution (including giving attention to foundational issues such as ownership and governance structures) to promote global financial market stability and to ensure that market participants, rather than the public, internalize the costs of

490 Jake Maxwell Watts, *Singapore Exchange Says Outage Was Result of Hardware Failure*, Wall S.J., July 19, 2016.

491 See Tucker, *Are Clearing Houses*, *supra* note 119. (stating that “Where a clearing house is for-profit, the remuneration contracts of management must be designed to tie them to the public good. I doubt they should be rewarded for group or CCP earnings; a fixed salary sufficiently high to secure and nurture quality staff would be better. If, however, remuneration linked to group or CCP earnings were to be permitted by regulators, this should be constructed so that there can be claw back if the CCP fails. One way of doing this would be for any such profit-related pay to be delivered in long-term super-subordinated debt that gets wiped out in the event of the CCP going into resolution.”).

492 See *id.* (suggesting increased legislative accountability for non-mutualized clearinghouse structures).

their OTC derivatives activities so that the bailouts of the recent financial crisis are not endlessly repeated. And they must also continue to work together going forward, “guided by the principles of efficiency, safety and integrity, and financial stability,”⁴⁹³ to explore possibilities offered by cutting-edge innovations - such as distributed ledger technologies - to advance clearinghouses and the clearing function⁴⁹⁴ for the betterment of financial markets and their contribution to society.

493 Lael Brainard, Governor of the Federal Reserve System, *The Use of Distributed Ledger Technology in Payment, Clearing, and Settlement*, Speech at the Institute for International Finance Blockchain Roundtable, April 14, 2016.

494 For example, the Australian Securities Exchanges (ASX) is working with Digital Asset Holdings and “trying to get to a stage where we could contemplate [replacing ASX’s clearing system];” See Jackie Range, *New Australian Securities Exchange Chief Defends Blockchain Plans*, Fin. Times, Sept. 5, 2016 (quoting ASX Chief Executive, Dominic Stevens). Five institutions - UBS, Deutsche Bank, Santander, BNY Mellon, and ICAP - also recently joined forces “to develop an industry standard to clear and settle financial trades over blockchain.” Sarah Murray, *Blockchain Can Create Financial Sector Jobs As Well As Kill Them*, Fin. Times, Sept. 7, 2016. Other exchanges and clearinghouses are also investigating the possibilities of blockchain technology for replacing back-office infrastructures. See Philip Stafford, *Banks and Exchanges Turn to Blockchain*, Fin. Times, June 30, 2015.

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ABOUT THE ALLIANCE

The Volcker Alliance was launched in 2013 by former Federal Reserve Board Chairman Paul A. Volcker to address the challenge of effective execution of public policies and to help rebuild public trust in government. The nonpartisan Alliance works toward that broad objective by partnering with other organizations—academic, business, governmental, and public interest—to strengthen professional education for public service, conduct needed research on government performance, and improve the efficiency and accountability of governmental organization at the federal, state, and local levels.

ABOUT THE AUTHOR

Dr. Colleen M. Baker is an expert in banking and financial institutions law and regulation and a mediator, with extensive knowledge of the regulation of over-the-counter derivatives, derivatives clearing, the Dodd-Frank Act, and bankruptcy. Her research has been published in the Harvard Business Law Review Online, the Notre Dame Law Review, the Arizona Law Review, the Capital Markets Law Journal, the University of Michigan Journal of Law Reform, and the University of Virginia Law & Business Review. Dr. Baker has taught courses at the University of Illinois Urbana-Champaign Business School, the University of Notre Dame Law School, Villanova University Law School, and the Wharton Business School. She received a JD/MBA from the University of Virginia and a PhD from the Wharton School of the University of Pennsylvania.

The Volcker Alliance

560 Lexington Avenue, Suite 16B

New York, NY 10022

(646) 343-0155

info@volckeralliance.org | www.volckeralliance.org