

Summary

In an effort to improve market infrastructure following the crisis, central counterparties (CCPs) are being put forth as the way to make over-the-counter (OTC) derivatives markets safer and sounder, and to help mitigate systemic risk. This chapter provides a primer on this topic and discusses key policy issues. It shows that soundly run and properly regulated CCPs reduce counterparty risk—the risk in a bilateral transaction that one party defaults on its obligations to the other—among OTC derivatives market participants. Importantly, systemic risk—the risk of knock-on failures from one counterparty to another—is also reduced due in part to the ability to net transactions across multiple counterparties. CCPs also have other risk-mitigating features that ensure that payments to others occur when a counterparty defaults. Nevertheless, movement of contracts to a CCP is not a panacea, since it also concentrates the counterparty and operational risk associated with the CCP itself.

The chapter makes recommendations for best-practice risk management and sound regulation and oversight to ensure that CCPs will indeed reduce risk. This may mean that existing CCPs will need to upgrade their risk management practices and that regulations will need to be strengthened. A big part of this is making sure that there is coordination among regulators and other overseers on a global basis to ensure that the playing field is level and that it discourages regulatory arbitrage. Contingency plans and appropriate powers should also be globally coordinated to ensure that the financial failure of a CCP does not lead to systemic disruptions in associated markets.

To achieve the multilateral netting benefits of a CCP, a critical mass of OTC derivatives needs to move there. However, this will be costly for some active derivative dealers. CCPs require that collateral (called initial margin) be posted for every contract cleared through them, whereas in the OTC context dealers and some other types of participants tend not to currently adhere to this practice. As a result, active OTC derivative dealers, those likely to be members of CCPs, will incur costs in the form of the increase in posted collateral and, if enacted, potentially higher regulatory capital charges against remaining derivatives contracts on their books. Hence, without an explicit mandate to do so there is some uncertainty as to whether dealers will voluntarily move their contracts and whether enough multilateral netting can be achieved. An approach that uses incentives based on capital charges or a levy tied to dealers' contribution to systemic risk could be used to encourage the transition.

The analysis in this chapter shows that CCPs can reduce systemic risks related to counterparty risks that are present in the bilaterally cleared OTC contracts, but that the short-run costs of moving contracts to CCPs are indeed far from trivial. Hence, because the relevant institutions are already challenged to raise funds and capital in the post-crisis period, a gradual phase-in period is warranted.

Over-the-counter (OTC) derivatives markets have grown considerably in recent years, with total notional outstanding amounts exceeding \$600 trillion at the end of June 2009 (Figure 3.1). During the financial crisis, the credit default swap (CDS) market, a part of the OTC derivatives market, took center stage as difficulties in financial markets began to intensify and the counterparty risk involved in a largely bilaterally cleared market became apparent. Authorities had to make expensive decisions regarding Lehman Brothers and AIG based on only partially informed views of potential knock-on effects of the firms' failures.

Since the crisis has subsided, a series of initiatives have been entertained to better contain and mitigate systemic risks. These are generally in three areas: (1) preventive measures using, primarily, higher liquidity and capital buffers making an institution less likely to fail due to a shock; (2) containment measures such as better resolution frameworks, alongside the formulation of a "living will" allowing a firm to prepare for its own unwinding; and (3) improvements to financial infrastructure that provide firewalls to help prevent the knock-on effects of an institution's failure and allow shocks to be absorbed more easily. The improved infrastructure should be able to withstand various types of shocks as the next crisis may not be like the last. Chapter 2 discussed a potential systemic-based capital charge, while this chapter examines how infrastructure improvements through the use of central counterparties (CCPs) in OTC derivatives markets can help.

Since OTC derivative markets started up in the early 1980s, transaction clearing and settlement has been mostly bilateral (i.e., between two counterparties). "Clearing and settlement" refers to the various operations that take place after the trade, including matching and confirming details, and transferring funds or ownership of instruments as per the terms and conditions of the trade. At year-end 2009, although about 45 percent of OTC interest rate derivatives were centrally cleared by U.K.-based LCH.Clearnet, almost all other OTC derivatives were

bilaterally cleared. Prior to the crisis, OTC markets had proven to be fairly robust despite rapid growth of trading activity. This is due in large part to the efforts of market participants, pushed by the New York Federal Reserve and other regulators and led by the International Swaps and Derivatives Association (ISDA), to continually improve the legal and operational infrastructure. However, the crisis exposed weaknesses. While CCPs worldwide functioned relatively well, where such CCPs were not involved, there were difficulties in unwinding derivatives contracts.

A major problem with bilateral clearing is that it has resulted in a proliferation of redundant overlapping contracts, exacerbating counterparty risk and adding to the complexity and opacity of the interconnections in the financial system. Redundant contracts proliferate because counterparties usually write another offsetting contract, rather than closing them out. All of this has left regulators and other relevant authorities largely in the dark about potential knock-on effects of a major counterparty failure.

This chapter focuses on the potential solution receiving the most attention—namely the movement of OTC derivatives to existing and new CCPs.¹ The primary advantage of a CCP is its ability to reduce systemic risk through multilateral netting of exposures, the enforcement of robust risk management standards, and mutualization of losses resulting from clearing member failures. At the same time, it is important to recognize that CCPs concentrate counterparty and operational risks, and thus magnify the systemic risk related to their own failure. Hence, a CCP needs to withstand such outcomes by having sound risk management and strong financial resources. Furthermore, moving OTC derivatives to a CCP is not without interim costs, which may particularly discourage the dealer community from moving its trades to a CCP. The chapter provides some rough estimates of the associated costs.

The chapter examines the regulation, supervision, and oversight of CCPs and suggests that these functions should be recognized as complementary

Note: This chapter was written by a team led by John Kiff and comprised of Randall Dodd, Alessandro Gullo, Elias Kazarian, Isaac Lustgarten, Christine Sampic, and Manmohan Singh. Yoon Sook Kim provided research support.

¹This chapter does not extensively discuss proposals to force OTC derivatives trading onto organized exchanges, although such a move would have obvious price transparency benefits to the users of these contracts.

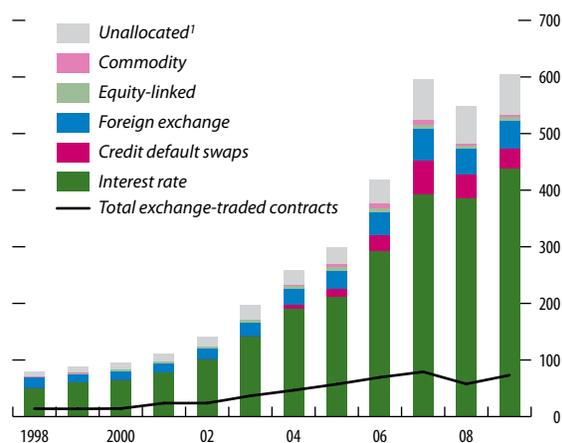
but with distinct focuses. Given the global nature of the OTC derivatives market, it also emphasizes the need for close cross-border coordination to establish international minimum risk management standards to avoid regulatory arbitrage. The joint initiative by the Committee on Payments and Settlement Systems (CPSS) and the International Organization of Securities Commissions (IOSCO) in revising international standards should be encouraged in this regard. The chapter finally discusses the current environment in which, due to various business, political, and regulatory obstacles to establishing a single CCP, multiple CCPs clearing the same type of derivative instrument are sprouting everywhere (Table 3.1). A single global CCP for OTC derivatives would provide maximum economies of scale and systemic counterparty risk reduction, but similar efficiencies can be achieved by linking multiple CCPs, the obstacles to which are not insurmountable, as shown by the success of the CLS Bank in settling cross-border foreign exchange transactions. However, currently, links are difficult to achieve and the business case is unclear.²

The Basics of Counterparty Risk and Central Counterparties

Counterparty risk is the risk that one of the contract counterparties fails to meet its payment obligations. Existing counterparty risk mitigation practices have generally been effective, though the Lehman Brothers bankruptcy and the near failure of AIG have led market participants and regulators to seek improvements. Typical mitigation practices include (1) netting of bilateral positions; (2) collateralization of residual net exposures; and (3) compression and tear-up operations that eliminate redundant contracts.

In very broad terms, a CCP can reduce systemic risk by interposing itself as a counterparty to every trade, performing multilateral netting, and providing various safeguards and risk management practices to ensure that the failure of a clearing member to the CCP does not affect other members (Box 3.1 describes

Figure 3.1. Global Over-the-Counter Derivatives Markets
(In trillions of U.S. dollars; notional amounts of contracts outstanding)



Source: Bank for International Settlements.
 Note: Over-the-counter data through June 2009; exchange-traded data through December 2009.
¹Includes foreign exchange, interest rate, equity, commodity, and credit derivatives of nonreporting institutions.

²Although CLS Bank is not a central counterparty in that it is not responsible for the risk that a counterparty fails to deliver foreign currency on time, its success shows that the cross-border complications that confront OTC derivative CCPs may not be insurmountable.

Table 3.1. Currently Operational Over-the-Counter Derivative Central Counterparties

Platform (Domicile)	Contract Type				
	Interest rate swap	Credit default swap	Foreign exchange	Equities	Other ¹
CME Clearing (U.S.)		✓			✓
BM&FBovespa (Brazil)	✓		✓	✓	✓
Eurex Clearing AG (Germany)	✓	✓		✓	✓
Euronext/LIFFE BClear (U.K.)				✓	✓
ICE Clear Canada (Canada)					✓
ICE Clear Europe (U.K.)		✓			✓
ICE Trust (U.S.)		✓			
LCH.Clearnet (U.K.)	✓				✓
LCH.Clearnet.SA (France)		✓			
IDCG International Derivatives Clearinghouse (U.S.)	✓				
NASDAQ OMX Stockholm AB (Sweden)					✓
NOS Clearing (Norway)					✓
SGX AsiaClear (Singapore)					✓

Source: IMF staff.

¹Other includes commodities, energy, freight, and macroeconomic (e.g., inflation) indicators.

in more detail some of the mechanics of OTC derivatives clearing).³

Netting of Bilateral Positions and “Close-Out Netting”

OTC derivative contracts expose counterparties to the default risk of others while those contracts have positive replacement values—that is, the value or payment the nondefaulting party would receive if the contract were to be terminated today. In the absence of close-out netting, the maximum loss incurred by one counterparty to a defaulting counterparty is equal to the sum of the positive replacement values (i.e., “derivative receivables”).⁴ However, most OTC derivative contracts are covered by bilateral master agreements that aggregate all exposures between two counterparties. These bilateral master agreements allow

for close-out netting when one of the counterparties defaults, which permits the “derivative payables” (the sum of the replacement values of the contracts with negative values, i.e., those that the nondefaulting counterparty owes the defaulting party) to be used to offset the derivative receivables.

Collateralization of Residual Net Exposures

The exposure of counterparties to each other can be further reduced by requiring the counterparties to post collateral (typically cash and highly-rated liquid securities) against outstanding exposures.⁵ In order to cover potential future exposure and residual risks, there is often an “independent amount” deposited at the initiation of a contract.⁶ Independent amounts

³Derivative clearing facilities need special risk management systems because these contracts have long lifespans as compared with cash and securities.

⁴Payment netting occurs throughout the life of a transaction as all payment obligations in a single currency between the counterparties are replaced with a single net amount on each relevant payment date. However, close-out netting occurs at the end of a transaction essentially when one party has defaulted. When default occurs, termination of the contract is typically triggered by the nondefaulting party, a single net amount due between the parties becomes payable, and the nondefaulting party is given access to its collateral if the defaulting party owes anything to the nondefaulting party.

⁵“Haircuts” are often applied so that the required amount of collateral reflects the potential for its value to decline between the time when the counterparty defaults and the time when the collateral is liquidated. A “haircut” is a discount applied to the posted collateral’s current market value to reflect its credit, liquidity, and market risk. The Basel II haircuts on securities rated AA- or better range from 0.5 percent for sovereigns maturing within one year to 8 percent on corporates and public sector entities. Haircuts are also used to factor in foreign exchange risk if foreign currency assets are accepted as collateral. As with the underlying exposures, collateral is usually revalued on a daily basis.

⁶Residual risks include delays between when the new collateral requirements are calculated, called, and settled, the impact of

Box 3.1. The Mechanics of Over-the-Counter Derivative Clearing

Clearing is what takes place between the execution of a trade (when two counterparties agree to fulfill specific obligations over the life of the contract) and settlement (when all of the contract's legal obligations have been fulfilled). This box uses a hypothetical swap transaction to run through the key clearing functions using an interest rate swap as an example.¹ These clearing functions are relevant to both bilateral and centrally cleared trades.

The key clearing functions are illustrated with a hypothetical \$100 million, 10-year interest rate swap that pays a fixed 5 percent rate against receiving floating-rate payments based on the one-year London Interbank Offer Rate (LIBOR). Both payments are made annually “in arrears,” which means that the payment calculations are made at the beginning of each annual payment period, but payments are not made until one year later.

The first step in the clearing process is to confirm the terms of the swap contract with both counterparties. This is followed by various transaction and risk management functions throughout the contract's (10-year) life, unless it is terminated early (see Bliss and Steigerwald, 2006; and Hasenpusch, 2009). These functions include:

- Determining payment amounts at the start of each (one-year) interest period, notifying the counterparties and settling the payments at the end of the period. In the example, if LIBOR is less than

5 percent (e.g., 4 percent), the “fixed payer” makes a payment (and the “variable payer” receives an amount) equal to the difference between the two calculated payments (\$1 million = \$100 million times 1 percent).

- Daily valuations of all derivative contracts under the specific master agreement (in the case of a bilateral trade) or with the counterparty (in the case of centrally cleared trades) for collateral requirement purposes. Similarly, all posted collateral must be monitored and revalued daily, and “haircuts” determined and applied.
- Monitoring counterparty creditworthiness and compliance with all the terms of the contracts. This includes determining whether to exercise settlement rights if an event of default or termination occurs, and recovering or making net final payments.
- Keeping relevant records and producing various reports.

There are a number of commercial vendors that provide all or part of these services. These include ICE Trust's ICE Link, the Depository Trust & Clearing Corporation and Markit's MarkitSERV trade matching and confirmation services, Euroclear's DerivManager, and TriOptima's triResolve daily position and collateral reconciliation services. Also, TriOptima's triReduce and the Creditex tear-up and compression services eliminate redundant contracts. While these services provide the nuts and bolts of the process, they do not take on the credit risks associated with a failure of a counterparty. Hence the function of a central counterparty.

Note: This box was prepared by John Kiff.

¹See Hasenpusch (2009) for a much more detailed explanation of the nuts and bolts of clearing.

are usually posted by end-users to dealers. End-users include investment funds, hedge funds, and other nondealers.

Market practice is that dealers do not typically post independent amounts to each other. Dealers also do

minimum transfer amounts, and the potential for replacement value fluctuations from the point when a counterparty defaults and the contracts are closed out. In futures markets, the upfront amount is called “initial margin” and is viewed as a performance bond or guarantee that a counterparty will honor its contractual agreements.

not typically ask for collateral from some types of customers, namely sovereign and quasi-sovereign entities and some corporate clients.⁷ Given these practices, exactly how much collateral is currently posted against OTC derivative positions is not known with certainty. According to a recent global survey by ISDA, 22 percent of OTC derivative transactions are uncollateral-

⁷Most dealers post collateral to each other against day-to-day changes in replacement costs (i.e., positive market value less negative market value)—that is, variation margin on mark-to-market valuations.

ized, which is a high proportion of uncovered risk (ISDA, 2010).⁸ Also, of the 78 percent of transactions (by notional amount) that are collateralized, 16 percent are unilateral, where only one side of the transaction is obliged to post collateral. In addition, where there is an agreement for bilateral collateral posting, such posting can be hindered by disputes between parties about the valuation of the underlying positions and collateral that result from diverse risk management systems and valuation models. Central clearing substantially reduces this problem, as it standardizes valuation models and data sources.

Multilateral Compression and Tear-Ups

Multilateral compression and tear-up operations eliminate redundant contracts and reduce counterparty risk, and shorten and simplify systemic interconnections. The redundant contracts result from multiple bilateral transactions. For example, if party A owes party B a sum, say \$10, and party B owes party C the same sum, say \$10, then party B can be eliminated and party A will owe party C the \$10. Since the Lehman bankruptcy, these multilateral contract termination operations have been pursued avidly. In 2008 and 2009, TriOptima's triReduce tear-up service eliminated about \$45 trillion notional of CDS contracts and \$39 trillion of interest rate swap contracts.⁹ Over the same period, the compression service run jointly by Creditex and Markit eliminated about \$6 trillion notional of CDS contracts. (To put these volumes in perspective, from end-2007 to end-June 2009, the Bank for International Settlements reported that outstanding CDSs dropped from \$58 trillion to \$36 trillion and interest rate swaps rose from \$310 trillion to \$342 trillion). The impact of these operations is

⁸According to the ISDA survey, collateralization coverage is quite diverse, ranging from 97 percent of credit derivatives to 84 percent on other fixed-income derivatives and 62 to 68 percent on all others (ISDA, 2010). However, another study by the Banking Supervision Committee of the European System of Central Banks found that over half of OTC derivative transactions were totally uncollateralized (ECB, 2009), although this report surveyed only European Union banks, including many smaller institutions.

⁹A contract's notional value is the nominal or face value used to calculate payments, and/or the quantity of the underlying reference instrument.

visible in the shrinking amount of gross outstanding CDS contracts, with the reduction concentrated in index contracts, whose high degree of fungibility and standardization makes them easier to match off and tear up (Figure 3.2).¹⁰

ISDA has made important progress in standardizing single-name CDS contracts (those associated with a single entity), which should facilitate compression and tear-up operations for those contracts. Despite this progress, many OTC derivative contracts (e.g., bespoke contracts) are not eligible for such operations because they do not fit the standard product templates.

The Case for Over-the-Counter Derivative Central Clearing

OTC derivative bilateral clearing has some key weaknesses even after the application of best-practice risk management techniques. It is helpful that market participants continue to work toward convergence of best practice, but much remains to be done. The failure of dealers to follow best counterparty risk management practice such as requiring the posting of upfront collateral on all contracts, and to agree explicitly on valuation and data sources, is likely to arise more in a bilateral context than a CCP context because the latter requires more conformity.

Novation of Bilateral Contracts to Central Counterparties

By interposing itself between the two clearing members (CMs) to a bilateral transaction, a CCP assumes all the contractual rights and responsibilities. In particular, the two CMs legally assign their trades to the CCP (usually through "novation"), so that the CCP becomes the counterparty to each CM (Box 3.2). In order to clear trades and perform multilateral netting, the CCP requires contracts to be standardized. Nonstandard contracts cannot be netted, since each one's cash flow characteristics are different, though such contracts could be placed in trade repositories and hence information about them transmitted to

¹⁰CDS index contracts are based on standardized indices based on baskets of liquid single-name CDS contracts, those associated with a credit event of a single entity.

authorities (see below). Hence standardization, in turn, encourages further standardization and a convergence of risk management and valuation models.

Central Counterparties Reduce Counterparty Risk

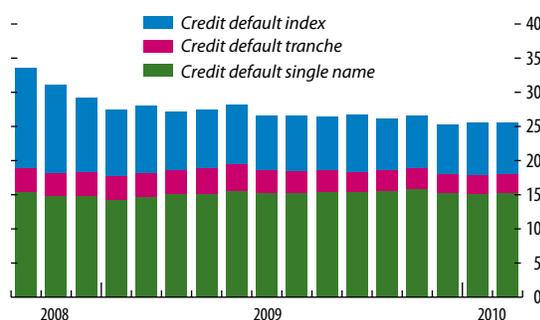
CCPs also reduce the potential knock-on effects of the failure of a major counterparty because the impact is mitigated and absorbed by the CCP's default protections, including the potential mutualization among its CMs who must share in any losses should the margin posted by the defaulting member be insufficient. In addition to lowering exposures through multilateral netting, CCPs require initial margin to be held against any losses of the defaulting CM. In the case of default, if initial margin funds are exhausted, then the defaulting CM's contribution to the CCP's guarantee fund made up of all the CMs' contributions is used. If this is also insufficient, then funds from the entire guarantee fund (now including other CMs' contributions) are used. Other backstops may also be in place to assure all other counterparties continue to be paid, thus halting the default of other counterparties (see below). The usefulness of a well-designed CCP became evident in the September 2008 Lehman Brothers failure and the near-failure of AIG (Box 3.3).

Central Counterparties Increase Market Transparency

CCPs can increase market transparency, as they maintain transaction records, including notional amounts and counterparty identities, although it is not the only route. The U.S.-based Depository Trust & Clearing Corporation (DTCC) shares CDS transaction information from its trade information warehouse with authorities.¹¹ However, it does not report on customized contracts, which by some estimates may comprise up to 15 percent of CDS and most equity derivative notional amounts outstanding. Sweden-based TriOptima is also collecting interest rate swap transaction data and sharing it with various countries' authorities. Also, MarkitSERV, jointly owned by

¹¹DTCC has been publishing detailed information on notional amounts outstanding by product type, reference entity, and other characteristics on a weekly basis since November 2008 (Figure 3.2).

Figure 3.2. Outstanding Credit Default Swaps in the Depository Trust & Clearing Corporation Data Warehouse
(Gross notional amounts, in trillions of U.S. dollars)



Source: Depository Trust & Clearing Corporation.

Note: Credit default swap (CDS) tranches are based on CDS index contracts, which are based on standardized indices of liquid single-name CDS contracts, those associated with a credit event of a single entity. Monthly data from November 2008 to February 2010.

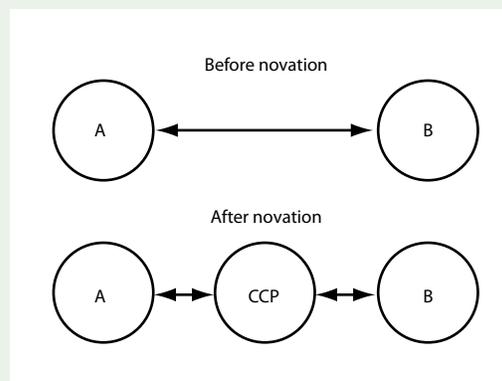
Box 3.2. The Basics of Novation and Multilateral Netting

This box provides a brief primer on the mechanics and counterparty risk reduction benefits of transferring bilateral derivative contracts to central counterparties.

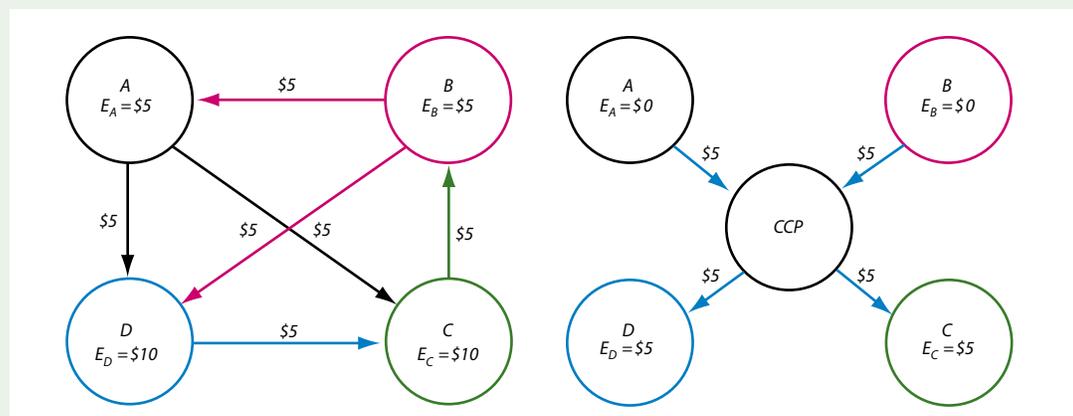
“Novation” discharges the original rights and obligations of the buyer and the seller and replaces their contracts with two new contracts with the central counterparty (see first set of figures). The assumption of counterparty risk can also be effected by an “open offer,” in which the central counterparty interposes itself at the time of the trade.

The second set of figures show how multilateral netting reduces the amount of counterparty risk in the system. The first figure of this second set shows contracts across four counterparties in a bilateral world (A, B, C, and D, clockwise from the top left corner). The numbers on the arrows indicate the net current replacement costs, so that, for example, if the contract between A and B were closed out immediately, B

Note: This box was prepared by John Kiff.



would owe A \$5. The E below those letters indicates the maximum counterparty exposure for the counterparty. Thus, for example, $E_C = \$10$ because it will cost C \$10 to replace the contracts with A and D if they both fail, etc. If all of these contracts are novated to a central counterparty, all of A's and B's counterparty risk exposure is eliminated, leaving C and D each with \$5 of exposure to the central counterparty.



DTCC and U.S.-based Markit, will also be performing similar functions for equity derivatives.

Ideally, there should be a single trade repository for each product type that collects and shares information in ways that are useful to the relevant authorities. Although different users will want information in different ways or for different purposes and at different times, they should agree to a standard framework.

Detailed individual counterparty transaction data should be available to all relevant regulators and supervisors of affected jurisdictions for use in monitoring individual and systemic risks. Indeed, relevant regulators are working on such templates and information sharing protocols in the OTC Derivatives Regulators Forum, which was formed in September 2009. Given the confidential nature of such data, the public should

Box 3.3. The Failure of Lehman Brothers and the Near-Failure of AIG

This box shows how central clearing might have reduced the systemic fallout from the Lehman Brothers' failure and AIG near-failure.

The logistical part of closing out Lehman Brothers' redundant credit default swap trades went quite smoothly, in large part due to an emergency round of compressions. However, the mass reestablishment of positions in already-stressed over-the-counter credit default swap markets was more difficult (Moody's, 2008). If all or most of Lehman's credit default swap trades had been novated to one or more central counterparties, the last-minute compressions and position reestablishments to other dealers would not have been necessary. In fact, all of Lehman's interest rate swap positions that had been cleared through LCH.Clearnet settled without difficulty in a few days following the bankruptcy, given the rules in place at the central counterparty. In fact, all other counterparties were paid what they were owed without using up all of Lehman's initial margin and without tapping the guarantee fund.

In the AIG case, systemically important banks had bought and relied on massive amounts of mortgage-

backed security default protection in the form of credit default swaps on subprime mortgages written by the insurer's financial products subsidiary (AIG-FP) and guaranteed by AIG.¹ As the crisis unfolded, the value of the protection soared, and following the ratings downgrade of parent company AIG, AIG-FP was obliged to post huge amounts of collateral that it did not have. Because of the potentially disastrous systemic knock-on effects of a failure to post, U.S. authorities decided to supply AIG with liquidity assistance that, at one point, exceeded \$100 billion. If these contracts had been novated to central counterparties, the collateral calls still would have been problematic for AIG, but they would have come sooner and more frequently. Hence, uncollateralized exposures would not have been given the chance to build to levels that became systemically critical.

¹AIG was able to amass such large positions because prior to March 2005 those positions were rated AAA and AIG was not required to post collateral. After the first downgrade (to AA+ in March 2005) AIG had to start posting. As the crisis unfolded, AIG's mounting collateral posting requirements, coupled with liquidity strains from its securities lending unit, became unsustainable in September 2008. See ISDA (2009) for more detail on the AIG situation.

Note: This box was prepared by John Kiff.

not be provided with this level of detail, but receive information that is aggregated.

Mandating exchange trading for all standardized derivatives as outlined in the September 25, 2009 G-20 Communiqué has also been suggested as a way to improve price transparency and market liquidity. However, to begin trading on an exchange the prospect of enough liquidity to maintain an active trading environment is needed. Standardization alone may not be enough to guarantee widespread interest in active trading. However, standardization is a necessary condition to achieving the counterparty risk reduction benefits of central clearing. Hence, the legislative and regulatory focus should be first on centralized clearing, and let standardization provide the natural incentives for exchange trading. Moreover, for any particular type

of contract, the potential benefits of exchange trading should be weighed against the infrastructure costs and benefits of continued customization typical in the OTC market.¹² Indeed, most of today's exchange-traded derivatives began as relatively customized bilateral transactions. An example of such evolutionary development is the "probability of default" (POD) credit derivative contract that is being developed for exchange trading. It is structured to resemble a euro-dollar futures contract, which is among the most active exchange-traded derivative contracts.¹³

¹²Squam Lake Working Group on Financial Regulation (2009, p. 5).

¹³For example, the POD contract will be available on the same quarterly maturity cycle as used for eurodollar contracts, and at maturity, single-name contracts will settle at a price of

Incentivizing Central Counterparty Participation and the Role of End-Users

While central clearing offers numerous counterparty risk mitigation benefits at the individual counterparty and systemic level, the benefits are only realized if a critical mass of contracts is moved to CCPs. In that regard, there remain some potential challenges to facilitate novation to CCPs, including enhancing the degree of product standardization and liquidity, potentially large up-front capital and margin requirements, and more clarity on how customer collateral would be treated in the event of the default of the CMs through which they establish CCP positions.

Product Standardization and Liquidity

Central clearing generally requires the use of “mass production” processes that work best with standardized and fungible products, whereas customized contracts require specialized pricing and risk models and one-off infrastructure solutions. This problem is most acute in the CDS market, where contracts have historically been nonfungible along business, legal, and operational dimensions. However, almost all interest rate swaps and index-based CDSs have long been sufficiently standardized for CCP eligibility, as are almost all single-name CDS contracts transacted since early 2009.¹⁴ That said, standardization is a necessary but not sufficient condition for CCP eligibility.

Another important condition for central clearing is the regular availability of prices and enough market liquidity to assure that such prices are representative, plus the ability of the CCP to manage the relevant risks (FSA/HM Treasury, 2009). All said, many end-

users continue to prefer OTC bilateral arrangements in order to meet their specific hedging requirements and hence have a desire for customized contracts. Accounting for these factors, according to dealer and IMF staff estimates, the movement of OTC derivative contracts to CCPs will vary by type of product. For example, the vast majority of bilateral interest rate swap and index-based CDS contracts are expected to move to CCPs, as are most single-name CDS contracts. However, commodity-based, equity-based, and foreign-exchange-based derivatives will be harder to move (see Table 3.2 for some estimates).

Getting Dealers to Move¹⁵

In order to get a critical mass of bilateral OTC derivatives to move over to CCPs, the major derivatives dealers will require some incentives to alter their current collateralization practices. The multilateral netting within the CCP should reduce counterparty risk and thus also the initial margin requirements for the individual participants in the CCP. However, because these overall benefits may be outweighed by various individual costs and hence may discourage dealers to move, it may be necessary to consider a charge against their remaining bilateral positions.

One implicit cost for some market participants is the loss of the netting benefits they already obtain on their bilateral contracts within their own derivatives books. For example, a dealer may be getting substantial netting benefits from standardized contracts that are CCP-eligible and nonstandard contracts that cannot be centrally cleared, but that are all transacted under the same master agreement.¹⁶ Collateral posting requirements associated with some market participants’

100 if the reference entity has not defaulted, or zero if it has defaulted. (The settlement price for index-based contracts will be equal to the sum of the referenced single-name probability of default contracts, divided by the number of entities.) Also, the contract is a pure play on default events, rather than on default events and recovery rates, as is the case with conventional CDS, in order to simplify settlement. Although this may limit the contract’s usefulness to some hedgers, planned as well are POD recovery futures that, for single-name contracts, settle at a price of 100 times the proportional recovery rate (the proportion of par value ultimately paid to the holder of the defaulted obligation).

¹⁴See Kiff and others (2009) for more on ISDA’s single-name CDS standardization protocols.

¹⁵See Singh (2010) for a more comprehensive discussion of the material in this section.

¹⁶For example, with a particular counterparty under the same master agreement, a dealer may have an in-the-money position (i.e., with a positive replacement value) via a nonstandard derivative contract and an out-of-the-money position via a standard derivative. These two positions can offset each other on the dealer’s books, resulting in a small net exposure on which capital requirements are based. If the out-of-the-money standard derivative position were to be transferred to a CCP, the net exposure would increase to the replacement value of the nonstandard derivative position, and capital requirements would increase accordingly.

Table 3.2. Incremental Initial Margin and Guarantee Fund Contributions Associated with Moving Bilateral Over-the-Counter Derivative Contracts to Central Counterparties (CCPs)

	Total Outstanding (Trillions of U.S. dollars of notional amounts)	Increment Moved to CCPs ¹ (Trillions of U.S. dollars of notional amounts)	Initial Margin and Guarantee Fund ² (As a fraction of offloaded notional amounts)	Incremental Initial Margin and Guarantee Fund (Billions of U.S. dollars)
Credit default swaps	36	24	1/600 to 1/300	40–80
Interest rate derivatives	437 ³	100 ³	1/5,000 to 1/3,300	20–30
Other derivatives ⁴	132	44	1/1,000	44
Total	605	168		104–154

Sources: Bank for International Settlements; and IMF staff estimates.

¹Two-thirds of all eligible credit default swaps and one-third of foreign exchange, equity, commodity, and “unallocated” derivatives are assumed to be moved to CCPs. See footnote 3 for the assumptions applied to interest rate derivatives.

²The ratios of initial margin and guarantee fund to notional cleared used to estimate costs to establish well-capitalized CCPs are drawn from recent CCP clearing activity. The ratios account for the impact of both multilateral compression and the margin rates on the resulting compressed notional amounts. For example, the 1/600 applied to credit default swaps could be consistent with a 1:10 compression ratio and a 1/60 margin rate.

³\$200 trillion of interest rate swaps are already on CCPs against which about \$20 billion of initial margin and guarantee fund contributions have been posted. \$100 trillion of the remaining \$237 trillion of interest rate derivatives is assumed to be moved to CCPs.

⁴Other derivatives include contracts linked to foreign exchange (\$49 trillion), equities (\$7 trillion), commodities (\$4 trillion), and an “unallocated” amount (\$72 trillion).

OTC derivative trading books may increase if only some of the contracts can be moved to CCPs, because some of the netting benefits under existing bilateral contracts could be lost.¹⁷ Some dealers argue that the multilateral netting benefits within the CCPs will not be large enough to offset these potential increased collateral needs. However, most view that this is a transitional issue that will be lessened as more derivatives become CCP eligible.

Another possibly sizable incremental cost of moving contracts to CCPs relates to the upfront initial margin that is not typically posted on bilateral inter-dealer trades, plus guarantee fund contributions where they are dependent on the amount of contracts cleared.¹⁸ The direct incremental initial margin and guarantee fund contributions are expected to be large—up to about \$150 billion according to the analysis sum-

marized in Table 3.2.¹⁹ To put this in perspective, a recent JP Morgan report estimated that the total capital cost of all the recently introduced regulatory measures across 16 global banks would amount to about \$221 billion (JP Morgan, 2010).

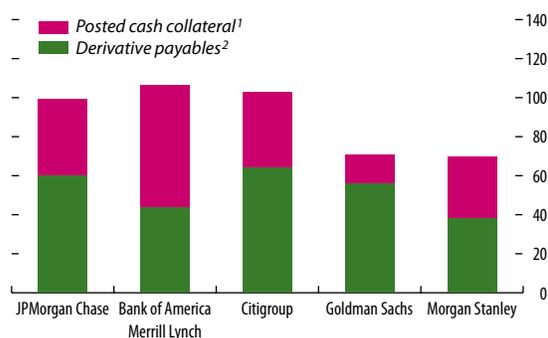
A somewhat smaller cost stems from the inability to re-lend or otherwise use the collateral that dealers do collect from some of their end-users. This collateral is typically re-used—for example, lent out again through rehypothecation (Singh and Aitken, 2009a). Such collateral that would then be posted at the CCP would be unavailable to the dealers for re-use. For example, at end-December 2009, posted collateral amounts ranged from \$15 billion to \$63 billion among the five U.S. banks most active in OTC derivative markets (Figure 3.3). In the current low interest rate environment, this lost revenue may

¹⁷If initial margin is not posted on contracts that are not centrally cleared, the loss of netting benefits becomes an increase in counterparty risk exposure. The assumption that it will be posted is based on the idea that the authorities will either mandate or incentivize (e.g., via higher capital charges) initial margin posting.

¹⁸The analysis here considers only bank-dealer initial margin requirements. Most nondealer financial firms (e.g., hedge funds) post both initial and variation margin to their dealer (and prime broker) counterparties. Other end-users, such as investment-grade corporates, sovereigns, and central banks, often do not post collateral.

¹⁹Variation margin is not expected to change, since the calculation methodologies are expected to remain functionally identical to those currently used for bilateral contracts. The estimates of the incremental amounts associated with the guarantee fund and initial margin posting are based on a framework detailed in Singh (2010) and on information gathered from a number of CCPs and derivatives dealers. This information includes, by product class, an estimate of the proportion of total outstanding notional amounts that are likely to be transferred to CCPs, and an estimate of the range of initial margin posting requirements currently used at CCPs as a proportion of notional amounts. These estimates would change if the amounts transferred to CCPs are different and as the risk of the underlying the product class changes.

Figure 3.3. Derivative Payables plus Posted Cash Collateral
(In billions of U.S. dollars as of December 31, 2009)



Source: Bank/dealer 10Q reports.

¹Posted cash collateral is collateral posted against specific over-the-counter derivative contracts that may be reused (rehypothecated) for other purposes by the institution to which it is posted.

²Derivative payables are the sum of the negative replacement values of an institution's outstanding contracts.

not be much greater than that which they would receive on the initial margin held at CCPs, since CCPs generally pass on whatever the posted collateral earns to their CMs. That said, as interest rates rise, the opportunity cost to the lost interest income may become greater and the reluctance to keep initial margin at the clearing house will rise.

Hence, all of these costs, which may be substantial for some dealers, could reduce or even eliminate any incentives to move contracts to CCPs. Given the higher costs for some dealers and their possible reluctance to clear OTC derivatives through CCPs, European and U.S. authorities are proposing legislation that will incentivize, if not mandate, clearing “eligible” OTC derivatives through CCPs. Eligibility standards for clearable contracts focus on contract standardization and market liquidity, and so far, are determined by the CCPs. In some cases the push will come from higher counterparty capital charges imposed on banks and dealers on bilaterally cleared transactions, and the pull from near-zero capital charges imposed on CMs on centrally cleared transactions.²⁰ There is a recognition that not all transactions will be eligible, but the proposals still intend to make noncleared transactions more expensive, reflecting their higher counterparty risks. Given the high upfront costs and a compelling case for some contracts to remain customized for end-users, some favor mandating a wholesale move of OTC derivatives to CCPs. This may help solve the dilemma that, without it, dealers may be reluctant to be first movers if they fear that not enough other dealers will move contracts to CCPs to achieve the multi-lateral netting benefits. On the other hand, because it would require dealers to post potentially large amounts of collateral at once, this may be disruptive.

The current method of assigning capital charges to derivative positions is based on net derivative exposures (i.e., derivative receivables minus derivative payables, net of collateral posted on receivables). This method is based on the traditional notion that the counterparty risk associated with an open derivatives position is borne by the dealer that holds the

²⁰Regulatory counterparty risk capital requirements on centrally cleared transactions are currently zero, but the Basel Committee on Banking Supervision has proposed a nonzero regulatory capital charge on CM contributions to default or guarantee funds (BCBS, 2009).

open position (i.e., if its counterparty reneges on the contract the dealer will have an unsecured claim in its counterparty's insolvency proceeding for the net replacement cost of all the contracts under the master agreement). So far, the Basel Committee on Banking Supervision's latest proposals are aimed at strengthening counterparty risk capital requirements to take better account of this measure of counterparty risk (BCBS, 2009).

However, as a way of reflecting the risks that the large OTC derivative dealers' books pose to their counterparties and to the financial system as a whole, a direct charge or "tax" on derivative payables (the amounts owed to others) could be considered (Singh, 2010; Singh and Aitken, 2009b).²¹ Figure 3.3 shows that the derivative payables of each of five large U.S. banks ranged from about \$50 billion to \$80 billion and totaled \$337 billion at end-December 2009. The five European counterparts most active in OTC derivatives markets had similarly large payables at end-December 2009 (ranging from about \$45 billion to \$95 billion and totaling \$370 billion). However, such amounts can vary. For instance, at end-December 2008, total derivative payables at these same 10 banks totaled over \$1 trillion, due to the severely dislocated markets at the time. As an example of how such a charge could be constructed: assume an ad hoc "tax" of 20 percent is charged on the peak \$1 trillion total derivative payables for these institutions and, say, on an assumed one-third of OTC derivative contracts that are not centrally cleared, then the total additional cost of such a surcharge will be about \$70 billion (20 percent x 1/3 x \$1 trillion).²² The "tax rate" would need to be calibrated to provide enough incentive to move contracts to CCPs, but not so high as to overly burden dealers, as they attempt to deleverage and accommodate the more stringent regulations likely to

be enacted. Also, timing of the introduction of such charges would need to be carefully considered.

This estimate should be considered very rough since the degree to which derivative payables may decrease when other Basel II capital charges are imposed or when more collateral is moved to CCPs is unknown. On the other hand, derivative payables may rise if bilateral netting is less effective given the movement of contracts to CCPs. However, in principle, a direct cost related to the systemic risk stemming from OTC derivatives that a large derivatives dealer poses to others would help induce them to lower their derivative payables in their OTC derivatives book—that is, their risk imposed on the rest of the system.

Getting End-Users to Move

One of the key challenges to moving OTC derivatives to CCPs is to get end-users to ask their CMs to move their positions. "End-users" in this case means investors, including hedge funds and insurance companies, and nonfinancial corporates, sovereigns, and quasi-sovereigns that are using derivatives to hedge balance sheet risks. While moving positions to CCPs reduces their counterparty risk, such end-users also want to be assured that their CCP positions will be seamlessly ported to another CM in the event of the default of the CM through which they have established their positions. Many large customers also want to be assured that any collateral they post will be segregated from the collateral posted by their CM, and ideally segregated from the collateral posted by the CM's (and CCP's) other customers. Some CCPs are providing customer clearing services offering different levels of position portability and collateral segregation, but this area remains a work in progress (Box 3.4).

Getting CCP buy-in from some end-users might be difficult, because many do not currently post any collateral or margin. In some cases, they pledge other assets in lieu of cash and high-quality securities, and in other cases they only have to post collateral if certain credit-quality triggers (e.g., credit-rating downgrades) are tripped. Reasons for noncollateralization include transaction volumes that are not high enough to justify the operational costs of collateralization, and insufficient liquidity to manage daily collateralization adjustments. Liquidity is a particular concern

²¹There are other amounts that a derivatives dealer bank would owe its counterparties besides those attributable to derivatives trades as such banks have many relationships with other counterparties. So a capital charge on derivatives payable would only cover systemic derivatives-based risks.

²²The total amount of capital raised during the crisis, excluding government capital repaid, for banks in the United States, euro area, United Kingdom and other mature European countries to date is about \$860 billion.

Box 3.4. Central Counterparty Customer Position Portability and Collateral Segregation

The segregation of customers' collateral and the portability of positions are viewed as key mechanisms to facilitate customer access to clearing, especially since direct access for most customers to a central counterparty (CCP) is not feasible or convenient. This box provides an overview of the legal foundations required to ensure that segregation and portability are effective. It also shows that when customer collateral is commingled in so-called omnibus or "consolidated" accounts, which is the case for most CCPs, some of that collateral is potentially at risk in the event of their clearing member's default.

Segregation occurs when a clearing member (CM) is holding two or more separate collateral portfolios: one for itself and one for its customers. While it may be technically possible, and in some jurisdictions feasible, to apply segregation techniques on cash, in other jurisdictions this will be legally difficult if not impossible.¹ Segregation is generally achieved by the CM lodging all customer collateral in a customer *omnibus* or consolidated account. In addition, a market practice is increasingly being considered under which the CM holds with the CCP the collateral of its customers in individualized or "designated" accounts (i.e., in the name of each customer). In some jurisdictions, and depending on the type of collateral (e.g., cash or securities) and agreements between stakeholders (CMs, CCPs, and customers), the collateral may be held at the CM, CCP, or a custodian.

The main purpose of segregation is to protect customers against the risk that, in the event of the insolvency of their CM, the insolvency receiver of the failed CM keeps the customer's collateral to satisfy the obligations of the failed CM generally, instead of its obligations to the customer. This is typically achieved through specific provisions in so-called securities holding laws, through which customers depositing securities collateral with a CM acquire individual or

collective property law rights in collateral pools held by that CM on behalf of its customers with custodians such as CCPs. By providing such protection, segregation enables a CCP (or the regulator) to transfer both the defaulting CM's customers' exposures and their related collateral to another CM in an unhindered manner, which allows the customers to meet their settlement obligations and hedge their exposures as needed. However, even in cases of segregation, the practice of reuse may subject collateral to additional risk. To enhance protection to a customer of its collateral, collateral should be used only subject to the customer's specific authorization.

However, even though well-designed omnibus and individualized accounts both protect customers against the insolvency of a CM, these two techniques have different legal consequences. In most systems using customer omnibus accounts, when both a CM and customer become insolvent, the CCP first applies the insolvent customer's collateral to satisfy the obligations of the failed CM. Then all collateral lodged into the omnibus account (including the collateral originally provided by nondefaulting customers) is used to satisfy any remaining obligations of the defaulting customer. (If a customer, but not the CM, fails, the CM will remain responsible to the CCP for the margin obligations of all its customers.) In contrast, if customers' *individualized* accounts are held and recognized at the CCP level, only the collateral lodged in the individual account of a customer can be used to cover losses related to the default of that customer.

To the extent that omnibus accounts are less costly than individual accounts to maintain, customers face a trade-off between the safety inherent in the enhanced individualized segregation of their collateral and the costs associated with such additional protection.

Portability is the legal mechanism allowing, in case of default or insolvency of a CM, for the transfer by the CCP (or the regulator) of the CM's customers' cleared positions and collateral to another solvent CM. By enhancing portability, legal frameworks can help to mitigate systemic risks arising from disruptions to the financial system in case of insolvency of a CM.

Movement by CCPs of contracts and related collateral from a defaulting CM to a nondefaulting CM takes place through new contractual arrangements,

Note: This box was prepared by Alessandro Gullo and Isaac Lustgarten.

¹See the "Report to the Supervisors of the Major OTC Derivatives Dealers on Proposals of Centralized CDS Clearing Solutions for the Segregation and Portability of Customer CDS Positions and Related Margin," letter delivered to the New York Federal Reserve on June 30, 2009 by an ad hoc group of market participants (www.managedfunds.org/members/downloads/Full%20Report.pdf).

sometimes supported by statutory provisions. Under such arrangements, the nondefaulting CM agrees to accept the defaulting CM's customer positions and collateral and the customers agree to accept the nondefaulting CM as a counterparty, commonly, without additional consent of the defaulting CM whose contract with the customer has been terminated as a result of its default. Positions and margins may be transferred as a unit or on a piecemeal basis.

The effectiveness of such a portability regime requires strong legal underpinnings. In particular:

- The laws applying to derivatives or to insolvent CMs should not limit the ability of customers to close out their position vis-à-vis the CM;
- The proceedings of the CCP should be carved out from general insolvency proceedings of insolvent CMs;

- Statutory provisions might be required to render portability enforceable even upon the commencement of an insolvency proceeding against the failed CM;
- Transfers organized by the CCP might need coordination with the supervisors in case the latter's approval is needed; and
- In some cases, private international law applicable to the transfer of contracts and related collateral should be harmonized.²

²The movement of positions and collateral made through the CCP, while being fully enforceable in the CCP's home jurisdiction, might not be recognized by other jurisdictions (e.g., where the CM is in insolvency proceedings) whose laws may provide for different treatment on issues such as the exercise of close-out netting rights.

for hedging transactions where the underlying cash flows being hedged occur years or even decades in the future. In this regard, the European Association of Corporate Treasurers has expressed concerns that if such transactions are not "carved out" of requirements to be fully collateralized, some corporations will find it too expensive to hedge genuine commercial risks (ACT, 2009).

Hence, there does seem to be a good case to "carve out" some "real" hedging transactions by end-users from requirements to move their contracts to CCPs. The legislation that was passed by the U.S. House of Representatives and similar legislation being considered by the U.S. Senate provides for exemptions for some hedgers who are not dealers or "major swap market participants." Furthermore, the House bill carves out transactions in which one of the counterparties is hedging commercial risk, including operating or balance-sheet risk, whereas the Senate bill carve-out applies only to derivatives that are "effective hedges" under generally accepted accounting principles. However, assuming end-users receive such relief, the dealers servicing these real hedgers should be expected to ensure that such hedges are truly effective, beyond the

legislative definitions. European policymakers are also deciding on which approach to take and are considering whether it is appropriate to carve out nonfinancial corporate end-users. However, rules that exempt "real" hedging transactions will be difficult to enforce and would require dealers to be highly knowledgeable about the activities of their customers.

Criteria for Structuring and Regulating a Sound Central Counterparty

While CCPs have advantages in terms of efficiency, potential transparency, standardization, convergence of risk management and valuation techniques, and counterparty risk reduction, they also concentrate credit and operational risk associated with their own failure. The collapse of a CCP can have systemic consequences on the financial system, although such failures have been rare. This underscores the importance of making sure that CCPs are subject to effective regulation and supervision, have strong risk management procedures in place, and are financially sound. To this end, CCPs should have appropriate risk modeling capabilities, be built on solid multilayered financial resources that are

reinforced by financially strong CMs, have clear and legally enforceable layers of protection or financial support for covering losses given a CM default, and have developed contingency and crisis management plans, including for emergency liquidity support.

Moreover, given that CCPs are active internationally, given the global nature of the OTC derivatives market, this requires close cross-border coordination of regulatory and supervisory frameworks. This would help avoid regulatory arbitrage and mitigate systemic risk and adverse spillover across countries. The legal and regulatory treatment of CCPs should be clarified on issues such as their legal forms and charters, supervisory regime, risk management framework, insolvency regime, and emergency resolution process.

A report with recommendations for central counterparties, jointly produced by the CPSS and IOSCO, represents the current worldwide standards for CCP risk management (CPSS/IOSCO, 2004). However, the report does not address the specific risks associated with OTC derivatives, an omission that is being rectified by a joint CPSS and IOSCO working group established in 2009. Moreover, the European System of Central Banks (ESCB) and the Committee of European Securities Regulators (CESR) have jointly published recommendations for CCPs that already reflect OTC derivatives clearing (ESCB/CESR, 2009). Also, the establishment of the OTC Derivatives Regulators' Forum by several financial regulators in September 2009 represents an important first step to promote consistent application of public policy and oversight approaches and to coordinate the sharing of information. This section will discuss some of the key best practices that should be embedded in such frameworks.

Membership and Governance

Best practice CCP risk management starts with stringent requirements to become a CM in terms of sufficient financial resources, robust operational capacity, and business expertise. These requirements should be clear, publicly disclosed, objectively determined, and commensurate with risks inherent in the cleared products and the obligations of CMs to the CCP. Also, CCP governance arrangements should protect against compromising risk management and controls.

The current CCP governance structures differ—some CCPs are for-profit entities with dispersed ownership, while others are effectively user-owned utilities. Although each type of governance structure has its strengths and weaknesses, the basic tenet to increase volume of business suggests that both models could lead to a loosening of risk management standards in order to either reduce the cost on the existing users or to attract new users. However, this tendency will be counteracted provided that users, who bear the risk of each other's default, have a sufficient voice in governance and particularly if the CCP is user-owned.

In most countries CCPs are set up as separate legal entities, although in some countries the CCPs are part of trading platforms or settlement systems. When CCPs are part of such larger groups there is a potential to create conflicts of interest and expose the CCPs to risks unrelated to their clearing operations. One way to mitigate these conflicts and protect CCPs from contagion risk is to legally ring-fence the CCP operations from the other activities and to have governance structures incorporating independent directors. When designing the governance structure, CCP risk management functions should report directly to the top organizational level (e.g., Board of Directors) and be separated from the management of financial resources. The interests of the CM's customers—such as through an advisory role in the corporate structure or as independent directors—should also be taken into account.²³

Financial Resources

One of the key lessons learned from recent CCP failures and near failures is the importance of having transparent, ex ante resolution arrangements on how to close out positions (Box. 3.5). These arrangements include the auctioning of proprietary positions, the transfer of customer positions to the surviving CMs, and allocating the losses to the surviving CMs in a timely manner. The arrangements also include methods for determining the size and

²³For example, the U.S. House of Representatives bill restricts dealers and other major swap market participants from collectively owning more than 20 percent of a derivatives clearing house.

nature of position allocations, as well as measures to handle confidentiality and conflict of interest between the CCP and the CMs.

Figure 3.4 illustrates the typical layers of protection that a CCP accesses to satisfy the obligations of a defaulting CM. Following the frequent payment of variation margin, initial margin collected from CMs against their specific positions forms the first buffer of protection against potential losses. Initial margin serves to protect the CCP against contract nonperformance—that is, a CM default. It should be determined by the specific features of the contracts and current market conditions, risk-based, reviewed and adjusted frequently, and stress-tested regularly, even daily for highly volatile contracts.²⁴ Initial margin should be in the form of cash, government securities, and possibly other high-quality liquid securities.²⁵ By contrast, variation margin, which passes daily losses or gains from losers to gainers to ensure that market risk exposures are covered, should be in the form of cash and collected automatically on a daily basis (or intraday in some cases).

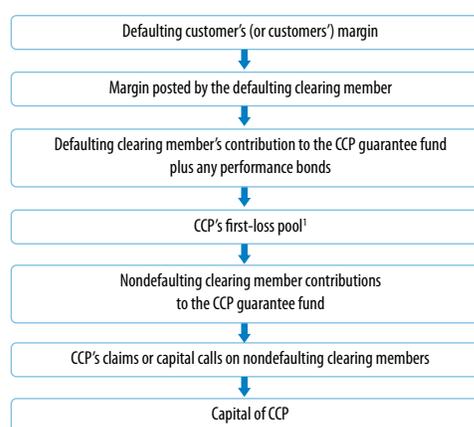
The next buffer of CCP protection comes from the defaulting CM's contributions to a guarantee fund (also known as a default fund or clearing fund). This is used, when a defaulting CM's margin is insufficient to fulfill its payment obligations, to temporarily cover the CM's losses while its other assets are being liquidated, and to permanently cover losses if the CM is insolvent. Guarantee fund contributions should be related to the CM's market position and the nature of its exposures, and be reevaluated regularly. Best practice for assigning this value is based on a combination of value-at-risk techniques and stress tests.²⁶ It is crucial that a CCP

²⁴More specifically, initial margin should be sufficient to cover potential losses during the time it takes to liquidate positions in the event of a CM default. For example ESCB/CESR (2009, p. 16) recommends that there be sufficient margin “to cover losses that result from at least 99 percent of price movements over an appropriate time horizon.”

²⁵Some CCPs allow designated hedgers to use letters of credit from highly rated banks to be used as collateral. (This allows nonfinancial firms to use their unencumbered physical assets to secure their hedging activities.)

²⁶Stress tests take into account extreme but plausible market conditions, and are typically framed in terms of the number of CM defaults a CCP can withstand. For example, ICE Trust's guarantee fund is sized to withstand the default of its two largest CMs.

Figure 3.4. Typical Central Counterparty (CCP) Lines of Defense against Clearing Member Default



Source: IMF staff.

Note: This is an illustrative example of lines of defense of a CCP. It should be noted that these structures, orders, and nomenclature vary in each CCP and there is not a legally mandated one (although their differences clearly have significant financial and operational implications). This figure assumes that a clearing member defaults because a customer fails to meet its obligations and its collateral is insufficient. Clearing member defaults may be triggered for other reasons, even ones unrelated to the derivative product involved in the transaction.

¹The first-loss pool is an initial level of funds contributed by the CCP, which even if absorbed would still allow the CCP to continue to function.

Box 3.5. History of Central Counterparty Failures and Near-Failures

Central counterparty (CCP) failures have been extremely rare—there have been only three going back to 1974. There are additional instances of close calls or near-failures. This box reviews the circumstances behind the three failures as well as two near misses, and then draws some key lessons from these episodes.

The French Caisse de Liquidation clearing house was closed down in 1974 as a result of unmet margin calls by one large trading firm after a sharp drop in sugar prices on the futures exchange. As described by Hills and others (1999), one of the primary causes of the failure was that the clearing house did not increase margin requirements in response to greater market volatility. Also, although it lacked the authority to order exposure reductions, the clearing house should have informed the exchange (which had the authority) of the large size of the exposure of Nataf Trading House. The problem was further aggravated when the clearing used questionable prices and non-transparent methods to allocated losses among CMs. The Malaysian Kuala Lumpur Commodity Clearing House was closed down in 1983 as a result of unmet margin calls after a crash in palm oil futures prices on the Kuala Lumpur Commodity Exchange. Six large brokers that had accumulated huge positions defaulted as a result of the large losses that were generated by the price collapse. Again, the clearing house did not increase margin requirements in response to greater market volatility. Furthermore, there was a coordina-

Note: This box was prepared by Randall Dodd.

tion breakdown between the clearing house and the exchange, which did not exercise its emergency powers to suspend trading. Also, sloppy trade confirmation and registration resulted in long delays in ascertaining who owed what to whom.

The Hong Kong Futures Exchange had to close for four days, and be bailed out by the government in 1987, as a result of fears of unmet margin calls on purchased equity futures positions following the October stock market crash (Cornford, 1995; Hay Davison, 1988). Adding to the situation was that many of the sold equity futures positions were being used to hedge purchases of stocks, so that a failure on the futures contract would likely require additional selling pressure by those holding the stocks themselves. Yet again, margin was not raised in amounts commensurate with rising volatility, plus many brokers were not diligently collecting margin from their customers. Also, there was a lack of coordination between those monitoring the market and those providing the guarantees due to the separation of ownership of the exchange, the clearing house, and the contract guarantee fund. In addition, there were no position limits and market risk became concentrated in a few brokers and customers (five of 102 brokers accounted for 80 percent of open sold contracts).

Near Failures

Also in the wake of the October 1987 crash, both the Chicago Mercantile Exchange (CME) and the Options Clearing Corporation (OCC) encountered severe difficulties in receiving margin. In the case of the

balance the relationship between initial margining and a guarantee fund. For instance, a CCP that relies on a lower margining and a higher guarantee fund may contribute to moral hazard by encouraging some CMs to take higher risks, since their losses are mutualized among all CMs. On the other hand, higher margining and a lower guarantee fund reduces CMs' potential exposures to other CMs and may dilute their interest in ensuring that the CCP manages its risks robustly. Ultimately, the CCP should be managed so that it can

survive an extreme but plausible stress event, such as simultaneous defaults of several large CMs.

If the defaulting CM's margin and guarantee fund contributions are insufficient, there are several additional layers of protection. These include a CCP-funded first-loss pool, the remaining guarantee fund contributions, and capital calls on nondefaulting CMs (which are typically capped). The capital of the CCP is the last layer of protection after the capital calls. Protections for various types of liquid-

CME, failure was averted when its bank, Continental Illinois, advanced the clearing house \$400 million just minutes prior to the opening bell in order to complete all the \$2.5 billion in necessary variation margin payments. These included a \$1 billion payment from a major broker-dealer that had remained outstanding despite assurances from its executive management of its ultimate arrival (MacKenzie and Millo, 2001; Brady Commission, 1988). Although the crisis was averted, the CME realized that CMs retained too much discretion over the timely payment of margin and thus adopted a policy of automated payments from CMs.

At the same time, similar problems occurred in clearing equity options trades on the Chicago Board Options Exchange. A large CM at the OCC had difficulties meeting its margin calls and required an emergency loan from its bank in order to avoid non-compliance. The OCC was also plagued by some operational problems, including the lack of an automatic payment system, and the OCC was late in making payments to its CMs (Cornford, 1995; GAO, 1990). Also, the OCC and CME did not have joint or linked clearing arrangements, so traders who hedged options with futures on the CME experienced delays in transferring gains realized at one clearing house to cover losses at another.¹

¹In addition, a major broker's automated order submission systems did not accommodate options prices above \$99.99, and so account payment instructions were sometimes understated (e.g., a price of \$106 appeared as \$6). Plus, in hindsight, there was a risk management failure in that it

Lessons

There are several overall lessons to be gleaned from these derivative CCP failures and near-failures.

First, margin requirements should be adjusted frequently and collected promptly in order to secure contract performance. Automated payments systems can help avoid liquidity shortfalls at CMs and the clearing house. Joint clearing or direct payment arrangements between clearing houses can relieve some problems with payment shortfalls.

Second, clearing and market oversight functions within a clearing house/exchange context should be well coordinated, so that position exposures can be monitored and appropriate steps quickly taken.

Third, market surveillance and the authority to manage potentially destabilizing exposures are critical. CCPs need to monitor positions, potentially impose limits on positions and daily price changes, and enforce exposure reductions if necessary. Even intraday exposures can pose problems, so capital or margin requirements based on volatility may be needed.

Operational risks can lead to failure during times of stress. Trades need to be confirmed and cleared promptly so as to minimize uncertainty as to exposures. Trade reporting is needed for proper market surveillance.

appears that too many market makers were selling insufficiently hedged puts with too little margin.

ity problems can also be provided by emergency lines of credit and access to central bank liquidity facilities.

More broadly, the structure of these protective layers can play an important governance role in assuring effective financial management of CCPs. For example, while CCP-funded first-loss pools incentivize diligent risk management by the owners, the guarantee fund and capital calls incentivize CMs to be particularly interested in membership criteria.

Access to Central Bank Liquidity

At a minimum, CCPs should have access to liquidity backup commitments from banks and other financial institutions that are preferably not CMs, in order to cover temporary shortfalls in payments from otherwise solvent CMs, and as an additional source of support to fulfill contract performance. Such liquidity lines should be denominated in the same currency as the contracts cleared. However, OTC derivative CCPs settling their cash obligations, including CM margins,

through commercial banks, could lead to potential risk concentrations to a few settlement banks. For example, the bank might default and the CCPs and its CMs may lose their money, or the bank might not be able to provide the liquidity when it is needed by the CCP. Hence, those deemed to be systemically important should have access to emergency central bank liquidity. However, any such emergency lending should be collateralized by the same high-quality liquid securities as those typically posted against monetary policy operations. Also, it should not be done in any way that might compromise the central bank's monetary policy or foreign exchange policy operations.

In order to reduce settlement risk, some European CCPs (e.g., German-based Eurex Clearing AG and France-based LCH.Clearnet SA) are licensed as banks, and have access to their central bank accounts, including access to intraday liquidity. Also, some European central banks (for example, the Sveriges Riksbank and the Swiss National Bank) offer intraday liquidity to regulated nonbank financial institutions, including investment firms, clearing houses, and insurance companies. Although automated payments systems can help avoid liquidity shortfalls at CMs, CCPs should be able to settle their transactions using the central bank so that there is no uncertainty about the finality of payment. Furthermore, CCPs should be able to deposit cash collateral with their central bank.

Operational Risk Mitigation

In order to reduce intraday risks, CCPs should ideally capture trades and assume the related counterparty risk at the time of execution.²⁷ This immediately reduces counterparty risk to the CMs because trades are immediately novated to and cleared by the CCP. However, some OTC derivative CCPs catch transactions at the time of trade execution, and of those that do, the counterparty risk is not assumed until the end of the

²⁷This is in fact the case for exchange-traded derivatives—the CCP catches the trade information automatically in real time from the trading platform, and typically becomes the direct counterparty after trade execution.

trade date.²⁸ In such cases, CMs remain exposed to the risk that their counterparties default.

CCPs should also identify and manage operational risks arising from operations outsourced to third parties or from interlinkages with other infrastructures. Finally, to ensure business continuity, CCPs should also implement robust infrastructures and sound internal controls and procedures so that operational failures are handled quickly, including offsite backup infrastructure and networks. CCP key system components also need to be scalable in order to handle increased volume under stress conditions.

Cross-Border Dimension of Central Counterparties and Regulatory Coordination

The failure of a major CCP will not only affect the functioning of the domestic financial market, but it will also have a cross-border dimension due to the global nature of OTC derivatives markets. Thus, authorities have an important role to play in ensuring that a CCP has adequate risk mitigation and management procedures and tools to protect the integrity of the markets more generally. There is also a need for authorities to have contingency plans and appropriate powers to ensure that the financial failure of a CCP does not lead to systemic disruptions in all related markets. Certain jurisdictions also empower supervisors to trigger early intervention tools to take control of a troubled CCP.

Potential complications are introduced if CCPs clear transactions originated outside the local market, involve counterparties from different jurisdictions, or deal with collateral located or issued in different countries or denominated in different currencies. Such internationally active CCPs require greater regulatory coordination than purely domestic ones.

These frameworks need to ensure that sound and efficient CCP linkages and clearing mechanisms are established across jurisdictions, without unduly constraining multiple-currency or cross-border transactions. Furthermore, cross-border cooperation among regulators should hinder any CCP “racing to the bottom,” such as by loosening risk management standards

²⁸Some CCPs will only accept transactions after checking on available (and/or calling for additional) collateral.

in pursuit of market-share gains. Such coordination should also aim to ensure that regulatory arbitrage opportunities are minimized.

How Should Central Counterparties Be Regulated and Overseen?²⁹

Regulation, prudential supervision, and oversight of CCPs are essential to ensure that risks are adequately managed, and that any adverse impact on the rest of the financial sector is limited. In the OTC derivatives market, securities regulators are generally responsible for transparency, protection of investors, and proper conduct. Central banks are typically responsible for the containment of systemic risk and the soundness of the systems. Sometimes enforcement of prudential rules (i.e., rules aimed at ensuring prudent management of risks by the CCP) is part of the securities regulator's remit, and sometimes it is the role of a separate prudential supervisor that may or may not be the central bank. Nevertheless, central banks responsible for financial stability have a keen interest in ensuring that the design and operation of the infrastructure does not have any adverse impact on financial market stability. Regulators, prudential supervisors, and central banks should cooperate to create an effective regulatory and oversight regime for CCPs avoiding overlaps or loopholes.³⁰ Various jurisdictions approach this issue differently (Box 3.6).

In order to ensure effective CCP regulation, prudential supervision and oversight, there should be a clear legal basis that assigns explicitly the role of the regulator, prudential supervisor, and systemic risk overseer, with appropriate coordination and division of labor in light of their competences. Memoranda of Understanding are insufficient in the absence of legally comprehensive and enforceable rules (Box 3.6). In addition, due to its systemic impor-

tance, a CCP should be subject to the oversight of a systemic risk overseer that has the authority to allow access to emergency liquidity, which in most countries is the central bank. Moreover, an international regulatory coordination framework should be in place for the regulation, prudential supervision, and oversight of internationally active CCPs that clear substantial trades executed in the relevant authorities' local jurisdictions.³¹

One versus Multiple Central Counterparties?

The CCP industry typically exhibits network externalities, in that the value of the services offered depends on the number of participants and contracts cleared. In other words, an increase in the number of CMs will have benefits that accrue to existing CMs, as they will be able to clear with more counterparties. In addition, the CCP industry exhibits important economies of scale, which means that the average cost per transaction declines with an increase in the number of transactions. Staffing, premises, and information technology infrastructure, such as a database engine, the clearing platform, networks, and interfaces have high fixed costs. Also, CCP multilateral netting efficiencies diminish as the number of CCPs clearing the same product type increases.³² In sum, a single CCP has potentially the lowest costs.

On the other hand, a single CCP would lead to the concentration of default and settlement risks in a single entity. If a single CCP fails due to inadequate risk management measures, there would be a tremendous impact on the market for the cleared product and potentially other linked markets simultaneously. Indeed, the OTC derivative market is global and the failure of a major CM would likely have a similarly material impact on more than one CCP, although the provision of emergency liquidity

²⁹The term "regulation" as used here encompasses both the issuance of rules and guidance by market regulators as well as enforcement, while the term "oversight" refers to the specific responsibilities and tools central banks have with regard to the safety and efficiency of payment and post-market infrastructures.

³⁰Noting that the credit derivative market was a focal point during the crisis, the G-20 Summit in London in April 2009 committed to promote the standardization and resilience of credit derivatives markets, in particular through the establishment of CCPs subject to effective regulation and supervision.

³¹The CLS Bank that settles foreign exchange transactions has such an oversight structure with the Federal Reserve Board in the lead role. Other central banks provide the Federal Reserve Board with any issues to raise with the CLS Bank about their domestic currencies.

³²Duffie and Zhu (2009) show that in plausible scenarios, the fewer the number of CCPs and the greater their scope, in terms of product types, the more efficient is the use of collateral and capital.

Box 3.6. The European and U.S. Regulatory Landscapes

This box outlines the respective regulatory landscapes in Europe and the United States and takes note that central counterparties providing similar services and products are subject to different regulatory regimes, creating potential regulatory arbitrage.

Currently in Europe, central counterparties (CCPs) provide services on a global basis but remain regulated at the national level. They are either part of the exchanges, settlement systems, or independent entities. In the latter case, they are mostly chartered as banks and, consequently, subject to the banking supervisory authorities. Furthermore, due to their impact on the orderly function of the securities market, CCPs are also regulated by securities regulators. Most are also subject to central bank oversight due to their systemic importance. The recommendations for CCPs by the European System of Central Banks and the Committee of European Securities Regulators (ESCB/CESR)—which are based on the Committee on Payments and Settlement Systems and International Organization of Securities Commissions recommendations—have started a process of converging national approaches, but they are not legally binding (ESCB/CESR, 2009). Recently, the European Commission, taking into account the ESCB/CESR recommendations, initiated work to produce European legislation that will govern the activities of CCPs, linkages between CCPs, and the features of instruments to be cleared. This work aims to allow cross-border provision of CCP services once it has been authorized by one member state's authorities.

In the United States, a CCP can also be established as a bank or as part of a settlement system or

an exchange. Depending on its legal status, a CCP could be regulated by the Federal Reserve System, Securities and Exchange Commission (SEC), or Commodity Futures Trading Commission (CFTC). Typically one of these bodies would be the main regulatory body. For example, ICE Trust is subject to the banking supervision of the Federal Reserve Bank of New York because it is a chartered limited purpose liability trust company in New York state. The two CCPs of the Depository Trust & Clearing Corporation group, Fixed Income Clearing Corporation, and National Securities Clearing Corporation are regulated by the SEC. The CFTC has jurisdiction over the Chicago Mercantile Exchange Clearing House and both the SEC and the CFTC regulate the Options Clearing Corporation.

This implies that different U.S. CCPs, providing similar services and products, may be subject to different rules and regulations depending on which regulatory authority granted their license. Though there have been no failures to date, this may lead to competitive distortions and potentially higher systemic risk, as CCPs may have an incentive to relax their risk management standards in order to gain market share. To address this, a memorandum of understanding on oversight of credit default swap CCPs signed among the relevant authorities established a framework for consultation and information-sharing. However, this memorandum of understanding is not legally binding and does not establish a harmonized regulatory regime for entities providing similar products and services. Ideally, the Federal Reserve or some other authority responsible for systemic risk should be given the oversight responsibility as a complementary function to prudential regulation and supervision.

Note: This box was prepared by Elias Kazarian.

or other financial support to a distressed CCP may be easier to disperse in a multi-CCP world in which each CCP has its own liquidity and other financial support providers.

Furthermore, some central banks such as the Eurosystem/European Central Bank (ECB) have publicly stated that they do not favor a CCP for OTC derivatives traded in Europe that is located outside its jurisdiction. Such

a statement is motivated, in part, by the consideration that the failure of a CCP that clears OTC derivatives denominated in euros may have an impact on the ECB's mandate to implement monetary policy and maintain financial stability in the euro zone. A single CCP would also raise significant challenges in terms of cross-jurisdictional coordination in regulation and oversight, particularly during periods of financial stress. However, as

international regulatory cooperation in the supervision of the CLS Bank, DTCC, and LCH. Clearnet demonstrates, cross-border coordination is possible.

Interlinking: The Final Frontier?

Currently, several CCPs are already clearing OTC derivatives and new ones are preparing to commence their operations shortly (Table 3.1). Some of the benefits of a single CCP can be achieved by connecting several CCPs through links (where CCPs cooperate with each other) and cross-margining (where a CM uses its positions at both CCPs to lower collateral requirements overall). There are several ways to accomplish this, with different implications for risk management and costs, provided that the respective legal, technical, and risk management obstacles can be addressed. In principle, participants in a cross-margining system can benefit by netting their positions across different CCPs, minimizing collateral and liquidity needs. Under linked arrangements, a CM of a CCP will be able to trade in another market and clear its trades through its existing arrangements with the home CCP.

One arrangement that could be considered for OTC derivatives is a link arrangement. The CM will continue to have a relationship with its “home” CCP, and the home CCP will assume its member obligations toward another CCP by, for instance, posting margin just like any other CM of the other CCP. Such arrangements typically do not require the CM to have any relationship with the remote CCP, although early versions of such links required CMs to transfer their positions executed in foreign markets to their home CCPs. When these positions were transferred, the home CCP replaced the other CCP, and assumed the counterparty risk of its CM. Another type of link is the creation of a joint (virtual) platform that allows CMs to manage all of their transactions in one place, independently of the market in which they were executed. Although a CM will continue its relationship with the home CCP, risk management procedures such as margin requirements, default procedures, and operational features will be compatible for both CCPs.³³ However, such

an arrangement could be subject to complications, as described below.

Given the global nature of the OTC derivative markets, it would be beneficial if more CCPs had the operational capacity to clear trades from multiple venues, and to allow CMs to benefit from cross-margining. However, establishing efficient linkages between CCPs across different jurisdictions and regulatory regimes has so far proven to be very complex, and may lead to risks to other CCPs from the CCP with the lowest risk management standards. Also, interlinking will expose CCPs to new or elevated levels of risks, including operational, legal, and counterparty risks. For these reasons, authorities should encourage the creation of links only if there is certainty as to the CCP’s legal framework (including its insolvency regime) and close regulatory coordination between relevant authorities and a common, robust risk management methodology (Box 3.7).

Conclusions and Policy Recommendations

Soundly run and properly regulated OTC derivative CCPs reduce counterparty risk among dealers and minimize the systemic risk associated with cascading counterparty failures. CCPs also provide the opportunity to improve transparency because of their collection of information on all contracts cleared. However, since CCPs concentrate credit and operational risk related to their own failure, a potential CCP failure could have systemic risk implications. Thus, CCPs should be subject to prudent risk management procedures and be effectively regulated and supervised.

Moving a critical mass of OTC derivatives to CCPs in order to realize the benefits associated with systemic risk reduction will be costly. Based on estimates of the degree of undercollateralization in OTC markets, dealers will be required to post substantially more collateral at CCPs than they currently do in the OTC context. Because of this and other associated costs,

ment procedures. These linked CCPs calculate a CM’s exposures separately, communicate to each other the outcome, and then try to offset the exposures and thereby reduce the total amount of collateral required. This has a limited benefit compared to a joint platform that would allow their CMs to enjoy similar multilateral netting efficiencies to what they would have in one CCP.

³³At present, some CCPs have opted to use a simple link model that lacks the possibility of cross-margining or the application of compatible and mutually acceptable risk manage-

Box 3.7. Legal Aspects of Central Counterparty Interlinking and Cross-Margining

Interlinking and cross-margining arrangements have been proposed to support the efficient use of capital in over-the-counter (OTC) derivatives clearing. However, this box shows that there are a number of legal hurdles that need to be overcome to make such arrangements legally sound.

Typically, interlinking arrangements take two basic forms. Actual arrangements may share elements of each form:

In the “member link” model (sometimes called the “simple model”), a central counterparty (CCP1) is a clearing member (CM) of another CCP2, with the same legal obligations and rights as any other CM (“access”). This requires the member-CCP1, but not its CMs, to adhere to the contractual framework (“Rule Book”) of the other CCP2. Most importantly, the CCP2 evaluates the creditworthiness and risk management systems of CCP1 as a member and requires CCP1 to post collateral and contribute to the financial resources of CCP2. Thus, CCP1 is exposed to the risk of CCP2 default.

In the “interoperating” model, two or more CCPs enter into a comprehensive, integrated contractual arrangement to clear contracts on a mutual basis, without requiring their respective CMs to become members of the other CCPs. The most typical example of interlinkage is when two CMs that are counterparties in a trade each have a different clearing arrangement with two different CCPs. CM3 opens a position in CCP4 and CM4 opens a corresponding/equivalent position that is mirrored for CCP3 at CCP4, without requiring the CM3 or CCP3 to become a member of CCP4, and thus allowing one CCP to offer its CMs the benefits of other CCPs’ services. The two CCPs then clear the trade. The arrangement is referred to as interoperability because the two CCPs cooperate and share information about each other’s positions and risk management (including the demands for collateral posted by the CMs) and may exchange collateral to cover the exposure of one CCP to the other.

Cross-margining allows a CM to use the margin it posts at a CCP as margin at another CCP in order

to reduce the amount of collateral for its various transactions. Cross-margining could take the form of “one-pot” or “two-pot” margin arrangements. For example, in a one-pot arrangement, the margin is calculated based on the CM’s total exposure across both CCPs and held in a single account at a CCP or at a custodian. If a CM defaults on its obligations to either CCP, the CM’s collateral would be liquidated and shared as agreed between the two CCPs. In a two-pot arrangement, the margin requirement for the CM, calculated based on the exposure to each CCP, is held separately in each CCP in different accounts. If the CM were to default, each CCP would satisfy the CM’s obligations based on what is in the respective CCP account subject to some loss-sharing arrangement between the two CCPs. Furthermore, in a two-pot approach, asset classes could be differentiated in the two accounts. Compared with the two-pot arrangement, the one-pot arrangement could be more effective for the CM in achieving an optimal offset of positions, thus reducing the CM’s total margin. However, it requires an alignment of bankruptcy, customer protection, and regulatory regimes. In contrast to the bilateral nature of interlinking arrangements, the contractual relationships in cross-margining involve a triparty arrangement: a CM agrees with two CCPs to use its collateral or positions at one CCP as collateral or positions at the other CCP.

Interlinking and cross-margining can be used to pursue different objectives. Traditionally, in securities clearing, interlinking has been viewed as a tool to promote competition among marketplaces. In particular, it is believed that competition is increased by enabling CMs to use their CCP’s services without requiring them to adapt to (and bearing the costs of) each CCP. In contrast, with OTC derivatives clearing, the primary objective of interlinking and cross-margining arrangements would be to reduce counterparty risk through multilateral netting, and to enhance the efficient use of collateral and capital.

Contractual and Legal Underpinnings

To effectively achieve those objectives, interlinking and cross-margining arrangements have to be supported by robust legal underpinnings, from both a contractual and a statutory perspective.

Note: This box was prepared by Alessandro Gullo and Isaac Lustgarten.

Contractual frameworks should clearly establish the rights and obligations of all parties involved, in particular CCPs and CMs. It is especially important to understand whether, and which, interested parties are exposed to losses in the event of a failure of a CM or a linked CCP. Other issues that can be solved through contract arrangements include dealing with (1) differing risk management practices and loss mutualization arrangements of CCPs; (2) differing mechanisms to assume counterparty risks; (3) the information needs of CCPs and CMs depending on whether they have established member link arrangements, interoperable arrangements, or cross-margining arrangements; and (4) the fungibility of cleared contracts for the CCPs. The laws governing the operation of CCP interlinking and cross-margining also need to provide robust statutory support. It is particularly relevant to establish clear and adequate rules on the insolvency and resolution of the CCPs involved, as well as on the treatment of the provision and segregation of collateral. These rules should specifically alleviate concerns that could arise from the treatment of inter-CCP margin requirements, which are applied by CCPs to cover counterparty risk to each other. For example, such concern could arise as to whether inter-CCP collateral would be subject to “claw-back rules,” whereby the defaulting CCP can claw back collateral from the nondefaulting one, and thus may not be enforceable by the nondefaulting CCP.

Regulation and Oversight

The specific features of interlinking and cross-margining arrangements justify a specific regulatory and oversight regime:

there is some uncertainty as to whether a critical mass of contracts will move without an incentive to do so. One approach that uses risk-based incentives could be based on capital charges or other “tax-like” features. This would be preferred over one that explicitly mandates that OTC derivatives must move to CCPs. That being said, mandating may be necessary to overcome some market participants’ fears of being first movers. In any case, if authorities decide to mandate that OTC

At a domestic level, the overseers of CCPs need to pay close attention to the impact of interlinking and cross-margining on the overall risk profile of the CCPs involved, and ensure that these risks are adequately mitigated. Eventually, the overseers should be able to impose regulatory standards regarding interlinking and cross-margining arrangements to enhance the predictable functioning of such arrangements, as well as to mitigate the potential systemic risks arising from the impact that a failure of one CCP can have on other CCPs.

To avoid cross-border regulatory arbitrage, it would be appropriate to establish common standards for interlinking and cross-margining in international fora such as the International Organization of Securities Commissions and Committee on Payments and Settlement Systems. For instance, to avoid weaknesses in inter-CCP arrangements, a globally consistent approach could avoid the risks created by weak collateral standards, while recognizing the different risk management practices adopted by CCPs. It could also seek to support legal certainty as to fundamental rules governing linked CCPs and all interested parties.

For interlinking and cross-margining with cross-border features (e.g., between CCPs established in different jurisdictions), the overseers and supervisors of all involved CCPs should enter into comprehensive cooperative arrangements to coordinate their oversight over the inter-CCP arrangements. Such coordination could entail (1) information-sharing; (2) early warning mechanisms; (3) coordination of regulatory oversight actions for issues of common interest aimed at avoiding regulatory gaps or conflicting regulation; and (4) coordination of crisis management plans for intervention either in particular institutions or affected markets.

contracts move to CCPs, given the high upfront costs, it should be phased in gradually.

There are several key elements of best-practice risk management and sound regulation governing CCPs that increase the likelihood that counterparty and systemic risk will indeed be reduced in the OTC derivatives market. In terms of risk management these include:

- CCPs should be established with independent decision-making bodies that are designed to mini-

mize potential conflicts of interest and maintain a high level of risk management.

- CCP membership should be objective and subject to stringent financial resource and operational capacity requirements to ensure that the CMs can meet their obligations to the CCP. These obligations include appropriate contributions to the CCP's guarantee fund and the callable capital that can be tapped if the guarantee fund is exhausted.
- CCPs should arrange for emergency lines of credit from other financial institutions that are not CMs and, if systemically important, from the central bank.
- In the event of a CM default, CCPs should have in place ex ante crisis management arrangements including mechanisms to close out or transfer positions to the nondefaulting CMs in a timely manner.
- CMs should be required to post high-quality collateral (e.g., cash and government securities) as margin against their positions. Margin adjustments should be made daily and even intra-day during periods of market stress. Initial margin amounts should be risk-based and reviewed and, if necessary, changed regularly.

As regards the regulatory environment, the ongoing efforts of the joint CPSS/IOSCO working group to revise existing international standards are critical to address some of the shortcomings revealed during the financial crisis. The coordinated regulatory effort will also help enhance the soundness and safety of the global OTC clearing and settlement arrangements.

Recommendations include the following:

- Central banks should provide CCPs access to their payment infrastructure, and put in place emergency liquidity backstops with the CCPs, given that in a systemic event other institutions are unlikely to be able to fulfill this role.
- Furthermore, CCPs should be able to deposit cash collateral with their local central banks to facilitate easy access in times of need.
- When a CCP is not present to assume counterparty risk, market participants should be mandated to record and store all transactions in regulated and supervised central trade repositories. Detailed, accurate, and timely individual counterparty transaction data should be available to all relevant regulators

and supervisors of affected jurisdictions for use in monitoring individual and systemic risks.

- Regulatory authorities should ensure that a CCP has adequate risk mitigation and management procedures and tools to protect the integrity of all related markets and the interests of its participants. There is also a need for authorities to have contingency plans and appropriate powers to ensure that the financial failure of a CCP does not lead to systemic disruptions in markets, including plans for emergency liquidity provision and orderly resolution.

A global framework for CCP risk management and other mitigating measures to stem systemic risks should be instituted to level the playing field and to discourage regulatory arbitrage. Otherwise there is the possibility that CCPs could compete with each other by lowering collateral thresholds and clearing fees and adjusting the layers of protection in ways that expose CMs and their customers to greater risks. Alongside a global framework for CCPs there would need to be coordinated response of the official sector to a failure of a CCP in any jurisdiction, including emergency liquidity provision and resolution.

Many of the benefits associated with CCPs are inversely related to the number of CCPs over which positions are spread. Although fewer CCPs leads to more concentrated credit and operational risks, some of the benefits of a single CCP can be achieved by interlinking several CCPs. This process, however, can only take place once sound CCPs are in place, and the CCPs agree on common risk management models, which will be difficult to achieve.

In sum, though ultimately the benefits of systemic risk reduction from moving OTC derivatives to a CCP very likely outweigh the costs in the longer run, there are transition costs that suggest a gradual phase-in period is warranted.

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