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# Economic perspectives

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**2** Policymakers, researchers, and practitioners discuss  
the role of central counterparties

Overview of a conference, titled “Issues Related to Central Counterparty Clearing,” cosponsored by the Federal Reserve Bank of Chicago and the European Central Bank held in Frankfurt, Germany, April 3–4, 2006.

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Tommaso Padoa-Schioppa, *Minister of Economic Affairs and Finance of Italy  
and former member of the Executive Board of the European Central Bank*

Michael H. Moskow, *President of the Federal Reserve Bank of Chicago*

Jean-Claude Trichet, *President of the European Central Bank*

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# Economic perspectives

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# Policymakers, researchers, and practitioners discuss the role of central counterparties

Douglas D. Evanoff, Daniela Russo, and Robert S. Steigerwald

## Introduction and summary

Central counterparties (CCPs) are structures that help facilitate the clearing and settlement process in financial markets. They have long been utilized in the derivatives markets, more recently have been adopted in cash securities markets, and currently are experiencing a growing interest in a further expansion of their use. Typical examples of CCPs in the U.S. include the clearinghouses for the derivatives markets in Chicago—the Chicago Mercantile Exchange Clearing House, the Options Clearing Corporation, and the Clearing Corporation.<sup>1</sup> Examples in the European Union include LCH.Clearnet and Eurex Clearing. A more comprehensive, but non-exhaustive, list of U.S. and European central counterparties, with characteristics of each arrangement, is included in Bliss and Papathanassiou (2006) and reproduced in appendix 1.

What are the benefits associated with CCPs? If properly structured, they can offer more effective risk-management procedures than is possible in markets that do not use central clearing and settlement arrangements, resulting in superior safety and soundness. This, in turn, can lead to increased liquidity and deeper markets.

How are these gains realized? The CCP interposes itself between the counterparties to a financial contract. Thus, the CCP becomes the counterparty to each side of the contract. A transaction initiated between customer X and customer Y becomes two separate contracts: one between X and the CCP and one between Y and the CCP. If the CCP has appropriate risk-management processes in place, this “substitution” of the CCP as the common counterparty to each transaction results in a decrease in counterparty risk.<sup>2</sup> Because traders are exposed only to counterparty risk from the CCP, they need not spend time and resources evaluating and managing the risk of other market participants—a job that is performed instead by the CCP. In fact,

traders in a centrally cleared market that uses a CCP are completely indifferent to the identity of other market participants, a fact that leads to anonymous trading. This decreases transaction costs and contributes to an increase in market liquidity. In addition, since the CCP is the common counterparty to each trade, the CCP framework naturally allows for multi-lateral netting of positions, which leads to additional decreases in transaction costs.

In recent years, we have seen significant changes in the financial markets for which CCPs are utilized. Trading volumes have surged, new financial products have been developed, technology has gotten cheaper and become more fully incorporated into the clearing and settlement process, and electronic trading has increased. Risk-management procedures have improved, cross-border trading activity has increased, and exchanges and clearinghouses have consolidated. These developments have had important implications for CCP operations, ownership, and governance. While CCPs have traditionally served one market in one country, they have more recently expanded to serve multiple markets across national borders. The interest of traders in a more efficient use of collateral tends to reinforce this trend and adds to the impetus for a re-consideration of CCP structures.

In response to this growing interest in CCPs, the Federal Reserve Bank of Chicago and the European

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Central Bank sponsored a joint conference on “Issues Related to Central Counterparty Clearing” on April 3 and 4, 2006, in Frankfurt, Germany. The conference featured a multidisciplinary “law and economics” discussion of key legal, risk-management, and public policy issues associated with CCPs, with a special emphasis on issues that arise in cross-border and cross-product transactions.

Over the two-day conference a number of industry executives, policymakers, and research economists evaluated an array of topics associated with CCPs, including:<sup>3</sup>

- Efficiency and systemic importance of current and evolving CCP structures, including ownership and governance structures;
- Management of credit, liquidity, operational, legal, and other risks by CCPs;
- Mutualization of counterparty credit risk;
- Costs and benefits of CCP structures;
- Innovation, competition, and integration initiatives among CCPs;
- Relationships between central banks and CCPs and their clearing participants;
- Similarities and differences in the potential for using CCPs in over-the-counter (OTC) and exchange-traded products;
- Cross-product clearing; and
- Policy issues related to the design, operation, oversight, and supervision of CCPs.

This article provides an overview of the conference and an introduction to this special conference issue of *Economic Perspectives*. Next, in an article that builds on the discussion at the conference, Robert Bliss and Robert Steigerwald discuss common problems of risk management, operational efficiency, liquidity support, and information that are inherent in both exchange-traded and OTC derivatives markets. The article discusses typical clearing and settlement arrangements for those markets and compares the bilateral clearing arrangements typically found in OTC markets with markets that utilize centralized clearing arrangements, such as CCPs.

The remainder of the issue features presentations by the keynote speakers, Gertrude Tumpel-Gugerell, member of the Executive Board of the European Central Bank; Randall S. Kroszner, governor, Board of Governors of the Federal Reserve System; Tommaso Padoa-Schioppa, Minister of Economic Affairs and Finance of Italy and former member of the Executive Board of the European Central Bank; Michael H. Moskow, president of the Federal Reserve Bank of Chicago; and Jean-Claude Trichet, president of the

European Central Bank. Given their inclusion in this special issue, little coverage of the keynote addresses is included in this summary article.

## Foundations of central clearing parties

### *Setting the stage*

A CCP imposes itself as the legal counterparty to every trade.<sup>4</sup> This substitution of the counterparties by the CCP typically occurs through a process known as novation, which discharges the contracts between the original trading entities and creates two new, legally binding contracts—one between each of the original trading parties and the CCP.

This arrangement places the CCP in a unique position in that it has direct interaction and counterparty risk exposure with each trading party.<sup>5</sup> This gives the CCP the incentive to closely monitor traders, as well as access to the information needed to manage its risk. Market participants, by contrast, are essentially indifferent to the creditworthiness of anyone but the CCP, which significantly decreases the cost of risk monitoring. This is typically considered the most important role of the CCP: what John Trundle (2006) of Euroclear SA/NV called the “collective investment of the market in risk management.”

The CCP uses a variety of tools to manage risk. First, it can establish membership requirements, including capital requirements, which the members must satisfy to continue to participate in the arrangement. Again, this eliminates the need for individual participants to be concerned with the risk of the trading partners, because they know that participants must satisfy certain minimum standards to continue to participate in the centrally cleared market.

The most common tool used to manage risk, and many would argue the single most important, is collateral. CCPs typically hold collateral (sometimes called initial margin) from each market participant to serve as a cushion against adverse market fluctuations. The CCP also monitors the position of members and may periodically require additional collateral following market movements to reestablish an acceptable cushion against future losses. Rules are established dictating what assets are allowed to serve as collateral, how much of a “haircut” should be given to specific assets in determining their value as collateral, and how often margin calls should take place.<sup>6</sup> Some have argued that the single most important reason for the existence of CCPs is to have them serve as a collateral facility.<sup>7</sup>

CCPs also typically require members to make periodic payments (sometimes called variation margin) to prevent a buildup of market losses. Payments equaling the “mark-to-market” from a recent settlement

price—often the closing price from the previous trading day—are made to the CCP by those traders whose positions have lost value as a result of market fluctuations. The CCP, in turn, makes payments that, in effect, pass through market gains to those traders whose positions have gained value as a result of market fluctuations. This process of exchanging variation margin permits the CCP to set collateral requirements as low as possible while maintaining its value as a cushion against future losses.

CCPs also use loss-sharing arrangements to cover any additional losses incurred beyond those covered by a defaulting trader's collateral. Mutualization of losses is a final layer of protection that insures the ability of the CCP to perform its obligations notwithstanding the failure of one or more traders. This also should reduce the potential spillover effects on other members when individual members in the arrangement fail, since the combined group should be better able to absorb losses. There is a realization, however, that mutualization may encourage market participants using a CCP to trade more and establish larger positions, increasing the potential risk for the CCP, and that decisions concerning loss allocation procedures have distributional effects that must be considered when developing the loss-sharing arrangement. For example, setting high (low) margin requirements shifts the burden of individual firm failure toward the defaulting (surviving) firms. Collateral is expensive and imposes costs on all CCP participants. Clearly, the perceived value to the members must offset the potential cost before the specifics of the loss-sharing arrangement can be agreed upon.

The CCPs unique position of being a common, substituted counterparty to all trades in a centrally cleared market greatly simplifies the multilateral netting of trade obligations. Past studies have shown that multilateral netting can result in significant decreases in risk exposure relative to the underlying gross positions—reductions exceeding 90 percent in some cases.<sup>8</sup> This contributes to improved liquidity and deeper markets.

As a result of the centralization of information flows and the standardization of processes, a CCP in a centrally cleared market may enjoy economies of scale and/or scope in the performance of these risk-management functions. For similar reasons, it may also realize economies of scale in the provision of additional administrative services, which may generate cost savings. Consider, for example, the default of a trader with outstanding contracts in a market that is not centrally cleared. Each of the defaulting trader's counterparties must take steps—such as closing out open positions, liquidating collateral, and, if necessary,

instituting legal action—to protect itself against losses arising from the default. In a centrally cleared market, however, the CCP acts on behalf of all users of the market in taking actions to protect itself against loss from a trader's default. Finally, there may also be cost advantages in the centralization of various back-office services, such as trade capture, trade matching, reporting requirements, netting calculations, centralized collateral valuation, and settlement services for CCP members.

### ***What does the market want from CCPs?***

Diana Chan (2006) from Citigroup started the conference discussion by describing how market participants want to see the CCP environment evolve. At the time of the conference, Citigroup was a member of 38 different CCPs worldwide. Many of Chan's points were echoed by other conference participants throughout the conference.

Chan (2006) stated that the role of CCPs could be expected to grow in the foreseeable future and that new ones would be developed to bring about the associated benefits in other markets. She observed that CCPs create a virtual cycle in growing transaction volumes as they increase participants' ability to trade through a netting process that reduces both regulatory capital requirements and the number of trades to be settled.

However, while CCPs are thought to create significant benefits, the proliferation of disjointed CCPs creates potential problems. As the number of CCPs grows, the coordination cost involved in operating in multiple arrangements increases. Additional pools of collateral must be held and managed, and administrative costs increase as firms need to work with multiple infrastructures having potentially different legal environments, controls, compliance procedures, and processes.<sup>9</sup> Ideally, the heterogeneity across CCPs would be decreased. While this could be achieved in a number of ways, including CCP consolidation, processing harmonization, linkages across CCPs, and CCP cross-memberships, most of the discussion over the two-day conference concentrated on the recent groundswell, particularly in Europe, for CCP consolidation.

Chan emphasized that as consolidation occurs, the market will have to invest heavily to adapt technology and reconfigure processes. However, these expenditures could be justified if they result in internal efficiency gains and maintain an adequate degree of safety. These safety concerns underscored the need for uniform regulatory standards, particularly uniformity across borders, and Chan said she welcomed the recent best practice recommendations for CCPs.<sup>10</sup> However, she suggested there might be a need to go even

further in a number of respects. For example, CCPs could be required to be as robust as top tier banks, meaning they would be subject to the Basel Accord's capital adequacy requirements. This is not uniformly the case—in some countries CCPs are considered banks, while in others they are considered clearinghouses, with correspondingly different regulatory requirements.

Chan also offered a wish list of additional safety issues that Citigroup was interested in including in future CCP arrangements, such as capped loss-sharing for each counterparty when loss-sharing arrangements are negotiated, firewalls between asset classes to protect participants from potential losses in markets for assets they may not use, the ability to opt out of using the CCP for certain products and instead use other means (perhaps bilateral arrangements) to access the product, and differentiated rules for general clearing members that may differ from those of associate members. The desire was to realize the full benefits of the CCP arrangement and to realize and address the specific needs of various segments of the CCP membership.

#### ***What does the regulator want from CCPs?***

As discussed above, CCPs may generate significant benefits by supporting the netting of positions, providing procedural standards, increasing market liquidity, and allowing for enhanced risk management. However, while risks on these arrangements may be shifted to the CCP, they are not eliminated. Instead risk becomes concentrated at the CCP, which becomes a potential source of systemic risk. Additionally, when the risks are shifted to the CCP and potential losses are mutualized, the incentives of participants may change, and moral hazard makes them more willing to take on additional risks. The financial regulatory authorities, therefore, have a significant interest in ensuring that risk is well managed. Based on economic theory, this is a classic case where there is an economic justification for regulatory involvement.

Stated differently, Trundle (2006) emphasized the need for a role for regulatory authorities based on their unique perspective of market activity. He argued that CCP participants will focus mainly on the management of day-to-day risks, and the public authorities will place more emphasis on the potential for extreme events (with systemic implications). These are low probability, but exceptionally high impact, events in the tails of the probability distribution. Given the mutualization of risk, CCP participants may have an inherent tendency to underestimate the probability of these types of events, since the cost of protecting against such remote events falls principally upon the group of participants. This tendency supports a role for the public sector.

There appeared to be almost complete agreement among conference participants in favor of some regulatory oversight of CCPs.<sup>11</sup> At a minimum, most agreed that there is value in having regulators play a role as coordinators to bring market participants together to develop best practices and standards for CCPs. The example most frequently cited in support of this coordinator role was the recent development of CCP recommendations by the Task Force on Securities Settlement Systems.<sup>12</sup> Given the growing interest in CCPs and the interest in expanding them across both countries and products, the recommendations were developed to help promote safety and stability in financial markets as CCPs expand. The Task Force's report addressed the major types of risk that CCPs encounter and provided general recommendations to manage these risks. The report also includes a methodology for assessing how well the recommendations have been implemented at CCPs. The recommendations are included in appendix 3.

The recommendations were embraced by most of the conference participants and were making inroads into practice. In fact, Yvon Lucas (2006) of Banque de France discussed a recent assessment of LCH.Clearnet against the CPSS-IOSCO standards. LCH.Clearnet is a multi-product CCP that serves exchanges in Paris, Amsterdam, Brussels, Lisbon, and London. It also has a link to the Italian CCP Cassadi Compensazione e Garanzia. LCH.Clearnet is subject to "cooperative oversight" based on Memoranda of Understanding with authorities in countries where it provides services. For the purpose of the assessment, Banque de France coordinated the contributions of the various regulatory authorities.

The assessment was performed using the methodology of the CPSS-IOSCO framework and was based on available data supplemented by interviews. For most of the recommendations, the assessment was considered straightforward and the overall result was that LCH.Clearnet was generally in compliance with the standards. In the areas where deficiencies were found, LCH.Clearnet was asked to provide an action plan to improve future compliance.

However, the exercise brought out a number of issues that other CCPs may find problematic in performing their own assessments. For example, how should links to other CCPs be treated relative to other membership relationships, given the unique nature of these links? The thought was that CCP links bring very different risks into play than those brought by other participants. Additionally, there was a feeling that certain recommendations—particularly those dealing with efficiency and governance—were open

to interpretation. Finally, some felt terms, such as “normal market conditions,” should be more clearly defined. Generally, however, the standards were seen as a valuable first step in assessing the resiliency of CCPs and in guiding their evolution.

### Discussion of the major issues

The conference presentations and discussion frequently returned to the issues of CCP consolidation, the appropriate public policy role in the evolution of CCPs, governance issues, and risk management.

#### Consolidation

Many participants expressed a desire to take advantage of potential economies of scale and economies of scope from CCP consolidation, thereby significantly reducing the number of CCPs, particularly across Europe. Lucas (2006) argued that consolidation was probably the single most important issue facing the industry today. There were differences of opinion, however, on the perceived benefits of consolidation, the tradeoffs associated with it, and how the process should proceed.

Alberto Giovannini (2006) of Unifortune Asset Management SGR and others insisted that fixed cost within CCPs made up the bulk of operational expenses and that the marginal cost of clearing and settlement operations was essentially zero over a wide range of output levels. Thus, there were obvious reasons for consolidation, since the industry has the textbook characteristics of a natural monopoly. This aligned well with a general view by many European market participants that it is an opportune time to break down current barriers and encourage cross-border and cross-product consolidation with a goal of a single European CCP.<sup>13</sup>

Some speakers, however, did question the extent of the benefits that could be realized from consolidation. In response to the claim that marginal costs were zero, Daniel Gisler of Eurex, David Hardy of LCH.Clearnet Limited, and Kimberly Taylor of the Chicago Mercantile Exchange stressed in their panel discussion that all costs were not fixed and, although low, marginal costs were not zero. Gisler (2006) indicated that personnel costs could change, and expenditures directed at innovation were significant and “lumpy” as CCP activity increases.

However, most of the disagreement centered on the role of competition in determining the direction of industry consolidation. The audience tended to fall into two general camps: one supporting the idea that competition should be the driving force leading industry structure and consolidation, and the other indicating

that competition in the industry “was not real” and artificial barriers stood in the way of a movement toward a single CCP with natural monopoly characteristics.<sup>14</sup>

The former camp emphasized that it was not obvious that there is a need for public authorities in Europe to push for consolidation of clearinghouses. Private entities operating in their own self-interest should be allowed to determine whether consolidation would, on net, be beneficial to stakeholders. With any movement toward a more concentrated industry, certain parties will benefit from the change and others will be harmed. The views of *all* stakeholders, including the CCP owners, users, full members, and associate members, as well as large and small participants, should be considered. The marketplace is probably best situated to allow the net benefits to be analyzed and decisions made as to how industry structure should change. Competition across CCPs does exist, as does competition between CCPs and alternative clearing mechanisms, such as those used for over-the-counter products. The marketplace should determine how to proceed.

The “pro-coordination” camp held that, to a great extent, CCPs have developed as “silos” because of unique legal characteristics and other peculiarities of the countries in which they operate. Economies do exist, but cannot be exploited as long as these national barriers remain in place. Competition will not drive the industry toward the optimal structure because each CCP has monopoly-like control over the market it serves. The potential cost savings from decreasing the number of CCPs in Europe to one or two are so great that coordination may be justified to overcome barriers to consolidation.

Another difference between the two camps is in the type of inefficiency they identify. The “pro-consolidation” camp takes the view that significant economies of scale could be exploited if consolidation took place because, they assert, CCPs have natural monopoly characteristics. Per unit costs could be driven significantly lower with consolidation.

An alternative form of efficiency that the other camp is considering is technical efficiency, which is a measure of how effective management is at operating efficiently, *given* the current scale of operations. Stated differently, economies of scale are captured by a movement along a declining average cost relationship as output is increased and is a function of the production process. Technical efficiency is a measure of how close firms are to operating on the average cost relationship, where the cost relationship is representative of the best practices in the industry and is a function of the effectiveness of management.



In banking in the U.S., technical efficiency has been shown to dominate scale inefficiency.<sup>15</sup> This may or may not be the case for CCPs, but certain speakers expressed concern that technical inefficiency might offset any efficiencies that may be realized from increasing the scale of production. Taylor (2006), for example, questioned any policy encouraging the development of a monopoly, since history has shown monopolies to be relatively slow in innovating and notoriously poor in providing high quality service. She gave the example of the Department of Motor Vehicles (DMV) in the U.S., where state governments monopolize the provision of automobile drivers' licenses. Taylor said she did not "believe many people think of the DMV as a model of efficiency."

A possible alternative to CCP consolidation would be to have some form of interoperability through linkages across CCPs. This could take the form of CCPs having memberships with other CCPs in an attempt to allow participants in any one of the linked organizations to have indirect access to each of the other linked organizations. While this was generally viewed as being suboptimal, it was considered a possible intermediate step before actual changes took place in industry structure. Hardy (2006) argued that while some "spaghetti" form of interoperability would likely gravitate toward one CCP in the longer run, the market might accept this as a short-term, second-best solution. However, concerns were also expressed about the potential costs of moving in this direction, and some argued that CCPs would have to make significant investments to develop the linkages.

Among those that favored industry consolidation, a significant proportion thought the idea of one single, pan-European CCP was unrealistic. Concerning the optimal number of CCPs, Chan argued that while there was significant room for industry consolidation, two CCPs were probably better than one. While there are significant scale advantages from consolidation, the differences between cash and derivatives markets are so significant that separate CCPs may be necessary. As a result, Chan argued, it may be necessary to forego some potential cost savings of consolidation. Trundle (2006) also stressed these market differences. With derivatives, there is a time gap between the initial trade and the settlement of the transaction. This gap is the essence of the product, as traders explicitly want to take (and manage) position risk. In the cash market, the gap is shorter, is incidental to the process, and, ideally, could be eliminated. The general impression was that while there could be potential economies of scope from combining the cash and derivative markets, in practice there may be few cost synergies to be realized.

Finally, Jill Considine (2006) of the Depository Trust and Clearing Corporation (DTCC) discussed the evolution of the DTCC, which provides clearing and settlement services for the U.S. securities markets and has subsidiaries that act as CCPs for various segments of the market.<sup>16</sup> She characterized the DTCC as a monopoly created by the marketplace—because the market wanted a monopoly to take advantage of industrywide economies of scale in the clearing and settlement of the cash securities market. While being careful to emphasize that different considerations came into play in determining the structure of the DTCC than those for the European markets, she noted that the cost savings from consolidation were significant. These occur in the form of collateral savings and other standard processing efficiencies, as well as at the periphery in the form of reduced business continuity and technology costs. Considine emphasized, however, that consolidation in these markets was industry driven and was not the result of a mandate by industry regulatory forces.

As is perhaps evident from the preceding discussion, the most significant disagreement at the conference concerned the appropriate role of regulators and policy setters in "assisting" industry consolidation. The current push toward CCP consolidation in Europe was originally encouraged by statements from the European Commission.<sup>17</sup> Therefore, it was no surprise that conference participants were looking forward to the comments of Mario Nava of the European Commission. Nava (2006) began by stating that he would not present a new directive from the Commission aimed at a further integration of European clearing and settlement institutions and instead discussed limitations to the Commission's ability to have influence in this area.

He discussed the role of the Commission in industry structure issues and the scope of competition rules. The internal market rules of the Commission are intended to encourage competition and allow it to intervene in cases of anti-competitive behavior. While the rules may address the framework for a pro-competitive environment, the Commission cannot set up new institutions. Most importantly, Nava explained, the Commission does not have the power to establish a single CCP. Rather, it will rely on other means such as competition and moral suasion to achieve its goals. He stressed that the industry should critically evaluate its options and move forward, with full consolidation and interoperability offered as current alternatives. Nava described interoperability as pragmatic, although it may not bring the level of efficiency associated with full consolidation. The Commission's "intervention role," if there is indeed such a role, would be to

assist the industry by facilitating movement toward the industry's choice of outcomes.

### ***Exchange & CCP relationships and governance***

In the U.S., there has been a recent movement away from the traditional model of mutual ownership of exchanges and their clearing and settlement providers, toward a for-profit, stock ownership.<sup>18</sup> The movement could have a potential impact on the incentive structure and, possibly, the risk aversion of the organizations. Similarly, since 2001, there has been a robust dialogue within the European Union on adequate governance arrangements for central securities depositories and CCPs for two reasons. First, there is concern that vertical integration of stock exchanges with depositories and clearinghouses in a vertical silo may impede integration across national borders. The European markets aspire to ensure open access to financial market clearing and settlement services, regardless of the nationality of the participant.<sup>19</sup> Thus, structures that hinder open access would not be in line with European Union policies. Second, there has been significant debate in Europe as to what extent governance is a tool that can ensure appropriate management of service providers that combine a wide range of services having different risk profiles in the same legal entity. At the conference, this discussion of governance focused on two issues: the relationship between exchanges and CCPs, and the perceived advantages and disadvantages of the mutual governance model.

Tomoyuki Shimoda (2006) of the Bank of Japan discussed the relationship between exchanges and the CCPs that serve them. He stressed the need for close communications and cooperation when dealing with exposure control, the monitoring of participant positions, and price movements. Exchanges and the CCPs that serve them are normally both interdependent (for example, the number of contracts is a source of revenues for both parties, since they have the same participants) and complementary (it may be possible to reduce the costs for participants if exchanges and CCPs jointly monitor the common members). However, he expressed concerns about situations where there may be potential conflicts between the exchange and the CCP. For example, if an exchange is the monopolist owner of the CCP, conflicts may arise if the financial resources for risk management of the exchange and the CCP are pooled.

The recent rush toward demutualization and public listing has resulted in more complex situations involving potential conflicts among the various stakeholders in exchanges and the CCPs that support them. Shimoda illustrated this potential for conflicts by relating recent

events involving the Osaka Stock Exchange. Following public listing of the exchange, an investment fund acquired a large position and ultimately became the exchange's largest shareholder (10 percent of the capital). The investor then sought a "cashing out" of the financial resources held by the CCP for use in case of a member default. A cashing out of the resources used by the CCP to mitigate counterparty risks would have reduced the market's ability to absorb the losses and would have transferred the cost of losses to members of the exchange through the loss-sharing arrangement. This case brought to the attention of the Japanese regulators the need for what has been called an "optimal degree of intimacy" among different stakeholders when designing the governance mechanisms of exchanges and CCPs.

While there can be a number of governance models for exchanges and CCPs—nonprofit, mutual ownership, for profit, and hybrids of these models—the main advantage typically associated with the mutual governance model is that the users have a long-term interest in the viability of the institution and are less likely to sacrifice those interests for short-term gains. This is sometimes thought to ensure that financial markets operate in line with public policy objectives. Concerns are sometimes expressed that moving away from this governance model may make the alignment of public and private concerns more difficult. However, even with the mutual governance model, Lee (2006) argued that there are numerous practical obstacles in the application of governance rules and that the purported benefits of the model may not be realized.

For example, often there are strict confidentiality requirements for the members of the governing boards of exchanges and CCPs. They are not supposed to share confidential information, nor are they to make decisions based on their own self-interests. However, since board members are often users of the exchanges and CCPs they govern, inherent conflicts arise. Additionally, Lee questioned whether it is possible to achieve the goal of reflecting the diversity of the user community in its governing board, noting that such boards typically have only 20 to 25 members. Alternatively, a board of 20 to 25 members can have practical problems in decision-making, particularly when the very nature of the business necessitates an understanding of many technical details to evaluate policy implications of such decisions. However, board members may tend to have a strategic vision of the business rather than detailed knowledge of the technical aspects of the business. These strategic and technical needs can be very difficult to reconcile. Lee therefore stressed that the differences across governance models may

not be as great as implied by the theory. There are difficulties in each model. This is somewhat consistent with Taylor's view that CCP behavior and performance are not necessarily driven by the ownership structure of the firm.

### **Risk management**

Risk management may be the single most important function of CCPs, because they are a substitute for active risk evaluation and management by users of the CCP. As the markets evolve, there are issues as to how effective current risk-management procedures are and how the cost of these processes may change in light of projected changes in the structure of the CCP industry. Papers presented at the conference aimed to describe the current state of the art in CCP risk management and to address some of these projected changes.

One session presented research evaluating the use of *collateral and margins* in the securities and settlement industry. Froukelien Wendt (2006) of De Nederlandsche Bank described the role of margin, the various types of margins collected by CCPs within their risk-management frameworks, the current use of intraday margins in Europe, and the costs and benefits of intraday margin.

Replacement cost risk is the risk that a counterparty to a transaction will default before final settlement has occurred. Since the CCP is the counterparty to each transaction, it is exposed to the cost of replacing the original transaction at current market prices. Because prices may have changed since the contract was originated, the CCP could suffer a loss when it fulfills its side of the contract. To manage replacement cost risk, CCPs require member firms to deposit collateral or margin. Initial margin is set to cover potential future losses on open positions and is typically based on calculations of the greatest loss that the position could sustain. Variation margin calls are periodic supplements to manage risk that bring the margin back into line with recent changes in market prices, and Wendt argues that they are typically made at the end of the day. In her definition, the variation margin can be held at the CCP (actually collateral to supplement initial margin) or passed through from trading losers to winners.<sup>20</sup> She discussed the increasing use of intraday margin calls that allow the CCP to offset replacement risk and position changes on a timelier basis.

Wendt identified three types of potential intraday margin: a routine intraday margin call (similar to the end of day call), a nonroutine call that is triggered by a significant price change, and a nonroutine call that is triggered by a significant position change by a particular trading member (that is, the trigger is quantity

driven). The major benefit of an intraday margin call is to enable the CCP to better manage counterparty risk by reducing it in a timely manner and/or to allow for the early detection of a troubled member. It may also better align collateral with the trading patterns and resulting exposure of day traders. Additionally, since traders are maintaining margin in line with the risks they pose to the CCP, they are bearing the additional costs of holding their positions. Such arrangements should decrease moral hazard, since traders have risk-management incentives that are consistent with the interests of the CCP and the market as a whole.<sup>21</sup>

However, these benefits come at a cost. The CCP will have to put systems in place that allow for the prompt determination of positions and margin needs. Similarly, the members must have facilities in place to obtain the necessary funding to satisfy the call and back-office procedures in place to verify their positions and reconcile any discrepancies.

Wendt noted that all European CCPs currently have the authority and operational capacity to initiate an intraday margin call on a nonroutine basis, and more are moving toward having a routine intraday call. While she described the routine call as an industry best practice, she said it may not be optimal for all CCPs. There are associated costs and benefits from putting procedures in place, and each arrangement should be carefully analyzed for the net benefits of initiating this change.

Next, Alejandro García of the Bank of Canada and Ramo Gençay (2006) of Simon Fraser University discussed how they combined statistical methods with risk measures to determine how best to value collateral, particularly to protect against unexpected market events. Accurate valuation is important because there is delay between the time the collateral is pledged and the time when it has to be sold to cover losses. In the interim, the collateral can change value and to account for this possibility, haircuts are placed on the value of the collateral. García and Gençay focused on the tradeoff between requiring additional (costly) collateral as a result of increasing the haircut and the resulting lower risk associated with an extreme (tail) event because of the additional collateral. Their work evaluates commonly used practices to calculate the haircuts and finds favor with extreme value theory, arguing that it leads to efficient haircuts and adequately accounts for events that could significantly affect the value of the collateral.

The researchers' goal is to develop a measure of the risk-cost frontier that indicates the tradeoff between the probability of an extreme tail event occurrence and the increased costs associated with holding

additional collateral. To develop the measure, García and Gençay used alternative measures of the cost of risk—measured as value at risk (VaR) and expected shortfall (the average loss given that the VaR has been exceeded, also noted as ES)—and alternative distributional assumptions concerning the returns on the assets. Extreme events are in the tails of the distribution, and past studies have shown that the assumption of normally distributed returns probably understates the true probability of the extreme events. To account for this, the authors use extreme value theory, which allows for a return distribution with “fat tails.” They then do a comparison using the alternative return distributions and different measures of the cost of risk—VaR or ES. Using simulated equity returns data, they find that using extreme value theory results in accurate risk measures when using either VaR or ES. Thus, extreme value theory leads to efficient measures of haircuts that adequately reflect the risk derived from the tail of the return distribution.

Additional analysis using real data from the Canadian airline industry produced similar results. In future research, they intend to extend the analysis to cover portfolios of collateral instead of individual securities and to analyze the valuation of debt instruments for extreme events.

The final paper in this session was by John Cotter of University College Dublin and Kevin Dowd of Nottingham University and was in the same vein as García and Gençay. However, Cotter and Dowd (2006) focused on the choice of a risk measure and the resulting characteristics of the measure. The risk measures considered include VaR, ES, and the spectral risk measure (SRM). Moving from VaR to ES allows the model to take into account additional information by calculating the average loss once the VaR is exceeded. Going still further, the SRM allows the model to take into account the degree of risk aversion of the users—that is, the attitude toward losses. It could do this by placing different weights (greater, for example) on higher losses further out in the tail of the loss distribution. Thus, a clear expected pecking order emerges, with ES being preferred to VaR, and SRM estimators better in principle than the ES.

The authors applied the analysis to real data on heavily traded futures contracts—S&P500, FTSE100, DAX, Hang Seng, and the Nikkei225—from 1991 to 2003. Somewhat surprisingly, they find all risk measures lead to similar estimates. The S&P500 and FTSE100 contracts appear to be the least risky and the Hang Seng the most risky contract. The VaR and ES estimates have fairly similar degrees of precision, but SRM estimators were found to be somewhat less precise.

The discussant for this session, Jean-Charles Rochet of the University of Toulouse, praised the authors for providing clear descriptions of current state-of-the-art risk-management approaches. However, he argued that he would like to see a clearer conceptual framework for evaluating the alternative measures. Is there a means to determine how to optimally combine different risk-management tools, such as margin requirements, clearing funds, and capital? How are risks and costs traded off? And how is it optimally done with a multiple tool set? He stressed the need for a more comprehensive optimization process that should take into account all relevant parties and not just the clearing service providers.

Another session evaluated the implications of alternative CCP risk-management arrangements in light of recent industry innovations. John P. Jackson and Mark J. Manning (2006) of the Bank of England considered the potential impact of two distinct trends in the clearing arena: an expansion in the range of products cleared via CCPs and the recent trend toward CCP industry consolidation. They approached the problem by constructing an analytical framework that expands upon the central idea of earlier work by Baer, France, and Moser (2004) that collateral has a cost that must be incorporated when deciding on optimal risk-management procedures. They then simulate the implications of the industry moving from a single product, bilateral clearing arrangement to a multiproduct, multilateral clearing arrangement for replacement costs and risk.

To summarize their results, moving from bilateral to multilateral netting results in significant decreases in risk and costs. Benefits increase, but at a decreasing rate, as the number of members in the clearing arrangement increases. Margin-pooling benefits are also realized when multiple assets are cleared through a single CCP. The extent of the risk reduction is shown to depend on the variance and covariance of price changes and trading positions in the assets held. Finally, the benefits of consolidation were found to increase more if margin was set on a portfolio basis instead of an asset-by-asset basis. Applying data from LIFFE (London International Financial Futures Exchange) on open interest in the EURIBOR (Europe Interbank Offered Rate) and FTSE100 futures contracts, their analysis shows that the expected replacement cost losses were 20 percent lower when contracts cleared through separate CCPs were consolidated into one.

Finally, Rajna Gibson and Carsten Murawski (2006) of the Swiss Banking Institute emphasized the distinct difference in the performance of exchange-traded derivatives and OTC derivative products.

While exchanges have not recently experienced notable credit events, the same cannot be said of OTC market products. On the surface, they suggest that it appears that risk-mitigation mechanisms used by the exchanges have been relatively more effective than those used in the OTC market. In general, however, the authors argued that the impact of risk-mitigation mechanisms is not fully understood and needs to be more fully analyzed. To initiate that analysis, they evaluate the affect of various mechanisms on market liquidity, default risk, and the wealth of market participants. The risk-mitigation procedures considered include initial margin, initial margin plus variation margin, and initial and variation margin combined with a CCP arrangement.

The authors conducted their analysis within a dynamic model of swap contracts where all market participants are hedgers—thus, there are no speculators to add liquidity to the market. Banks are given an initial endowment and use the funds to trade derivatives contracts with each other to hedge the price risk to their initial endowment. Given the complexity of the model with numerous nonlinearities, the model is analyzed via simulations. While the model is an abstraction from actual markets, it is thought to capture the features of derivatives markets. These features include significant market concentration, significant credit exposures in derivatives contracts, participants' requirement to pledge cash as collateral, and a zero capital requirement to cover default risk exposure for contracts supported by a CCP.

The analysis is conducted in a period of extreme stress when risk-mitigation mechanisms are deemed to be most needed. Under these conditions, the authors' analysis indicates that default rates actually *increase* as risk-mitigation efforts are increased. Introducing initial margin generates perverse effects as it increases default severity (losses given default). Having margin combined with a central counterparty tends to reduce loss-given default but, in some cases, impairs a bank's ability to hedge and, on net, has negative consequences for the bank's wealth. Thus, the authors conclude that default-risk-mitigation mechanisms might have a negative effect on wealth at times when market participants expect them to be most valuable.

The discussant for this session, James Moser of the Commodity Futures Trading Commission, raised

issues related to the assumptions employed in the modeling of risk-mitigation behavior. However his major point was one directed at market regulators. There is frequently a tendency to believe that, without regulators, exchanges would be slow to respond to risks. In fact, Moser's research finds exactly the opposite result, that is, the market responds relatively quickly to mitigate risks. This does not occur because exchanges are more risk averse, but rather because the inclination to manage risk results from an interest in increasing trading volumes. Thus, it is in the interest of the exchanges to mitigate risk. Firmly establishing the self-interest of exchanges adds to the credibility of their risk-mitigation efforts and affects policy choices. Research, such as the two papers in this session, can be seen as attempts to identify and begin to understand the linkages between trading activities and the risk-management practices of exchanges.

### Conclusion

One goal of the conference was to bring together policymakers, researchers, and industry practitioners to engage in a multidisciplinary discussion of key legal, risk-management, and public policy issues relating to central counterparty clearing arrangements. Toward that goal, the participants debated how these structures might best evolve to meet the clearing and settlement needs of the dynamic and growing financial markets around the world.

Another goal of the conference sponsors was to encourage further research concerning the clearing and settlement of payments, with special interest in risk-mitigation processes. Thus, there was an attempt to bring together top researchers in this area to discuss their current work and explore the potential for future research. The conference clearly succeeded in gathering together in one place researchers who have done seminal work in this area. This was evident in John Jackson's comments about the state of the economic literature concerning CCPs. Looking at the audience and his fellow panelists, Jackson noted "... you're all here!" Whether the conference promotes further research in this area remains to be seen. The sponsors are hopeful that it will.

## NOTES

<sup>1</sup>The Clearing Corporation, formerly known as the Board of Trade Clearing Corporation, was the clearinghouse for the Chicago Board of Trade until the creation of the “common clearing link” for the Board of Trade and the Chicago Mercantile Exchange.

<sup>2</sup>As further discussed later in this article, it is imperative that the substitution of the CCP for each of the counterparties be legally binding. This is often achieved via a process known as novation.

<sup>3</sup>The complete program is included in appendix 2. Additional information, including drafts of some of the presentations, is available at [www.ecb.int/events/conferences/html/ccp.en.html](http://www.ecb.int/events/conferences/html/ccp.en.html)

<sup>4</sup>For discussions of the historical evolution of clearing and settlement arrangements, see Moser (1994, 1998), Kroszner (2000), and Schaede (1991).

<sup>5</sup>More accurately, it has exposure to each clearing member of the CCP. Traders that are not members of the CCP must have their trades cleared by clearing members.

<sup>6</sup>Haircuts are discounts applied to the market value of securities that have been posted as collateral.

<sup>7</sup>See Koeppl and Monnet (2006).

<sup>8</sup>See for example, Considine (2001). See also Baer and Evanoff (1991) for a discussion of netting in payments more generally.

<sup>9</sup>Bliss and Papatnassiou (2006) stressed the problems associated with legal uncertainty and the efforts in both the U.S. and Europe to address the concerns.

<sup>10</sup>See appendix 3 for the Bank for International Settlements, Committee on Payment and Settlement Systems and the Technical Committee of the International Organization of Securities Commissions (CPSS–IOSCO) best practice recommendations for CCPs.

<sup>11</sup>While not disputing the point, Rubin Lee (2006) of the Oxford Finance Group made the argument that he thought that concerns about the systemic risk associated with clearing and settlement institutions were “exaggerated.”

<sup>12</sup>See Bank for International Settlements, Committee on Payment and Settlement Systems and Technical Committee of the International Organization of Securities Commissions (2004). The Task Force was jointly established by the Committee on Payment and Settlement Systems (CPSS) of the central banks of the Group of Ten countries and the Technical Committee of the International Organization of Securities Commissions (IOSCO).

<sup>13</sup>The push for consolidation in Europe is exemplified in comments by McCreevy (2005) and joint statements by AFEI/Assosim/FBF/LIBA/SSDA (2005, 2006). The 2006 statement is exceptionally far reaching and calls for “...the imposition of the unbundling of the vertical silos if private stakeholders do not start the process on their own” [italics added].

<sup>14</sup>Broadly speaking, Gisler and Taylor took positions consistent with the former group, and Giovannini and Chan with the latter.

<sup>15</sup>See, for example, Berger, Hanweck, and Humphrey (1987) and Evanoff and Israilevich (1995).

<sup>16</sup>The National Securities Clearing Corporation (NSCC) acts as a CCP for broker-to-broker equity, corporate bond and municipal bond, exchange-traded funds, and unit investment trust (UIT) trades in the U.S.; the Fixed Income Clearing Corporation (FICC) acts as a CCP for government securities and certain mortgage-backed securities; and the Emerging Markets Clearing Corporation (EMCC) acts as a CCP for emerging market securities.

<sup>17</sup>See McCreevy (2005) and joint statements of AFEI/Assosim/FBF/LIBA/SSDA (2005, 2006).

<sup>18</sup>CCPs are typically associated with exchange-traded products. However, there has been a recent push to move OTC contracts to CCPs when the characteristics of the products allow it; for example, when products are sufficiently standardized. The conference discussion covered some of these issues, but most of the discussion concerning a (non-CCP) facility introduced by the Depository Trust and Clearing Corporation to help in administrative issues, such as trade confirmation, matching, assignment, and reconciliation. See the comments of Peter Axilrod (2006) of the DTCC.

<sup>19</sup>The Directive on Markets in Financial Instruments of 2004 has already required this for CCPs (2004/39/EC).

<sup>20</sup>Wendt uses the term to describe the funds that are paid by a clearing member to settle any losses resulting from price changes, independent of whether the funds are maintained at the CCP or are passed through to the members profiting from the price change. However, whether the funds are held or passed through by the CCP has implications for its ability to manage member defaults.

<sup>21</sup>This point was raised by the discussant, Jean-Charles Rochet.

APPENDIX 1: DERIVATIVES AND OTC CENTRAL COUNTERPARTIES<sup>a</sup>**A. Organizational information on CCPs in the European Union**

Member state	CCP	Corporate form	Ownership structure	Instruments and products cleared
Austria	Central Counterparty Austria GmbH (CCP.A) <sup>b</sup>	Commercial entity	50% Wiener Börse, 50% Oesterreichische Kontrollbank (the settlement bank)	Derivatives and securities
Belgium	LCH.Clearnet S.A., a subsidiary of LCH.Clearnet Group	Bank	See France	See France
Denmark	Stockholmsbörsen AB <sup>c</sup>	Commercial entity	Group owned; see Sweden	Derivatives
Finland	Stockholmsbörsen AB <sup>d</sup>	Commercial entity	Group owned; see Sweden	See Sweden
France	LCH.Clearnet S.A., (Banque Centrale de Compensation) a subsidiary of LCH.Clearnet Group	Bank authorized by the “Comité des Etablissements de Crédit et des Entreprises d’Investissement” with their ongoing supervision being performed by the “Commission Bancaire.” Its rules have to be approved by the Autorité des Marchés Financiers (AMF)	Subsidiary of Euronext, branches in Belgium and Amsterdam. LCH.Clearnet Group is owned 45.1% by exchanges; 45.1% by former members of LCH; and 9.8% by Euroclear. Of the 45.1% owned by exchanges, Euronext owns 41.5%, but its voting rights are limited to 24.9%	Equities and bonds; warrants; exchange-traded derivatives; swaps; commodity and energy; interest rate & commodity futures and options; equity and index futures & options; OTC-traded bonds and repos
Germany	EUREX Clearing AG	Commercial entity	Public company, 100% affiliate of Eurex Frankfurt AG, an 100% affiliate of Eurex Zurich AG, which owned in equal parts by Deutsche Börse AG and the SWX Swiss Exchange	Equities, derivatives, repos and bonds, OTC options, and futures corresponding to those contracts admitted for trading on Eurex Deutschland and Eurex Zurich
	Clearing Bank Hannover	Commercial entity		Agricultural and energy products
Greece	ADECH	Commercial entity	A 99% subsidiary of Hellenic Exchanges, which is owned by local banks and foreign and local investors	Derivatives and repos
Hungary	KELER	Public limited company	Owned by Magyar Nemzeti Bank (53.33%), Budapesti Stock Exchange (26.67%), and the Budapest Commodity Exchange (20%)	Derivatives, spot markets, OTC
Ireland <sup>e</sup>	EUREX Clearing AG	See Germany	See Germany	Irish securities and exchange-traded funds (ETFs)

APPENDIX 1: DERIVATIVES AND OTC CENTRAL COUNTERPARTIES<sup>a</sup> (CONTINUED)

Member state	CCP	Corporate form	Ownership structure	Instruments and products cleared
Italy	Cassa di Compensazione e	Commercial entity Garanzia (CC&G)	Since 2000, the Italian Stock Exchange has the majority with 86%	Exchange-traded derivatives and equities since 2003
Netherlands	LCH.Clearnet S.A., a subsidiary of LCH.Clearnet Group	Bank	See France	See France
Portugal	LCH.Clearnet S.A.	Bank	See France	See France
Spain	MEFF	Commercial entity, division of MEFF Exchange	Group-owned by MEFF–AIAF–SENAF Holding de Mercados Financieros	Exchange traded derivatives; OTC trades
Sweden	Stockholmsbörsen AB	Commercial entity	Group-owned by OMHEX Group	Derivatives; OTC fixed income products
United Kingdom	LCH.Clearnet Ltd; founded in 1888 as The London Produce Clearing House, Limited	Commercial entity; recognized Clearing House (RCH) supervised by the FSA under the UK's Financial Services and Market Act 2000 (FSMA).	Group-owned, a subsidiary of LCH.Clearnet Group, see also France	Equities, derivatives, repos, and swaps

<sup>a</sup>From Bliss and Papathanassiou (2006). The list should not be considered exhaustive.

<sup>b</sup>Operational as of January 2005.

<sup>c</sup>Operational as of February 2006.

<sup>d</sup>Operational as of January 2005.

<sup>e</sup>As of December 5, 2005.



APPENDIX 1: DERIVATIVES AND OTC CENTRAL COUNTERPARTIES<sup>a</sup> (CONTINUED)**B. Organizational information of derivatives clearing organization in the U.S.**

CCP	Corporate form	Ownership structure	Instruments and products cleared
AE Clearinghouse, ILLC	Subsidiary of the Actuarials Exchange	Exchange owned	Cash settled OTC contracts excluded from the Commodity Exchange Act (CEA) executed on a board of trade exempted from the CEA.
The Clearing Corporation (CCorp)	Commercial entity; first founded in 1925 as the Board of Trade Clearing Corporation	Owned by its members	Euro denominated products traded on Eurex Futures and options on futures
Chicago Board of Trade (CBOT)	As of 2005, stock company (exchange founded in 1848)	As of 2005, stock, for-profit holding company with stockholders (CBOT Holdings) and Board of Trade of the City of Chicago, Inc., a nonstock, for profit derivatives exchange subsidiary with members (CBOT)	From 2004 to 2008, the CME provides clearing for CBOT and CME products, with the possibility of extension through the Common Clearing Link. Futures and options on futures
CME Clearing House	Clearing division of the Chicago Mercantile Exchange Holding, Inc. (CME), a Delaware corporation founded in 1898	Exchange owned. Since 2002, CME has been (the first) publicly traded exchange in the U.S.	CME provides clearing to CME products; futures and options related to agricultural commodities, equity index, foreign exchange, interest rate, weather, energy. With effect as of 2004, CME provides clearing for all CBOT products
Hedge Street, Inc.	Division of Hedge Street Inc. a Delaware corporation	Exchange owned; affiliate of Hedge Street Inc.	Fully collateralized cash settled futures and options listed for trading on the market HedgeStreet Inc.
Kansas City Board of Trade Clearing Corporation	Commercial entity, wholly owned subsidiary of the Exchange Kansas Trade Clearing Corporation	Exchange owned; the exchange is member owned	Futures and options
LCH.Clearnet Ltd. (LCH)	Commercial entity, subsidiary of LCH Ltd	See Belgium	OTC interest rate swaps and commercial energy products, financial futures and options
MGE Clearing House	Department of the Minneapolis Grain Exchange, a private company (MGE)	Exchange owned. The MGE is a nonprofit, membership organization	Futures and options

APPENDIX 1: DERIVATIVES AND OTC CENTRAL COUNTERPARTIES<sup>a</sup> (CONTINUED)**B. Organizational information of derivatives clearing organization in the U.S.**

CCP	Corporate form	Ownership structure	Instruments and products cleared
New York Clearing Corporation (NYCC)	Not-for-profit Corporation under the Laws of the State of New York founded in 1915, designated clearing organization for the Board of Trade of the City of New York, Inc. (NYBOT). NYBOT is the only designated contract market after the merger of the Coffee, Sugar & Cocoa Exchange, Inc. (CSCE) and the New York Cotton Exchange (NYCE) was completed in 2004	Exchange owned, subsidiary of the NYBOT, a member owned exchange.	Futures and options
NYMEX Clearing House	Division of the New York Mercantile Exchange (NYMEX)	Exchange owned	OTC energy contracts, futures
The Options Clearing Corporation (OCC)	Corporation under the laws of Delaware founded in 1973	Exchange owned. It is equally owned by the American Stock Exchange, the Chicago Board Options Exchange, the International Securities Exchange, the Pacific Exchange, and the Philadelphia Stock Exchange	Equity derivatives, securities options. Security futures Commodity futures and options on commodity futures

<sup>a</sup>From Bliss and Papathanassiou (2006). The list should not be considered exhaustive. Summary information on CCPs associated with the DTCC is provided in footnote 16 of the article.

<sup>b</sup>Operational as of January 2005.

<sup>c</sup>Operational as of February 2006.

<sup>d</sup>Operational as of January 2005.

<sup>e</sup>As of December 5, 2005.

## **Monday, April 3, 2006**

**Opening Remarks:** Gertrude Tumpel-Gugerell, Member of the Executive Board of the European Central Bank

### **Panel 1 Setting the Context**

*Chair:* Patrick M. Parkinson, Board of Governors of the Federal Reserve System

Diana Chan, Citigroup

Yvon Lucas, Banque de France

Tomoyuki Shimoda, Bank of Japan

John Trundle, Euroclear SA/NV

### *Lunch*

*Keynote Speech:* Randall S. Kroszner, Governor, Board of Governors of the Federal Reserve System

### **Invited Session I**

#### **CCP Foundational Issues**

*Chair:* Robert Steigerwald, Federal Reserve Bank of Chicago

#### **Derivatives clearing, central counterparties and novation: the economic implications**

Robert Bliss, Wake Forest University, and Chryssa Papathanassiou, European Central Bank

#### **Central counterparties**

Thorsten Koepl, Queen's University, and Cyril Monnet, European Central Bank

*Discussant:* Charles Kahn, University of Illinois

### **Invited Session II**

#### **Collateral and Margins**

*Chair:* Douglas Evanoff, Federal Reserve Bank of Chicago

#### **Intraday margining of central counterparties: EU practice and a theoretical evaluation of benefits and costs**

Froukelien Wendt, De Nederlandsche Bank

#### **Valuation of collateral in securities settlement systems for extreme market events**

Alejandro García, Bank of Canada, and Ramo Gençay, Simon Fraser University

#### **Extreme spectral risk measures: an application to futures clearinghouse margin requirements**

John Cotter, University College, Dublin, and Kevin Dowd, Nottingham University

*Discussant:* Jean-Charles Rochet, University of Toulouse

### **Conference Dinner**

*Dinner Speech:* Tommaso Padoa-Schioppa, Minister of Economic Affairs and Finance, Italy, and Former Member, Executive Board, European Central Bank

## **Tuesday, April 4, 2006**

### **Panel II**

#### **Industry Structure and Developments**

*Chair:* Alberto Giovannini, Unifortune Asset Management SGR

Peter Axilrod, The Depository Trust and Clearing Corporation

Daniel Gisler, Eurex

David Hardy, LCH.Clearnet Limited

Kimberly S. Taylor, Chicago Mercantile Exchange

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APPENDIX 2: ISSUES RELATED TO CENTRAL COUNTERPARTY CLEARING  
JOINT CONFERENCE OF THE EUROPEAN CENTRAL BANK AND  
THE FEDERAL RESERVE BANK OF CHICAGO (CONTINUED)

**Session III**

**CCP Risk Management**

*Chair:* Jens Tapking, European Central Bank

**Comparing the pre-settlement risk implications of alternative clearing arrangements**

John P. Jackson and Mark J. Manning, Bank of England

**Default risk mitigation in derivatives markets and its effectiveness**

Rajna Gibson and Carsten Murawski, Swiss Banking Institute

*Discussant:* James T. Moser, Louisiana Tech University and Commodity Futures Trading Commission

Lunch

*Keynote Speech:* Michael Moskow, President, Federal Reserve Bank of Chicago

**Panel III**

**CCPs and the Future Development of Financial Market Clearing and Settlement**

*Chair:* Daniela Russo, European Central Bank

Jill Considine, The Depository Trust and Clearing Corporation

Ruben Lee, Oxford Finance Group

Mario Nava, European Commission

*Concluding Remarks:* Jean-Claude Trichet, President, European Central Bank

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APPENDIX 3: CPSS–IOSCO TECHNICAL COMMITTEE RECOMMENDATIONS FOR CENTRAL  
COUNTERPARTIES (CCPS)

**CPSS–IOSCO Recommendations for Central Counterparties (CCPs)**

**1. Legal risk**

A CCP should have a well founded, transparent, and enforceable legal framework for each aspect of its activities in all relevant jurisdictions.

**2. Participation requirements**

A CCP should require participants to have sufficient financial resources and robust operational capacity to meet obligations arising from participation in the CCP. A CCP should have procedures in place to monitor that participation requirements are met on an ongoing basis. A CCP's participation requirements should be objective, publicly disclosed, and permit fair and open access.

**3. Measurement and management of credit exposures**

A CCP should measure its credit exposures from its participants at least once a day. Through margin requirements, other risk-control mechanisms or a combination of both, a CCP should limit its exposures to potential losses from defaults by its participants in normal market conditions, so that the operations of the CCP would not be disrupted and participants that are not in default would not be exposed to losses that they cannot anticipate or control.

**4. Margin requirements**

A CCP that relies on margin requirements to limit its credit exposures to participants should have sufficient margin requirements to cover potential exposures in normal market conditions. The models and parameters used in setting margin requirements should be risk based and reviewed regularly.

#### **5. Financial resources**

A CCP should maintain sufficient financial resources to withstand a default by the participant to which it has the largest exposure in extreme but plausible market conditions.

#### **6. Default procedures**

A CCP's default procedures should be clear and transparent, and they should ensure that the CCP can take timely action to contain losses and liquidity pressures and to continue meeting its obligations. Key aspects of the default procedures should be publicly available.

#### **7. Custody and investment risks**

A CCP should hold assets in a manner whereby risk of loss or of delay in its access to them is minimized. Assets invested by a CCP should be held in instruments with minimal credit, market, and liquidity risks.

#### **8. Operational risk**

A CCP should identify sources of operational risk and minimize them through the development of appropriate systems, control, and procedures. Systems should be reliable and secure and have adequate, scalable capacity. Business continuity plans should allow for timely recovery of operations and fulfillment of a CCP's obligations.

#### **9. Money settlements**

A CCP should employ money settlement arrangements that eliminate or strictly limit its settlement bank risks, that is, its credit and liquidity risks from the use of banks to effect money settlements with its participants. Funds transfers to the CCP should be final when effected.

#### **10. Physical deliveries**

A CCP should clearly state its obligations with respect to physical deliveries. The risks from these obligations should be identified and managed.

#### **11. Risks in links between CCPs**

A CCP that establishes links either cross-border or domestically to clear trades should evaluate the potential sources of risks that can arise, and ensure that the risks are managed prudently on an ongoing basis. There should be a framework for cooperation between the relevant regulators and overseers.

#### **12. Efficiency**

While maintaining safe and secure operations, CCPs should be cost-effective in meeting the requirements of participants.

#### **13. Governance**

Governance arrangements for a CCP should be effective, clear and transparent to fulfill public interest requirements and to support the objectives of owners and users. In particular, they should promote the effectiveness of the CCP's risk-management procedures.

#### **14. Transparency**

A CCP should provide market participants with sufficient information for them to identify and evaluate accurately the risks and costs associated with using its services.

#### **15. Regulation and oversight**

A CCP should be subject to transparent and effective regulation and oversight. In both a domestic and an international context, central banks and securities regulators should cooperate with each other and with other relevant authorities.

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Sources: Bank for International Settlements (BIS), Committee on Payment and Settlement Systems of the central banks of the Group of Ten countries (CPSS) and Technical Committee of the International Organization of Securities Commissions, 2004, exhibit 1.

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# Derivatives clearing and settlement: A comparison of central counterparties and alternative structures

Robert R. Bliss and Robert S. Steigerwald

## Introduction and summary

The past several decades have seen fundamental transformations in the size, structure, and liquidity of world financial markets. Equity markets have fluctuated in value (currently about \$17 trillion for U.S. equities) and have introduced new products such as exchange-traded funds (mutual funds that trade like equities). Increasingly, structured equity products combine derivatives and cash market positions to manage equity risks. Debt markets have grown rapidly (currently about \$26 trillion for the U.S.<sup>1</sup>), with the greatest growth coming from mortgage- and asset-backed securitizations. Recently, credit derivatives (currently \$26 trillion in notional value<sup>2</sup>) have begun to supplement and even, in some instances, replace cash markets in debt. Derivatives markets, of which over-the-counter (OTC) interest rate swaps are by far the largest component, have grown to \$284 trillion in notional value.<sup>3</sup>

These changes have facilitated economic growth. Where banks once held the loans and mortgages they originated, these are now routinely securitized and sold to domestic and foreign investors, thus increasing the pool of capital that banks intermediate. The continuing exponential growth of derivatives markets; the development of new derivatives instruments; their impact on financial markets generally; the rapid transformation of traditional institutional arrangements; and occasional operational, liquidity, and credit problems have all focused attention on what happens *after the trade*—the post-trade practices, structures, and arrangements that ensure the smooth and efficient functioning of these markets.<sup>4</sup>

After a trade involving a financial instrument such as a derivatives contract is executed, it must be “cleared” and ultimately “settled.” These terms may have different meanings in the context of different market practices, which vary from country to country,

as well as from market to market. Nevertheless, clearing typically involves post-trade operations, such as trade matching, confirmation, registration, as well as risk-management functions, such as netting, collateralization, and procedures (including “variation settlement” or “variation margin”) that mitigate or eliminate some forms of credit risk. Settlement, by contrast, involves the transfer of money or assets necessary for the counterparties to perform (and, in legal terms, “discharge”) their obligations.

Clearing and settlement systems are critical to the stability of the financial system, a system that is increasingly interconnected and global in scope. The significance of these systems, however, is at times incompletely appreciated by observers. For example, these functions are sometimes referred to as mere “plumbing.” In a recent speech, President Michael Moskow of the Federal Reserve Bank of Chicago took issue with this usage:<sup>5</sup>

Post-trade clearing and settlement are sometimes referred to as the *plumbing* of the financial system. This term may suggest that clearing and settlement systems are of secondary importance. In fact, however, they are more like the *central nervous system* of the financial system. Clearing and settlement systems provide vital linkages among components of the system, enabling them to work together smoothly. As such, clearing and settlement systems are critical for the performance of the economy.

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This article explores the functions performed by clearing and settlement institutions for financial markets, with a particular focus on *derivatives*, as opposed to *securities*, clearing and settlement. The nature of the counterparty credit risks that arise prior to settlement are essentially the same in both secondary securities markets and derivatives markets. The risk that either the buyer or seller of the security will be unable to perform its obligation (to pay for or deliver the security, respectively) is conceptually indistinguishable from the risk that the counterparties to a derivatives contract will be able to perform their obligations as they fall due.

However, securities transactions also involve functions that have no analogues in derivatives markets. Securities, unlike derivatives, are financial assets. Securities settlement, therefore, involves the transfer of the asset against the corresponding payment. This involves the services of institutions, such as custodians, transfer agents, and others, which have no role in typical derivatives markets and necessitates risk-management procedures that are not typically present in derivatives markets. For example, risk-management operations for securities transactions and other linked payment transactions have been developed to ensure that both legs of the transaction (that is, the transfer of the asset and the corresponding payment) are completed or, if there is a failure, to ensure that neither leg is completed. The risk that one leg of the transaction may be completed but not the other is known as “settlement risk.”<sup>6</sup> The kinds of risk-management operations that have been developed to mitigate or eliminate this risk are typically called “delivery versus payment” (or DvP) or “payment versus payment” (or Pvp).

Derivatives contracts are agreements to make payments or transact (buy/sell something) at some time in the future, ranging from a few days (for example, futures contracts nearing expiry) to many years (for example, long-dated interest rate swaps), based on the value of some underlying asset or index and, in the case of options, the decision of one of the counterparties. As a result, post-trade processing of derivatives can involve complexities that are typically missing from securities clearing and settlement. Box 1 lists many of the separate functions that may need to be performed over the life of a typical derivatives contract.

In securities clearing and settlement, the length of time between the execution of a transaction (in which the counterparties undertake reciprocal obligations to deliver a security against payment) is dictated primarily by operational constraints. The parties do not bargain for deferred delivery and payment in a typical cash

securities transaction—they seek the transfer of a particular quantity of securities in exchange for an agreed payment. The economic purpose of the transaction would be fulfilled if the transfer and payment took place immediately, without any delay. Time lags between the execution of a trade and settlement, whether that lag is one or three or five days in duration, result from the complex and interrelated operations necessary to complete both legs of the transaction.

With derivatives, however, the length of time between the execution of a transaction and settlement is *essential to the contract*. Put another way, the fundamental economic purpose of a derivatives transaction involves the reciprocal obligations of the parties over the life of the contract. Of course, the creditworthiness of the parties to a derivatives contract can fluctuate in the interim. This is also true in securities transactions.<sup>7</sup> However, unlike long-dated derivatives transactions, the obligations of the buyer and seller of a security are settled within a few days, typically no more than three or five days, depending upon the security and the market involved.

As a result, the parties to a derivatives contract are principally dependent upon each other’s creditworthiness to assure future performance in the absence of mechanisms to transfer that risk. The combination of a much longer time horizon for completing transactions, greater uncertainty as to the value (and even direction) of the ultimate transfer obligations, and the unavoidable significance of counterparty credit risk in derivatives transactions means that substantial performance (that is, credit) risk is an integral factor in the completion of derivatives transactions, compared with securities or payments transactions.

Derivatives markets have evolved practices and institutional arrangements to deal with these special characteristics.<sup>8</sup> These in turn have affected the development and structure of derivatives markets. Today, broadly speaking, two parallel systems exist for clearing and settling derivatives: *bilateral* clearing and settlement and *central counterparty* (CCP) clearing and settlement. Most OTC derivatives are settled bilaterally, that is, by the counterparties to each contract. Risk-management practices, such as collateralization, are also dealt with bilaterally by the counterparties to each contract.<sup>9</sup>

In contrast, most exchange-traded derivatives and some OTC derivatives are cleared and settled through a CCP. In the case of centrally cleared derivatives markets, the original contract entered into by two counterparties is automatically replaced by two contracts, each of which arises between one of the original counterparties and the central counterparty.

## BOX 1

### Example of the functions required to clear and settle a derivative

Consider a ten-year interest rate swap with a notional value of \$10 million and a fixed rate of 5 percent against a reference rate of six-month London Interbank Offer Rate (LIBOR), with semiannual payments in arrears. This contract calls for 20 semiannual payments to be computed at the beginning of each payment interval by taking the difference between the prevailing six-month LIBOR and 5 percent and then multiplying that number by \$10 million. This payment is then made at the end of the six-month interval, at which time the next period's payment is also being determined. If the six-month LIBOR at the beginning of the period is greater than 5 percent, the payment is made by the "variable payer" to the "fixed payer" and vice versa.

Clearing and settling this swap involves all of the following:

- Confirming the terms of the contract at its inception;
- Determining the payment obligation at the beginning of each six-month interval and notifying the parties;
- Settling payments due at the end of each six-month interval;
- Maintaining the following records: terms of contract, payments made/received by the counterparties, and names, addresses, and account numbers of the counterparties;<sup>1</sup>

- Preparing reports needed for tax, financial, position, risk-exposure reporting, and so on;
- Valuing the swap for purposes of determining collateral requirements;
- Monitoring counterparty creditworthiness;
- Determining collateral requirements (this usually involves all positions documented under a master agreement);
- Valuation and monitoring of securities posted as collateral, and determination of "haircuts" to be applied to securities posted;<sup>2</sup>
- Monitoring counterparties for compliance with the terms of the contract, in particular credit events defined under the contract;
- Determining whether to exercise closeout rights when credit events occur; and
- Pursuing legal remedies for recovering net amounts owed under closed out positions, or making net final payments owed and ensuring legal finality of closeout obligations.

<sup>1</sup>Even if the swap is not assigned to a new counterparty, this information can easily change over ten years.

<sup>2</sup>Haircuts are discounts applied to the market value of securities posted as collateral. Thus, a bond with a market value of \$10 million may only count as \$9 million worth of collateral. Haircuts protect the collateral holder against any fluctuation in the value of the collateral.

Critical risk-management functions are typically carried out by the clearinghouse.

In the remainder of this article, we discuss a number of interrelated functions typically performed by derivatives clearing and settlement arrangements—regardless of whether they are centralized (as in markets that utilize CCPs) or not—including:

- Counterparty credit-risk-management techniques, such as netting, collateralization, procedures (such as DvP and PvP) to mitigate settlement risk, procedures (such as variation settlement) to mitigate replacement cost (or so-called forward) risk, and other risk-management mechanisms;
- Market access restrictions, ongoing credit evaluation, and monitoring;
- Crisis management and user default administration;
- Loss mutualization, insurance, and other measures that supplement the CCP's risk-management mechanisms; and

- Related information collection and administrative functions necessary to the operation of the clearing and settlement arrangement.

We then consider how the clearing and settlement structure (for example, bilateral versus CCP) can affect the functioning of markets. However, our comparison between bilateral and centrally cleared alternatives does not imply that one is a better model than the other. Bilateral and centrally cleared systems have coexisted for almost a century and are likely to continue to do so. This has occurred due to the heterogeneous nature of derivatives products and their evolution. Each clearing method has its pros and cons, and these vary with the characteristics of the derivative being cleared.

### Structure of central counterparties

A CCP can be defined as "... [a]n entity that interposes itself between counterparties to contracts traded in one or more financial markets, becoming the buyer to every seller and the seller to every buyer."<sup>10</sup> In other words, a CCP becomes a substituted principal to

contract obligations originating with other members of a financial market. Because it stands between market buyers and sellers, the CCP bears no net market risk exposure—such risk remains with the original counterparties to the trade. Credit risk, on the other hand, is centralized in the CCP itself. As a result, there is no need for the original counterparties to initially evaluate or continuously monitor each other’s creditworthiness. In fact, in a market that utilizes a CCP, the original parties to a trade may be entirely unknown to each other.

The legal process whereby the CCP is interposed between buyer and seller is known as novation.<sup>11</sup> Novation is the replacement of one contract with another or, in this case, one contract with two new contracts. The viability of novation depends on the legal enforceability of the new contracts and the certainty that the original counterparties are not legally obligated to each other once the novation is completed. As a result of novation, the contract between the original counterparties is discharged and the CCP becomes the “buyer to every seller and the seller to every buyer.”

A CCP is legally obligated to perform on the contracts to which it becomes a substituted counterparty in place of the original counterparties. However, because the CCP enters into two offsetting positions as a result of each novation, the CCP is “market neutral”—the number of long positions will equal the number of short positions to which the CCP is a party, just as the number of long and short positions across the market as a whole cancel out. Thus, a CCP normally bears no market risk.<sup>12</sup> But as counterparty to every position, the CCP bears credit risk in the event that one of its counterparties fails. Similarly, the CCP’s counterparties bear the credit risk that the CCP might fail.

CCPs mitigate their credit risk exposure through a number of reinforcing mechanisms, typically including *access restrictions*, *risk-management tools* (such as collateralization), and *loss mutualization*. These mechanisms simultaneously serve to make market participants indifferent to the actual creditworthiness of the parties with which they trade on the centrally cleared market. They also have a number of ancillary effects that reduce costs to the CCP counterparties and increase liquidity in the market.

Access restrictions (such as membership requirements) are central structural components of the CCP arrangement. CCPs only deal with parties that meet the CCPs’ standards for creditworthiness and operational capability and may revoke access privileges for those who fail to maintain their creditworthiness and meet their other obligations to the CCPs. This permits the CCPs to limit their risk exposure to those parties they are able to monitor.

In addition, CCPs typically impose some or all of the counterparty credit-risk-management techniques described above. For example, trading obligations (positions) and payment requirements are multilaterally netted, increasing operational efficiency and reducing the amount at risk. CCPs also typically impose collateral requirements (sometimes known as initial margin) on those that have direct access to the CCP. Margining systems are designed to ensure that in the event that a clearing member fails to meet a margin call, sufficient funds remain readily available to close out the member’s positions without loss to the CCP in most market conditions. As a complementary risk-management mechanism, the gains and losses from open positions are posted to a clearing member’s margin account on a regular (usually daily) basis and result in calls for variation settlement (or variation margin). The variation settlement reflects periodic mark-to-market fluctuations and is an important mechanism for assuring the collateral held by the CCP is likely to be sufficient to meet the needs of the CCP in the event of a default.

Another mechanism becomes operative if the posted collateral is not sufficient to offset a loss resulting from the failure of a counterparty. After exhausting the counterparty’s collateral, CCPs typically provide that any remaining loss will be shared among all (or certain classes of) clearing members. The details of such “loss mutualization” arrangements vary, but generally include a clearing or capital fund that is either paid in by clearing members or built up through accumulated undistributed profits or transaction fee rebates.

The result of the credit standards and margining systems employed by CCPs and enforced on the market is twofold. Firstly, credit risk is homogenized; and secondly, credit risk monitoring is delegated. Both of these effects tend to reduce the costs to market participants. Credit risk is homogenized through standardized margining and member capital requirements. In addition, the CCP’s risk-management mechanisms are supplemented by mutualization or loss sharing and other measures, such as third-party insurance. Since every clearing member’s counterparty is the CCP, it does not matter which member a market participant enters into a trade with. Informational costs and asymmetries may also be reduced by having a central counterparty. Instead of a market where participants must assess the creditworthiness of their counterparties individually and then act on that assessment, either through trading decisions or pricing, every clearing member is required to satisfy well-understood requirements. The CCP then monitors and enforces these requirements, relieving the market participants of the

need to do so. Market participants need only have confidence in the creditworthiness of the CCP, which may be ascertained in various ways, such as public ratings.

Because members are collectively liable for losses, up to a predetermined level, and more importantly perhaps because they have a collective interest in the survival of the CCP, they have a strong incentive to work with and through the CCP to resolve issues. Since the CCP is the only direct counterparty of a clearing member, it effectively acts on behalf of the other, non-defaulting clearing members in pursuing legal remedies against any clearing member that defaults. In a bilaterally cleared market, each counterparty of a failed market participant would have to look out for its own interests, which, in principle, would significantly raise legal and administrative costs.

### Effects of CCP structure

Novation and the credit-risk-mitigation mechanisms utilized by CCPs have a number of important effects on how centrally cleared derivatives markets function. The first and perhaps most important is that credit risk becomes homogenized, at least as far as clearing members are concerned. All clearing members meet identical credit requirements and are subject to the same oversight. The homogenization of credit risk and the structure of mutualized loss sharing facilitate anonymous trading among market participants. This greatly reduces the informational costs of trading. Unlike bilaterally cleared markets—where assessments of counterparty credit risk influence the decisions of which counterparties will trade with which and which must post collateral and in what amount—in a centrally cleared market using a CCP, everyone is equal and the CCP ensures that obligations are met.

Clearing derivatives through a CCP also facilitates liquidity in another way. Recall that a derivatives contract is established between two particular parties. In the absence of a CCP, the contract could not easily be exited except by agreement of both parties (unlike a security that can simply be sold to a third party). Entering into an offsetting contract with a different counterparty may eliminate the market risk of the combined positions, but credit risk remains. We'll call the counterparty to both contracts A and the other two counterparties B and C. If B or C defaults, then A may be left with a loss on that position and an unhedged position in the remaining contract. Furthermore, since A has two positions, it may need to hold collateral against both positions. Only by entering into an identical offsetting contract with the original counterparty and then getting the counterparty to agree to cancel the offsetting positions (as is usually embodied in the relevant

master agreements) can a market participant exit a position with legal certainty.

The result is that positions tend to be left "on," although they have become economically redundant. Furthermore, redundant positions can easily be built up across networks of participants. Redundant positions increase administrative burdens but, more importantly, increase the number of positions that would need to be resolved were a member of the network to fail. The solution, multilateral netting, requires knowledge and analysis of all the positions of all members in the network—however, the information needed to accomplish multilateral netting may include proprietary information that the traders involved may not wish to share with outsiders. That concern may inhibit the cooperation and disclosure needed in the bilateral markets to accomplish multilateral netting.

In a centrally cleared derivatives market with a CCP, the rules of the clearinghouse typically provide for the automatic netting and cancellation of offsetting contracts. Market participants can easily exit positions by entering into an offsetting trade with the CCP. The ability to easily enter into positions (which comes from credit risk homogenization and delegated monitoring) and the ability to easily exit positions (by having a single common counterparty) greatly increase the liquidity of the market.

While liquidity is a great benefit of a CCP-cleared market, CCPs are themselves dependent upon a sufficient level of liquidity to be of value to a particular market. Many OTC derivatives contracts are too specialized to develop the necessary volume to make central clearing feasible. However, as markets for particular contracts mature and as standardized forms of transacting and standardized contract terms are adopted (as has happened in interest rates swaps, for instance), CCP clearing of OTC derivatives becomes more and more feasible.

### Alternatives to CCPs

In the previous section, we explained that CCPs bring a bundle of interrelated services to the market, including credit risk management, delegated monitoring, and liquidity enhancement. However, a CCP is only one of a number of alternative structures that could be used to provide these services.<sup>13</sup> Next, we consider how the OTC derivatives markets face the same issues addressed by these CCP services.

As we discussed earlier, netting and position close-out are natural outcomes of a CCP, so long as the legal system recognizes novation (or the applicable legal mechanism for effecting counterparty substitution). Through the efforts of trade organizations, such

as the International Swaps and Derivatives Association (ISDA), central banks, and others, legislatures have provided legal protection for netting and collateral under covered master agreements for derivatives transactions. Thus, OTC derivatives market participants may enjoy netting and collateral benefits vis-à-vis a single counterparty similar to those enjoyed by CCP members with respect to their sole counterparty, the CCP. As noted above, there are practical constraints upon the ability of OTC market participants to multilaterally net their positions, payments, and other obligations. However, these markets have developed other innovations to facilitate multilateral netting. An example is TriOptima.<sup>14</sup> Subscribers to TriOptima's web-based service input their positions. TriOptima then runs algorithms to detect redundant positions and notifies subscribers of the early termination trades needed to eliminate redundancies.

Organizations such as ISDA have also worked to reduce legal uncertainty through the use of standardized contract language and terms. As a result, some types of OTC derivatives contracts have become standardized in all but their economic specifics. This increases liquidity and reduces the costs of transacting. Likewise, the standardization of collateral arrangements reduces the costs of managing collateral. Moreover, recent movements to standardize the process for the assignment of contracts—that is, mutually agreed substitution of one counterparty with another—and greater market acceptance of assignments have the potential to enhance market liquidity.<sup>15</sup>

Mutualized loss sharing occurs in many forms in the economy. The most common mechanism is insurance. Customers pay nonrefundable fees to the insurance company, which in turn agrees to cover customers' losses. Insurance, in the form of third-party guarantees, is routine in fixed income, securitization, and some derivatives markets. While insurance and performance guarantees rely on a single guarantor, rather than a pool of members, the business model effectively spreads the cost across the client base (or the company would not make a profit). Unlike mutualized loss sharing across a CCP's member base, expected losses in an insurance arrangement are paid ex ante through premiums, rather than being assessed ex post through attachment of member funds and additional assessments. A CCP member only shares the losses after they have occurred and after the defaulting member's funds have been exhausted. Meanwhile, the members may retain a legal interest in the funds from which losses are to be paid. Insurance customers, on the other hand, have no right to excess premiums they pay in and rely on market competition to keep these to an appropriate

minimum. As with CCPs, the insurance company also centralizes risk assessment, pricing, mitigation, legal standing to pursue claims, collection and processing of payments, and so on.

Another function performed by CCPs is centralized bookkeeping. A similar function is performed in securities markets by securities depositories, which track beneficial ownership of securities, record changes in ownership, provide mailing lists for proxies and dividend payments, and so forth. These mundane functions occur on such an enormous scale that centralization provides overwhelming economies.<sup>16</sup> Securities depositories are expanding their range of securities and the ancillary functions they perform. A recent proposed innovation by the Depository Trust and Clearing Corporation (DTCC) working with major dealers was to set up a database of "golden copies" of all credit derivatives in the U.S. This is to serve as the repository of the legally binding copy in the event of disagreement. In the case of credit default swaps, the DTCC also assists in the determination of credit events by collecting information from individual counterparty actions and, when these reach a critical level for a particular underlying reference entity, informing the market.

## Conclusion

The CCP structure we know today is, to a certain extent, an artifact of the origins of exchange-traded contracts. At the same time, OTC markets have evolved other means of dealing with similar problems of credit risk management and efficiency.

Today both CCP and bilaterally cleared market structures are evolving rapidly. Much of the attention has focused on CCPs, in part because they represent identifiable legal entities. The historical linkages between CCPs and specific exchanges have sometimes been viewed as important to the competitiveness of those exchanges and to the countries in which the CCPs and exchanges are located. Pressures to consolidate CCPs across exchanges, to free CCPs to clear OTC products, and to clear across borders continue to be controversial. Bilateral clearing is a market practice rather than a legally identifiable institution. Nonetheless, the sheer size of the dealers at the center of the OTC market, the relative opacity of the markets, and some operational problems have begun to draw attention to clearing in these markets as well.<sup>17</sup>

While CCP and bilaterally cleared markets deal with similar issues, they also have dissimilarities. OTC market products tend to be customized, to be less liquid, and to involve less turnover of positions. In contrast, derivatives cleared through a CCP tend to be

highly standardized and highly liquid. While it is too strong to say that the two systems are converging, it is the case that both are evolving and in the process adapting ideas from each other: increasing scope and coverage on the part of CCPs and increasing efficiencies through standardization on the part of the OTC derivatives market.

An important public policy issue is whether and how to encourage these developments. In considering these questions it is important to distinguish the benefits from the structures. Economies of scale can be achieved both by cross-border consolidation of CCPs and by cross-border consolidation of dealers. Credit risk management can be done by CCPs or by insurance companies. Operational efficiency can be obtained by centralizing processing in CCPs or in securities depositories. It is true that CCPs perform all these functions

in a single institution. There may be some synergies to doing so, though this is not necessarily obvious. As the discussion proceeds, it is important to note that markets have generally been successful in evolving mechanisms for dealing with collective risks. Both CCPs and the structures and practices of bilateral clearing were, for the most part, developed by markets and not mandated by regulators. If the goal of policymakers is to create an environment in which market mechanisms can evolve to provide greater societal benefits while containing systemic risks, it may be useful to recognize the multiplicity of possible approaches to any given problem. The CCP, where it has the necessary market depth to function, may turn out to be the most attractive and efficient solution. But, then again, in some cases it may not.

## NOTES

<sup>1</sup>The Bond Market Association ([www.bondmarkets.com](http://www.bondmarkets.com)).

<sup>2</sup>International Swaps and Derivatives Association ([www.isda.org](http://www.isda.org)). The “notional value” of a financial contract is the principal amount involved in the transaction. For example, an option to buy 100 barrels of oil at \$65/barrel would have a notional value of \$6,500. Derivatives contracts typically call for periodic payments over the life of the contract of amounts that may be based upon the principal amount, but not the principal itself. Thus, the parties’ credit exposure is typically measured by the “replacement cost” of the contract, not the notional value.

<sup>3</sup>According to the most recent semiannual survey of derivatives market statistics published by the Bank for International Settlements, the outstanding notional value of OTC derivatives contracts (including both futures and options) was \$284 trillion (Bank for International Settlements, 2006b, table 19). By comparison, exchange-traded derivatives exceeded \$83 trillion (Bank for International Settlements, 2006a, table 23A). Data are for December 2005 and June 2006, respectively.

<sup>4</sup>See, *inter alia*, Bliss and Papathanassiou (2006), Bank for International Settlements (2001), Bank for International Settlements (1997), Bank for International Settlements (1998), Bank for International Settlements (2004), Counterparty Risk-Management Policy Group II (2006), Kroszner (1999), Moser (1998), Moskow (2006), Murawski (2002), Ripatti (2004), and Russo, Hart, and Schöenberger (2002).

<sup>5</sup>See Moskow (2006).

<sup>6</sup>Settlement risk, sometimes referred to as “Herstatt risk,” is the risk that arises because of a temporal disjunction between two related payments or other financial transactions. It is not unique to foreign currency transactions, as it arises whenever two linked payments or financial transactions occur sequentially. The 1974 failure of Herstatt Bank has become the classic illustration of settlement risk. See, for example, Steigerwald (2001).

<sup>7</sup>In recent years, securities markets have begun to use mechanisms (such as central counterparties) to mitigate the counterparty credit risks associated with securities transactions prior to settlement. See, for example, Bank for International Settlements (2004).

<sup>8</sup>See Moser (1998) and Kroszner (1999).

<sup>9</sup>In the late nineteenth century, a third arrangement existed on some futures exchanges known as ring clearing, but this evolved into central counterparty clearing. Ring clearing involved agreement by a group of market participants to treat each other’s contracts as more or less interchangeable, allowing transfer and termination of offsetting positions. The recent development and acceptance of standardized procedures to assign derivatives (substitute counterparties) and their use on a regular basis has some of the characteristics of ring clearing. See Moser (1998) for history and details.

<sup>10</sup>Bank for International Settlements (2004).

<sup>11</sup>An alternative approach to establishing a central counterparty relation, known as open offer, is used in some European countries. In this case, the CCP makes an offer to enter into pairs of contracts on terms agreed upon by two markets participants, under certain rules. The market participants agree upon the terms but never formally enter into a contract *vis-à-vis* each other. Instead, they report their agreement to the CCP, which then enters into the two contracts.

<sup>12</sup>Were a counterparty to default, the CCP’s position would become unbalanced and exposed to market risk until the CCP reverses out the defaulting member’s positions.

<sup>13</sup>See, for example, Hills et al. (1999), pp. 122–124.

<sup>14</sup>See [www.trioptima.com](http://www.trioptima.com).

<sup>15</sup>The assignment of a contract, if legally effective, results in the substitution of a new counterparty for one of the original parties to a financial transaction.

<sup>16</sup>With the exception of securities derivatives and government bonds, most securities in the U.S. are processed through a single depository, the Depository Trust Corporation (DTC) and its affiliates, which provide a variety of risk-management functions.

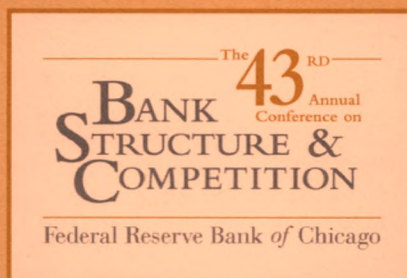
<sup>17</sup>See Counterparty Risk Management Policy Group II (2005), Bliss and Kaufman (2006), and Bliss and Papathanassiou (2006).

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The Federal Reserve Bank of Chicago invites the submission of research- and policy-oriented papers for the 43rd annual Conference on Bank Structure and Competition to be held May 16–18, 2007, at the Westin Hotel in Chicago. Since its inception, the conference has fostered a dialogue on current public policy issues affecting the financial services industry. As in past years, the program will highlight a conference theme (to be announced) but will also feature numerous sessions on topics unrelated to the theme. We therefore welcome submissions of high-quality research on all topics related to financial services, their regulation, and industry structure. A non-exhaustive list of possible session topics includes:

- The mixing of banking and commerce;
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# Issues related to central counterparty clearing: Opening remarks

**Gertrude Tumpel-Gugerell**

First of all, I would like to say that I am extremely delighted to welcome you to this conference and to Frankfurt—a city that offers a huge variety of facets based on almost 2,000 years of history. Frankfurt was not only the home of important writers and philosophers, such as Goethe, Schopenhauer, and Adorno, it has also over the centuries prospered as a marketplace and magnet for business. Key to this success was its central location at the crossroads of large trading routes between the North and South and the East and West. Finance followed trade, and early on, Frankfurt became not only the home of large trade fairs but also an important financial center. It was one of the birth places of our modern stock exchanges, bringing about early financial innovations, such as trade with derivatives or bonds. When I look at the history of Chicago, I see a lot of similarities to Frankfurt: Chicago developed from a trading hub of agricultural products into a financial metropolis with a very potent stock exchange.

I am therefore very proud that this conference is a joint conference organized by both the European Central Bank (ECB) and the Federal Reserve Bank of Chicago (Chicago Fed), and I would like to give a particularly warm welcome to all our colleagues from Chicago. Cooperation between the ECB and the Chicago Fed is very well established: We have close bilateral exchanges and meet regularly in international meetings. Yet, most of our cooperation is often rather invisible to the public at large. Thus, I am particularly glad that this conference highlights visibly the close collaboration between the ECB and the Chicago Fed. It also demonstrates that we witness similar developments in both the United States and Europe and that we can benefit from each other's experiences by analyzing these developments together.

As you can see from the program, this two-day conference aims at exploring the foundations of central counterparties (CCPs), the importance of collateral

and margining, issues related to risk management, and future developments of financial market clearing and settlement. The conference provides a unique forum for discussion and will allow participants to interact with industry executives, policymakers, central bankers, and academics. I am confident that by the end of the conference, we will all have a better understanding of the driving forces, practical arrangements, and the legal environment within which the CCPs operate in the European Union (EU) and the United States, as well as the future developments of financial market clearing and settlement.

Before I give the floor to the panelists, I would like to set the stage by presenting ten statements on key issues related to central counterparty clearing. I will emphasize our wish to achieve an efficient, sound, and stable “domestic” securities market infrastructure in Europe.

## **Central banks have a keen interest in the smooth functioning of central counterparty clearing**

Central counterparties represent an integral element of securities settlement systems. Although a CCP has the potential to reduce the risk exposures of market participants, it also concentrates risks and the responsibility for risk management. In the light of the growing interest in developing CCPs and expanding the scope of their services, central banks have a strong interest in the development of a coherent and integrated securities clearing and settlement infrastructure.

*This article is a reprint of a speech by Gertrude Tumpel-Gugerell, member of the Executive Board of the European Central Bank, on April 3, 2006, at “Issues Related to Central Counterparty Clearing,” a joint conference of the Federal Reserve Bank of Chicago and the European Central Bank, held in Frankfurt, Germany, April 3–4, 2006. The conference agenda and presentations are available at [www.ecb.int/events/conferences/html/ccp.en.html](http://www.ecb.int/events/conferences/html/ccp.en.html).*

Although the Eurosystem is not directly involved in the regulation of CCPs, issues related to the clearing and settlement infrastructure touch on the key responsibilities of central banks:

- The smooth functioning of payment systems, and
- The preservation of financial stability.

Guided by these objectives, the Eurosystem has explicitly expressed its interest in monitoring, understanding, and promoting the development of sound, efficient, and safely functioning financial market infrastructures. In this light, the ECB and the Chicago Fed have organized this joint conference on the role of CCPs.

### **The importance of post-trade processes and services for the overall economy will grow significantly**

Capital markets play a vital role for the global financial system and for long-term economic prosperity. In particular, securities markets facilitate the effective allocation of capital by funneling society's resources to promising productivity-enhancing investments across space and time. The marketplaces operated by exchanges and clearing and settlement institutions have grown at an unprecedented pace. This gives them a central role and responsibility in the global financial environment. In particular, post-trading processes and services, typically referred to as clearing and settlement, are a key part of modern capital markets. From a market perspective, their importance derives from the fact that clearing and settlement costs can be viewed as a subset of transaction costs. These are the costs faced by an investor when carrying out a trade. Expensive and inefficient clearing and settlement limit the development of efficient markets.

The most recent performance figures for the five major European clearinghouses confirm this trend. After the introduction of the euro, the volume of trades cleared increased by a factor of 2.5, reaching a record of around 670 million trades in 2004, which represented a value of close to 350 trillion euro. These figures clearly show that a significant amount and value of securities are held and transferred in these systems. It is therefore crucial that the safe, sound, and reliable functioning of clearing and settlement systems is ensured.

### **Financial innovations and technological advances will continue to be the key drivers for the financial infrastructure industry**

The practices and procedures involved in clearing and central counterparty services are currently undergoing a process of evolution in Europe and the United

States. Developments in technology, advances in the design of financial products, and progress in techniques for management of financial risk have prompted some market participants to advocate the development of clearing arrangements on an international basis. This would allow capital to be used as efficiently as possible. At the same time, the financial soundness of existing clearing arrangements needs to be maintained.

There are two main trends that present numerous challenges for market participants, infrastructure providers, central banks, and financial market regulators: first, developments regarding operational arrangements and the functions of clearinghouses, which I will elaborate on in the following section, and second, consolidation initiatives in the clearing infrastructure, which I will address later.

### **Central counterparty clearinghouses will increasingly perform essential functions in the transaction value chain**

Let me now turn to the operational and technical arrangements of clearinghouses. A clearinghouse determines the obligations that result from debit and credit positions arising from the trading of financial assets. It calculates the amounts that need to be settled, typically through securities settlement systems. The clearinghouse may act as a buyer to the seller and as a seller to the buyer. It thus creates two new contracts that replace the original single contract.

Many of the benefits of central counterparty clearing can be attributed to multilateral netting. Multilateral netting allows for a substantial reduction in the number of settlements and, therefore, in operation costs, including settlement fees. In addition to multilateral netting, central counterparty clearing creates benefits mainly by providing risk-management services. Central counterparty clearinghouses thereby enable market participants to trade without having to worry about the creditworthiness of individual counterparties.

Central counterparty clearing not only creates benefits for individual participants, but it is also essential for the economy as a whole. This is because central counterparty clearinghouses increase market liquidity, reduce transaction costs, and improve the functioning of the overall capital market.

### **There is a need for adequate risk-management procedures and standards for clearinghouses**

Securities infrastructures, in particular central counterparty clearing systems, are vulnerable to failure if they are not sufficiently protected against financial and nonfinancial risks. In fact, if such risks do materialize, the consequences for the stability of the

financial system could be enormous. It is therefore particularly important that appropriate measures are taken to mitigate these risks. Consequently, the effectiveness of a CCP's risk controls and the adequacy of its financial resources are critical aspects of the infrastructure of the market it serves. Clearinghouses have developed different methods of limiting the potential losses arising from the default of a participant. Some of these safeguard measures and their effectiveness in limiting risk exposures will be addressed in the course of this conference.

Given the potential systemic implications of securities clearing and settlement systems, the establishment of standards for risk management is essential. The process of setting standards has already started, with initiatives being driven by market participants or pursued in the framework of international cooperation between regulatory bodies.

### **Competition, transparency, and open access are important to address the interests of customers and public authorities**

The Eurosystem is of the view that competition is important to achieve the overall objective of creating a safe, efficient, and integrated EU clearing and settlement infrastructure. The basic conditions for this goal are transparency and open access. Efforts undertaken by a CCP help to improve transparency and foster confidence of market participants in its safety and efficiency. It is therefore essential that a CCP provides market participants with sufficient information for them to identify and evaluate accurately the risks and costs associated with using its services. To avoid discrimination against classes of participants and competitive distortions, participation requirements should be fair and open within the scope of services offered by the CCP. However, these rules and requirements for fair and open access should be balanced against and aimed at controlling and limiting risks.

Looking ahead, the adoption of a harmonized regulatory regime for securities clearing and settlement systems should be considered in order to complete the internal market. In this respect, an approach that sets out requirements for transparency and participation as instituted in a jurisdiction seems to be preferable.

In this light, the Eurosystem welcomes the initiatives specified in the European Commission's communication on clearing and settlement. The Eurosystem, in principle, supports the adoption of a framework directive on clearing and settlement. A directive could complement the market-led removal of the existing barriers to efficient EU clearing and settlement arrangements. This is a necessary condition for competition

to come into full effect. It may contribute to ensuring open and fair access and price transparency. However, the Eurosystem cautions that the concerns and responsibilities of central banks as regards a safe and integrated securities infrastructure need to be adequately reflected in a potential directive on clearing and settlement. The Eurosystem also understands that a legal and regulatory framework will not impede the continuing cooperation in the area of supervision and oversight of securities clearing and settlement systems. This is essential in order to further improve and follow up on the establishment of common European standards on clearing and settlement.

### **Integration of European securities clearing infrastructures will proceed at different speeds and with more diversified and enlarged businesses**

In the euro area, most countries have established central counterparty clearinghouses. Projects to set up new central counterparty clearinghouses are also under consideration in several countries. Typically, CCPs are attached to particular local organized markets, that is, stock or derivatives exchanges. The European clearing infrastructure inherited from the pre-euro era was a patchwork of national systems operating within their geographical boundaries.

However, the pattern of a single central counterparty clearinghouse serving one market in one country has been changing. Since the start of the European Monetary Union (EMU), a process of integration and consolidation has been under way in the field of CCP clearing. Integration within the securities clearing infrastructure has taken the form of vertical and horizontal consolidation. In the past five years, the number of CCPs for financial instruments has dropped from 14 to seven in the euro area.

In the European context, there have been significant changes in central counterparty clearing, and these have led to increased consolidation among securities clearinghouses. The majority of trades are cleared in a very small number of clearinghouses in Europe. However, a high number of CCPs with a relatively small market share still operate in parallel at the local level. As a result, the Eurosystem is of the view that the process toward further consolidation is making progress but is still in its infancy. On account of the economies of scale and network externalities inherent in the securities clearing business, further cost savings and increased technical efficiency can be expected from more integration and consolidation.

In addition to the tendency toward consolidation of CCPs, another trend can be observed in the field of CCP clearing. At the start of the EMU, almost all

CCPs in the euro area cleared only derivatives transactions. However, in recent years many CCPs have expanded their activities and now also cover repos and securities trades. The CCPs appear to be seeking new business opportunities in an increasingly competitive market. In this context, there is another field of business opportunities for CCPs that has not yet been fully exploited. I am referring to the over-the-counter derivatives markets. These markets have grown substantially in recent years, but their post-trading infrastructure remains somewhat underdeveloped.

The consolidation of CCPs and the expansion of business tend to go hand in hand with the growing volumes in securities trading, advances in technology, and the internationalization of the activities of clearing and settlement infrastructures.

### **Comparing experiences in the United States and Europe for achieving a consolidated and efficient clearing infrastructure**

Looking across the Atlantic, it is interesting to compare the existing organization of domestic clearing arrangements in the United States and the European Union. Recently, major market participants have repeatedly expressed support for the idea of a single European central counterparty clearinghouse, which would be designed as multicurrency and multiproduct. Such a single central counterparty in Europe would be expected to create clearing arrangements that mirror those in the United States. It is often said that clearing arrangements in the United States are more consolidated and cost-effective than those in Europe. However, an examination of the case of derivatives clearing suggests that the main features of central counterparties in the two currency areas are not fundamentally different. In particular, when looking at the level of consolidation, the situation is far more complex than is commonly thought. For example, in the United States, the decentralized clearing of futures transactions derives primarily from the business decisions of exchanges and clearinghouses to maintain separate operations. In addition, sectoral regulation in the United States impedes the development of cross-product clearing, leading to seemingly less integrated clearing arrangements than those in Europe.

### **The Eurosystem's guiding principles are neutrality, market forces, public policy decisions, and cooperation at the global level**

As yet it is unclear which model of integration will eventually prevail in the euro area. The Eurosystem is of the view that the process of consolidation of the central counterparty clearing infrastructure should

be driven by the private sector. Public intervention might be needed if there are clear signs of market failure. For example, a persistent lack of interoperability and the need for standards among clearinghouses are examples that call for coordinated public action.

Irrespective of the final architecture, it is essential that access to clearing, as well as trading and settlement, facilities should not be unfairly impeded. The policy of open and fair access should ensure the safety, legal soundness, and efficiency of securities clearing and settlement systems; guarantee a level playing field; and avoid excessive fragmentation of market liquidity.

The Eurosystem supports cooperation in central counterparty clearing at the global level. Key concepts in this respect are legal feasibility and interoperability. Interoperability means agreeing on common processes, methods, protocols, and networks to enable cooperation between central counterparties at the technical level. This would allow central counterparty clearinghouses worldwide to develop links between one another. As a final outcome, this may or may not lead to the creation of international or global clearinghouses. Furthermore, when global multicurrency systems handling euro begin operations, the Eurosystem should be involved in their oversight, given its interest in the smooth functioning of such systems.

### **The financial infrastructure industry needs to take advantage of the opportunity window that integration offers**

Tomorrow's global securities market infrastructures will be characterized by ongoing integration and consolidation initiatives. However, the message that I would like to convey is that action to promote financial integration in the field of clearing and settlement is urgently needed. In a fast-evolving global financial system, there is a window of opportunity to raise the euro area's financial infrastructure to the highest levels of efficiency, competitiveness, sophistication, and completeness. The window of opportunity was opened by the euro, but it will not remain open forever. The shape of the euro financial system is likely to be determined in the next few years and remain crystallized in that shape for a very long time.

In this respect, post-trading service providers should devise strategic responses in a number of directions in order to best increase business opportunities and to meet investors' demands for lower trading costs, improved liquidity, and immediate access to international clearing and settlement. Economies of scale, efficiency gains, greater risk diversification, and global networks encouraging competition and

consolidation in the securities infrastructure industry will be key to this development. Transatlantic linkages or cooperation would also stimulate financial market infrastructure dynamics. Moreover, the Eurosystem takes the view that the finalization and implementation of the European System of Central Banks–Committee of European Securities Regulators (ESCB–CESR) standards for clearing and settlement in the EU based on the recommendations by the Committee on Payment and Settlement Systems–International Organization of Securities Commissions (CPSS–IOSCO) are essential to ensure the sound and smooth functioning of the financial clearing infrastructure in the EU.

### **Conclusion**

I would like to conclude my speech with a reference to German literature—quoting Johann Wolfgang Goethe, who was born here in Frankfurt more than 250 years ago. He said that the best that history teaches us is the enthusiasm that it evokes (“das Beste, was wir von der Geschichte haben, ist der Enthusiasmus, den sie erregt”). In the spirit of Johann Wolfgang Goethe, my wish for the future is that all relevant

market participants, actors, and authorities in the field of securities market infrastructure take their lesson from the past and promote with their best efforts, dynamism, and enthusiasm the development of a better, integrated, efficient, and safe financial infrastructure landscape. Moreover, we should learn from each other: from our analytical work and from our cooperation. A priority for the future is to pursue a consistent implementation and application of the EU-wide and harmonized rules for clearing and settlement. Successful cooperation among the relevant European and national supervisors and authorities is an important and challenging task. The private sector also has to play its role and take up its responsibility to foster further integration. In this context, it is time for the financial industry to leverage its efforts to higher degrees of efficiency and take full advantage of the opportunities that integration offers. To this end, technological advances and financial innovation will be the factors of success to keep pace with increasing competition at the global level. And financial innovations should go hand in hand with adequate risk measures for an efficient, but also safe and stable, financial sector.

# Central counterparty clearing: History, innovation, and regulation

**Randall S. Kroszner**

As many of you know, I became a member of the Board of Governors of the Federal Reserve System only a month ago. I am delighted to be giving my first speech as a governor at a conference that has resulted from the kind of international cooperation that I see as essential in today's world. The joint sponsorship of this conference by the European Central Bank (ECB) and the Federal Reserve Bank of Chicago (Chicago Fed) represents an extremely fruitful collaboration of researchers, market participants, and policymakers from both sides of the Atlantic. Having been a research consultant at the Chicago Fed for many years and having visited the ECB numerous times since its founding less than eight years ago, I have many friends at both institutions and am pleased to see so many of those friends here today.

In addition, I am delighted that the topic of this cooperative venture and my maiden speech is central counterparty (CCP) clearing. As an academic, I wrote several papers on clearing arrangements and participated in many conferences such as this one. I am very pleased to be in a room filled with others who share that interest.

In recent years, public policymakers have demonstrated growing interest and concern about the effectiveness of CCP risk management. In particular, in November 2004 the Committee on Payment and Settlement Systems (CPSS) of the Group of Ten central banks and the International Organization of Securities Commissions (IOSCO) jointly issued comprehensive international standards for CCP risk management.<sup>1</sup> I have often cited CCPs for exchange-traded derivatives as a prime example of how market forces can privately regulate financial risk very effectively.<sup>2</sup> Indeed, it is hard to find fault with the track record of derivatives CCPs, many of which have managed counterparty risk so effectively that they have never suffered a counterparty default.

But perhaps it is not unreasonable to ask whether that track record will be maintained. I see that good track record as a result of innovations that, over time, produced organizational arrangements that have provided market participants with the incentives and capabilities to ensure effective CCP risk management, thereby serving the public interest as well as the interests of market participants. Significant changes to those arrangements could result in less effective risk management. Furthermore, some CCPs have begun to clear new products, some of which may be less liquid or more complex than exchange-traded derivatives, and thus may pose challenges to traditional risk-management procedures. Finally, more intense government regulation of CCPs may prove counterproductive if it creates moral hazard or impedes the ability of CCPs to develop new approaches to risk management. As cross-border activity becomes ever more important, regulatory differences across countries may become an increasingly serious impediment to innovation by CCPs.

In my remarks today, I will begin by reviewing the historical development of CCPs. I do this not for antiquarian interest but because this history illustrates how market forces led to the evolution of organizational and contractual features that have created strong incentives for effective private regulation that addressed both market participants' and public policymakers' concerns about risk control. I will then discuss the possible implications of recent variations on traditional arrangements. Next I will discuss the challenges

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involved in clearing certain new products, particularly over-the-counter (OTC) derivatives. I will conclude with some views on how government regulation can provide an environment in which private regulation of CCP risk management continues to be effective.

### Historical development of futures clearinghouses

My review of the historical development of central counterparties will focus on the CCP for grain futures traded on the Chicago Board of Trade (CBOT). I make no claim that a CCP first arose in the United States. Indeed, a number of coffee and grain exchanges in Europe had some form of CCP in the late nineteenth century, well before any U.S. exchange.<sup>3</sup> Rather, I simply am more familiar with developments in Chicago, in large measure because of the time that Jim Moser spent digging through the CBOT's archives while on the staff of the Federal Reserve Bank of Chicago.<sup>4</sup> Furthermore, the market forces that drove the evolution of risk controls at the CBOT likely produced a broadly similar evolution on other exchanges.

An important lesson from the CBOT's experience is that a CCP emerged gradually and slowly as a result of experience and experimentation. Early on, the CBOT recognized the importance of creating incentives for adherence to its rules, including the contractual obligations of counterparties to contracts traded on the exchange. Initially, the primary incentive was the threat that a member that defaulted on its obligations could be barred from the trading floor. No doubt this consequence was a powerful incentive for solvent members to meet their obligations, but an insolvent member might not have assigned significant value to the loss of trading privileges. By 1873, the CBOT recognized the importance of evaluating the solvency of its members and adopted a resolution stipulating that any member whose solvency was questioned must open its financial accounts to inspection and could be expelled if it refused to do so. Around the same time, the exchange introduced initial and variation margin requirements for contracts traded on the exchange and set strict time limits for the posting of margin deposits. Failure to post margin deposits would be considered a default on the member's contracts.

The next step along the road to addressing private and public concerns about effective risk control was the CBOT's creation of a clearinghouse in 1883. For many years, the clearinghouse was not a true CCP. Rather, as created, it was merely a mechanism to reduce transactions costs by calculating members' net obligations to post margins and to settle contracts. In the event of a member's default, the clearinghouse assumed no responsibility for settling the defaulting

member's trades or for covering the losses to other members that exceeded the amount of margin that the defaulting member had posted.

Only in 1925 did the CBOT form the Board of Trade Clearing Corporation (BOTCC), a true CCP that became the counterparty to all transactions on the exchange. With the creation of BOTCC, members of the exchange were required to purchase shares in the clearinghouse, and only the member-shareholders were permitted to use the facility.<sup>5</sup> Members were also required to post their margin deposits with the clearinghouse. In the event of a member's default, the clearinghouse would take responsibility for settling the defaulting member's trades. The clearinghouse would seek to cover any losses incurred in settling the defaulter's obligations by liquidating its margin deposit. But if the losses exceeded the value of the margin, the deficiency would be charged against the clearinghouse's capital, including the capital owned by the nondefaulting members. If the losses were so severe as to deplete the clearinghouse's capital, the members could be required to purchase additional shares.

This organizational arrangement has been adopted by many other CCPs, both for exchange-traded derivatives and for cash securities transactions. I characterize this structure as a partial integration of the members of the exchange into a single unit because each member is now at least in part financially responsible for the performance of the others' obligations arising from contracts traded on the exchange.<sup>6</sup> The mutualization of risk creates incentives for all of the exchange's members to support the imposition of risk controls that limit the extent to which the trading activities of any individual member expose all of other members to losses from defaults. Moreover, because the members own the clearinghouse, they have the capability to act on their incentives for effective CCP risk management. I see this alignment of incentives for effective risk management with the ability to act on those incentives as the key to the strong historical track record of derivatives CCPs.

What is interesting and instructive about the history of these arrangements is that it illustrates how market forces can produce private regulations that address the concerns about safety, soundness, and broader financial stability.

### Potential challenges raised by recent changes to central counterparty organization

During the twentieth century, various changes occurred in the historical organizational arrangements that I have characterized as a partial integration of the members of the exchange. And in the twenty-first



century, the pace of change seems to be accelerating. Some derivatives exchanges have remained integrated with their CCP, but even in those cases, there now tends to be less integration. Members of the exchange are seldom required to be members of the clearinghouse. Instead, members of the exchange may arrange to clear through other members, which are referred to as “clearing members.” When a clearing member agrees to clear for a nonclearing member, it becomes responsible to the clearinghouse for the obligations of the nonclearing member. Only the clearing members are required to buy stock in the clearinghouse or to contribute to a clearing fund that would be used to cover losses from defaults by other clearing members, including defaults on their obligations to perform on positions held by nonclearing members.

In recent years, an increasing number of exchanges have engaged unaffiliated CCPs to clear their trades. A “horizontal” integration of CCPs has replaced the “vertical” integration of an exchange and its CCP. Both horizontally integrated CCPs and vertically integrated CCPs have often arranged for insurance policies that limit the potential losses to their clearing members from defaults. Finally, many exchanges have converted from mutual associations of exchange members to for-profit corporations.

Clearly some of these changes have important implications for competition among exchanges. But they may also have implications for the effectiveness of risk management, which is the focus of my remarks today. As I have discussed, historically the key to effective risk management has been that the members of the exchange have borne the risk of losses from defaults and have had the capacity to institute risk controls (principally membership standards and margin requirements) that have limited those risks. The question then is whether any of these changes to the organization of CCPs have left those bearing the risks without the capacity to manage those risks.

I would caution against assuming that change is inherently risky. After all, as we have seen, the partial integration model that worked so well for so many years emerged only gradually as a result of experimentation. Moreover, thinking that “one size fits all” regarding the organization of financial markets is a mistake. That said, it seems critical that the organization of any CCP, including a CCP that follows the traditional partial-integration model, should conform to a pair of broad principles. First, a CCP’s default rules need to be transparent: The party that bears the risk of default (who has “skin in the game”) must be clear to all. Second, a CCP’s governance arrangements must provide those with “skin in the game” with substantial influence over the CCP’s risk controls.

## New products

In recent years, appreciation of the possible benefits of a well-organized CCP has been growing. CCP arrangements have been introduced in a wide variety of markets that had not previously been served by CCPs. In the United States, the New York Stock Exchange established a clearinghouse in 1892 and transformed it into a true CCP in 1920. But, outside the United States, few securities exchanges established CCPs until late in the twentieth century. Today, a CCP is in place and functioning in nearly all major securities markets. Increasingly often, CCPs for securities clear trades, including trades and repurchase agreements involving government bonds, in the over-the-counter securities markets. Since 1999, the London Clearing House (now LCH.Clearnet) has been clearing growing volumes of some types of OTC derivatives through its SwapClear service.

The clearing of OTC derivatives is an especially interesting development. Although SwapClear has been gaining traction, it has been met with resistance from some OTC derivatives dealers. Some of them have argued that bilateral credit risk management, which uses many of the same techniques that CCPs use (netting and margin requirements), is highly effective. Moreover, not all OTC derivatives are sufficiently standardized to be cleared. Consequently, some have expressed concerns that CCP clearing of “vanilla” products could increase the risks on noncleared “exotic” products by limiting the scope for bilateral netting of vanilla products against exotic products outside the CCP. Another consideration for the most creditworthy dealers may be the potential effect of CCP clearing on mitigating the competitive advantage of their creditworthiness.<sup>7</sup>

With regard to systemic risk, the key question about the clearing of OTC derivatives is whether the risk-management techniques that have proved so effective in clearing exchange-traded products will prove equally effective in clearing products that are not as standardized. In particular, the clearing of OTC derivatives tends to entail much less scope for offsetting transactions. As a consequence, if a default occurred, a huge volume of transactions would need to be closed out. The feasibility of a CCP’s achieving closeout promptly is clearly a critical issue that deserves careful examination. In that regard, a recent report by leading participants in the OTC derivatives markets expressed concern about the feasibility of closeout procedures in the event of default of a large market participant in stressed market conditions.<sup>8</sup> Further experimentation with closeout procedures may be necessary to address that concern.

## The role of government

In recent years, policymakers have devoted much attention to oversight and regulation of CCPs, with the objective of promoting their soundness and stability. I certainly share that objective, but I would like to call attention to some possible unintended and undesirable consequences of CCP regulation. The first is moral hazard. Policymakers must be very careful to avoid any impression that government oversight comes with a promise of government financial support in the event of a risk-management failure; otherwise, private-market discipline, which has served private and public interests in the stability of CCP arrangements so well for so long, may well be eviscerated.

Instead, government regulation should focus on improving the effectiveness of private-market regulation. In particular, it should enforce the observance of the two critical principles I identified earlier. First, it should ensure that a CCP's risk-management policies and procedures, especially its policies for handling defaults and allocating the burden of losses from defaults, are transparent to market participants. Second, it should ensure that CCP governance arrangements provide the parties who would bear the losses with substantial influence over the CCP's risk-management policies.

My sense is that policymakers are well aware of the risks that moral hazard poses for financial stability. But I am concerned that a second unintended consequence of regulation has too often gone unrecognized. That is the potential for conflicting regulation (and laws) to impede the evolution of CCP arrangements, especially the potential for economies of scale and scope to be achieved through consolidation. I am always puzzled when I hear the United States held up as the model for the benefits of consolidation of the clearing and settlement infrastructure. We have achieved significant consolidation within the securities markets and within the futures markets. But I am struck by the lack of consolidation of securities and futures CCPs. Perhaps there is no business case for such consolidation. Even if a business case exists, however, I believe

consolidation would be difficult to achieve due to the legal and regulatory distinctions in the United States between securities and futures.

Law and regulation seem also to be placing significant barriers in the way of consolidation of the securities and derivatives clearing and settlement infrastructure in Europe. Most of the fifteen barriers to efficient cross-border clearing and settlement that were identified by the Giovannini Group report in 2001, seem to be grounded in law and regulation rather than in the practices of private-market participants.<sup>9</sup>

Policymakers in all countries need to examine whether legal and regulatory distinctions are impeding innovation and, if so, whether the distinctions are meaningful and essential for the achievement of public policy objectives. Policymakers must also resist the temptation to place regulation in the service of protectionism. I read with interest and appreciation European Union Commissioner McCreevy's recent speech at the London School of Economics on the development of the European capital markets, in which he decried the signs of a new wave of protectionism in Europe.<sup>10</sup> As he noted, "Protectionism is a proven route to economic stagnation and decline."<sup>11</sup> This is an important message, indeed.

## Conclusions

I find the history of financial markets to be enormously instructive. My reading of the history of CCP clearing is that it teaches us that private-market regulation can be effective for achieving the public policy goal of safety and soundness and broader financial stability. Government regulation and oversight should seek to provide an environment in which private regulation can be most effective. Government regulation should not place unnecessary barriers—domestically or internationally—in the path of the future evolution of private-market regulation. Innovation should be fostered, and regulatory protectionism should be rejected.

## NOTES

<sup>1</sup>Bank for International Settlements, Committee on Payment and Settlement Systems and Technical Committee of the International Organization of Securities Commissions, 2004, *Recommendations for Central Counterparties*, Basel, Switzerland, November.

<sup>2</sup>Randall S. Kroszner, 1999, "Can the financial markets privately regulate risk? The development of derivatives clearinghouses and recent over-the-counter innovations," *Journal of Money, Credit, and Banking*, Vol. 31, No. 3, August, pp. 596–618. See also Randall S. Kroszner, 2000, "Lessons from financial crises: The role of clearinghouses," *Journal of Financial Services Research*, Vol. 18, No. 2–3, December, pp. 157–171.

<sup>3</sup>See the discussion on pp. 71–72 of Henry Crosby Emery, 1896, *Speculation on the Stock and Produce Exchanges of the United States*, New York: Columbia University.

<sup>4</sup>James T. Moser, 1998, "Contracting innovations and the evolution of clearing and settlement methods of futures exchanges," Federal Reserve Bank of Chicago, working paper, No. WP-1998-26.

<sup>5</sup>Later, a member of the exchange was not required to be a member of the clearinghouse if it could arrange for a clearinghouse member to assume responsibility for the nonmember's obligations to the clearinghouse.

<sup>6</sup>See Kroszner (1999), p. 603.

<sup>7</sup>For one account that argues that the introduction of CCP clearing in U.S. futures markets was delayed by financially strong members who were resistant to giving up the advantage of their high credit quality and to implicitly subsidizing weaker members, see Craig Pirrong, 1997, "A positive theory of financial exchange organization with normative implications for financial market regulation," Washington University in St. Louis, Olin School of Business, working paper.

<sup>8</sup>Counterparty Risk Management Policy Group II, 2005, *Toward Greater Financial Stability: A Private Sector Perspective*, report, New York, July

<sup>9</sup>Giovannini Group, 2001, *Cross-Border Clearing and Settlement Arrangements in the European Union*, Brussels, Belgium: European Commission, November.

<sup>10</sup>Charlie McCreevy, 2006, "The development of the European capital market," speech given at the London School of Economics, March 9.

<sup>11</sup>See McCreevy (2006), p. 3.

# Central counterparties: The role of multilateralism and monopoly

**Tommaso Padoa-Schioppa**

It is a great pleasure for me to speak tonight at this joint conference of the European Central Bank (ECB) and the Federal Reserve Bank of Chicago (Chicago Fed) on central counterparty (CCP) issues. Central counterparties were the topic of the very first workshop in the field of payment and settlement issues that I organized as a member of the Executive Board of the ECB. I am also happy to attend a conference co-organized by the ECB and the Chicago Fed, since it represents an example of multilateral cooperation between monopolistic institutions!

Multilateralism and monopoly are indeed the two issues I would like to deal with tonight. These two issues are essential in order to understand central banks' concerns in the field of central counterparty issues; they are also very general issues, going well beyond payment and settlement issues and even beyond economics. Their wide spectrum makes them suitable for a dinner speech, where the topic should be both related to the specific occasion and of a general nature. I will take multilateralism and natural monopoly one by one, then show how they are interrelated, and finally argue that it is because of their presence in clearing and settlement that the involvement of public authorities is indispensable if the "hot" issue of integrating the infrastructure is to be properly addressed.

## Multilateralism

Multilateralism is a method or an approach that involves a relationship between two parties with a third party coming into play. This third party is the collectivity itself, the group, the universe of all parties. As a result, it incorporates some notion of "public good" to the extent that breaching a multilateral agreement implies not only "private" and "individual" but also "social" and welfare costs. Indeed, it constitutes the very essence of money as it is the element that makes a difference between a barter economy and a monetary economy.

Multilateralism is thus an essential feature of a payment system, that is, the set of arrangements whereby money performs its function as a medium of exchange. Defined as "a group of independent but interrelated elements that compose a unified whole," the notion of system is thus tantamount to the notion of "multilateralism." Indeed, a malfunction in a payment system has the potential to affect all the participants in the system. Clearly, central counterparties are multilateral entities, since they replace a multiplicity of bilateral relations between sellers and buyers and become the single counterparty of each and every transaction, just as the money is the single counterpart of every exchange in a nonbarter economy.

It is interesting to note that the concept of multilateralism or its converse antonym (unilateralism and/or bilateralism) exist also in fields remote from the one you are debating at this conference. In medicine/biology, the terms *unilateral* and *bilateral* indicate a condition or disease that occurs respectively on only one or both sides of the body. As multilateral does not identify any kind of disease, we are tempted to conclude that a multilateral body is healthier than a unilateral or bilateral one! In political history, multilateralism refers to multiple countries working in concert. In this respect, the first modern experiment in multilateralism occurred in Europe after the Napoleonic Wars, when the great powers redrew the map of Europe at the Congress of Vienna and established the Concert of Europe, as it became known, the practice whereby

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great and lesser powers would meet to resolve issues peacefully. So *multilateralism* becomes rightly, I think, synonymous with peace! In sociology or political science, the term multilateral has been used as an adjective to describe the noun *institution*. What distinguishes the multilateral form from others is that it coordinates behaviors on the basis of generalized principles of conduct.

The economic literature shows that in a world of interdependent economies a number of externalities cut across the individual/national players, requiring commonly agreed solutions. Of course, policies themselves have spillovers and hence naturally raise the possibility of inefficiencies: policymakers or market players who pursue an individual objective and ignore the externalities they impose on others. The literature also tells us that there are two types of externality: spillover externality, in which each of the two players is affected by the behavior of the other, irrespective of his/her own behavior, and network externality, in which damage only materializes if the two players act differently.

A network externality is typically described by the tale of the “battle of the sexes.” As the story goes, a recently married couple discusses whether to go shopping or to a football match. In my version of this story—one which does not affect the reasoning—the wife prefers that they both go to the football match, while the husband prefers that they both go shopping. If they separately go to different places, however, they both are worse off than joining their partner in their least preferred activity. It is intuitive that this tale captures the collective incentives arising from a network externality.

In the field of payment systems the foremost example of network externalities is standardization. If two systems adopt different and incompatible proprietary networks, participants will be penalized, since they cannot reach each other. If only one standard is adopted, everyone will benefit from the possibility of increasing the number of the potential counterparties. However, the costs of adopting the new common solution are unequal. The case of the CCP provides another example. Imagine market participants who are members of more than one CCP. Going to one CCP only can be beneficial for these participants. However, the criteria for selecting the CCP are not obvious, since the costs for the various participants to join one or the other are unequal.

Let’s move to the second type of externality, a spillover externality, which occurs irrespective of the behavior of the player experiencing it. The parable here is the well-known one of the prisoner’s dilemma.<sup>1</sup>

Two individuals, who jointly committed a crime, are separately offered the following deal: Defect, give evidence, and implicate your accomplice. If both refuse, neither gets any time in jail. If both defect and implicate the other, both go to jail for a short period of time. If one turns in the other but is not implicated, he gets off while the one implicated goes to jail for a long period of time.

The prisoner’s dilemma also applies to payment and settlement systems; for instance, in the two cases of standards setting and cross-margin requirements. When new standards are introduced, if the central bank decides to adopt them but market participants do not, the latter will de facto be excluded by monetary policy operations, unless central banks agree to deal with old and new standards at the same time. Managing two sets of standards is obviously quite inefficient. And it is equally obvious that only multilateral coordination would lead to a common set of standards. Moving from standards to margin, consider now the case where participants in two CCPs would like to stipulate cross-border arrangements in order to reduce the costs associated with margin requirements. The benefits of cross-margins could be maximized if both CCPs decide to change one of their operational rules. If one CCP makes the change, the general benefits for its participants will be much lower. If both refuse (thinking that by doing so they will penalize the competitor) the arrangement will not be possible. Now, in practice, it is likely that neither CCP will change procedures, fearing that the other won’t do so. The only (Nash) equilibrium would thus be the least favorable for the users.

### Natural monopoly

Let me now turn to the second topic, natural monopoly. The concept of natural monopoly has been used and abused in the current European Union (EU) debate on the need for a single CCP. Economic theory helps in identifying natural monopolies but not in understanding why concrete implementation of monopolistic solutions is so difficult.

Economics teaches us that natural monopolies result from the presence of market failures: externalities, public goods, asymmetric information, and increasing returns to scale or decreasing average costs. The concept of natural monopoly generally covers activities requiring a high level of fixed investment to develop the infrastructure. When giving examples of a natural monopoly, reference is often made to the case of network industries, such as telecommunications, transportation (rail and air), and energy markets.

The clearing and settlement industry is a network industry that presents several aspects of a natural monopoly. However, so far, market forces have in practice established a monopolistic infrastructure for reasons that are not clearly explained by economic theory.

The first element involves EU and U.S. experience in the field of securities systems, which seems to demonstrate that the only existing examples of a natural monopoly in this field are those imposed by law! A more in-depth look at the EU and U.S. experience, however, shows that the inability of market forces to establish monopolistic solutions depends on the existence of regulatory barriers limiting competition, and indeed competition is the vehicle leading to a monopoly. For instance, in the euro area, a study by the London School of Economics for the European Commission reported two elements limiting competition in the field of clearing and settlement, namely: 1) legal requirements indicating the clearing and settlement providers to be used, and 2) trading and clearing membership rules imposing the use of a specific service provider.

The second element is the “bundling” between entities providing different services. Integration in the production and provision of complementary services is not undesirable. However, standard economic theory suggests that two (for-profit) entities that offer complementary services should merge, provided that both entities are monopolistic firms.<sup>2</sup>

However, in reality the complementary services are provided by vertically integrated entities that are not in a monopolistic position in the provision of both services. In this situation, a vertically integrated structure has the potential to undermine the possibility for the investors to freely choose the services they want to use. As a consequence, the incentive for the institutions to provide services as efficient as those offered under competitive conditions would decrease.

The third element concerns the geographical scope of the natural monopoly. Economic literature seems to refer to a stylized situation of one country, one currency, one stylized product, and one market. Reality confronts us with situations where multicurrency systems are in operation in a single country. Monetary unions have created situations where one currency exists in more than one country. In the European Union’s very special situation, you have a single market with 13 currencies and a single economic integrated area with 18 currencies. European experience shows that CCPs for derivatives have expanded their business so as to cover cash products as well, unlike in the U.S. This seems like advocating a “genetically modified” natural monopoly!

Last but not least, technological developments have a strong impact on the definition of the scope of the monopoly. Technology may create the need to remove existing regulations or to create new ones. It affects the scale and scope of economies; allows for the further removal of geographical barriers, making irrelevant location of the parties; and reintroduces contestability in the market.

## Conclusions

Let’s now briefly draw some conclusions. The first conclusion is that we should note there is a common element in multilateralism and natural monopoly. This seems to be based on the fact that both embody a “public good” element. Thus, the existence of an almost natural monopoly is one of the situations calling for cooperation, in particular when the geographical scope of the monopoly is hard to define. The emergence of a monopoly can be the result of a competitive process (war) or of multilateral cooperation between competitors (peace). Needless to say, the latter is the less painful.

The second conclusion is that the presence of elements of a natural monopoly and the failure of market forces to achieve spontaneously multilateral cooperation make it necessary for the authorities (by this I mean institutions mandated to pursue the public interest) to intervene in the process with a view to facilitating the development of cooperative solutions. The history of payment systems provides innumerable examples. With the exception of the case of the Society for Worldwide Interbank Financial Telecommunication (SWIFT), which represents a very remarkable case of multilateral cooperation leading to the creation of a monopolistic solution by market forces, the establishment of national and international infrastructures has been only possible thanks to the intervention of the authorities: Let me just quote the case of CLS (Continuous Linked Settlement) and the Depository Trust and Clearing Corporation (DTCC). The recent Single Euro Payments Area (SEPA) project of the Eurosystem is another example of the catalyst role played by the authorities in fostering market agents’ cooperation.

This takes me to my third and final conclusion, which concerns the role of the authorities. A persistent lack of cooperation can rightly be interpreted as a lack of government. There are many ways the authorities can intervene. They can create conditions for cooperation through regulation or by acting as a catalyst, as well as by being an “enabler,” but not a “constrainer.” Or, they can provide integrated facilities (when the

elements of natural monopoly and the financial stability concerns are particularly strong). For example, almost all central banks provide real-time gross settlement (RTGS) facilities and most of them provide central security depository (CSD) services for government securities. Third, they can regulate/oversee the monopolistic solution in order to prevent potential abuses by the monopolist.

George Bernard Shaw said that democracy is a device that ensures we shall be governed no better than we deserve. I would say that cooperation is a device that ensures that we will be governed better than we deserve. That's why I would like to conclude by inviting the authorities to foster multilateral cooperation: It is the best way to obtain the best solutions for the most difficult problems.

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## NOTES

<sup>1</sup>The prisoner's dilemma, devised by Merrill Flood and Melvin Dresher in 1950, is the cornerstone of a vast theoretical literature on cooperation in fields as different as evolutionary biology and international relations.

<sup>2</sup>The underlying assumption is that all customers either buy both services or neither of them, and therefore they only consider the sum of both prices, but not each price individually. If the sum of the two prices is low, then the demand for both services is high. The best situation for one entity is a high own price and a low price of the other entity. As a result, both tend to set high prices, which are bad for the customers. If the two firms merge, this upward price pressure disappears and lower prices are more likely.

# Public policy and central counterparty clearing

Michael H. Moskow

Good afternoon and thank you for joining us today to discuss some important issues related to central counterparty clearing. On behalf of the Federal Reserve Bank of Chicago (Chicago Fed), I want to thank our host and cosponsor of this conference, the European Central Bank (ECB). This has been a wonderful opportunity for us to discuss these issues with experts from around the world, and I hope that the participants here today have found these discussions helpful. The ECB and the Chicago Fed have worked together closely to plan the conference and agenda, and it has been a very good partnership.

Today, I'd like to share with you my thoughts about the important role that clearing and settlement institutions play in supporting financial markets. In particular, my remarks today will revolve around four key questions related to central counterparty clearing. First, what economic functions do central counterparties, or CCPs, perform in the clearing and settlement of financial transactions? Second, what alternative institutions can perform the same or economically equivalent functions? Third, what are the costs and benefits of using CCPs as compared with alternative clearing institutions? And fourth, what do these costs and benefits tell us about public policy decisions that should be made concerning CCPs and alternative institutions?

I do not expect to give definitive answers to these questions today. We just don't know enough to provide such answers. But I think that careful consideration of these issues is essential to formulating good public policy. The wide variation in financial market structures and the fast pace of financial and technical innovation mean there may not be a single, "first-best" clearing solution that meets the needs of all markets. So, as a practical matter, it is not possible to formulate public policy without facing fundamental and unavoidable tradeoffs when comparing alternative structures for the

clearing and settlement of financial transactions. I'll elaborate on this theme in the course of my discussion.

Post-trade clearing and settlement are sometimes referred to as the "plumbing" of the financial system. This term may suggest that clearing and settlement systems are of secondary importance. In fact, however, they are more like the "central nervous system" of the financial system.<sup>1</sup> Clearing and settlement systems provide vital linkages among components of the system, enabling them to work together smoothly. As such, clearing and settlement systems are critical for the performance of the economy. A key role then for public policy is to ensure that these systems function well when confronted by a variety of stresses.

Centralized clearing arrangements utilizing CCPs have become more widespread in recent years, both for exchange-traded and over-the-counter (OTC) markets. This is no surprise, since they are extraordinarily good at what they do. As a consequence of this growth in CCP usage, central banks, securities regulators, and other financial market policymakers have cooperated in recent years to establish appropriate standards for the design, operation, and oversight of CCPs. This effort recently culminated in the Group of Ten (G-10) and International Organization of Securities Commissions' *Recommendations for Central Counterparties*.<sup>2</sup> The Federal Reserve Bank of Chicago actively participated in the consultative process leading to the adoption of the recommendations and related financial stability initiatives.<sup>3</sup>

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In the U.S., the regulatory structure has evolved toward supporting a “hybrid” system of clearing and settlement. For securities transactions, Congress has mandated a “national market system,” and the Securities and Exchange Commission has favored centralized clearing and settlement arrangements. But there is no such policy mandate for the derivatives industry. The U.S. thus provides a mixed example of the policy approach that I plan to focus on today.

Central counterparty clearing issues also are of keen interest to public policymakers here in Europe, particularly because of the ongoing European financial and economic integration. So the issues being discussed at this conference are both timely and of first-order importance.

As you undoubtedly know, Chicago is home to some of the world’s most active exchanges. Chicago is also home to three major clearinghouses: the Clearing House Division of the Chicago Mercantile Exchange, or CME; the Clearing Corporation, which you may recognize under its former name, the Board of Trade Clearing Corporation, or BOTCC; and the Options Clearing Corporation. Together these institutions represent what is sometimes called the “Chicago model” of centralized clearing and settlement. This model is characterized by counterparty substitution. That is, the clearinghouse becomes the legally substituted buyer to all sellers and the seller to all buyers in the markets they serve. This typically occurs through a legal process known as “novation.” Over the past few decades, this model has been extended to securities markets around the world. The fact that the Chicago model has been so widely emulated is evidence that it is a robust and effective way to operate a clearing and settlement system.

However, this model was not developed in a monolithic way, which is not surprising when you think about the historical development of CCPs. This history demonstrates that risk management is not the only factor motivating the development of clearing structures.<sup>4</sup> In fact, the first Chicago clearinghouse, BOTCC, was founded after the enactment of the Grain Futures Act of 1922. With the passage of this law, Chicago Board of Trade members faced a choice of alternatives for keeping trading records, reporting open positions to federal regulators, and paying stamp taxes. They could remain in a principal-to-principal relationship with their counterparties and thus keep their records, make their reports, and pay stamp taxes on their gross transactions. Or, they could clear their transactions through the clearinghouse and perform those functions on a multilateral net basis. Clearly, the multilateral approach saved both recordkeeping costs and taxes.

There are additional lessons to learn from the evolution of the Chicago markets. Early on, each Chicago clearinghouse was associated with a single exchange. While BOTCC was formed as a separate legal entity, it only cleared trades from the Board of Trade. The clearinghouse of the Chicago Mercantile Exchange was and continues to be a division of its parent exchange. Both clearinghouses, however, functioned effectively as CCPs. This one-to-one association of clearinghouse with exchange changed with the advent of exchange demutualization. This forced exchanges to decide whether they wished to be in the trade intermediation business, the clearing and settlement business, or both. Indeed, the separation of ownership and governance of BOTCC from that of the Board of Trade led, in recent years, to a situation where these two institutions pursued somewhat different business objectives. Ultimately, this led to the termination of the longstanding relationship between the two. The Board of Trade then took the remarkable step of outsourcing its clearing operations to its crosstown rival, the Chicago Mercantile Exchange!

Another historical example that illustrates the possibility of de-linking the clearinghouse from the exchange comes from the rice futures market of Osaka, Japan, in the eighteenth and nineteenth centuries. There were many different institutions serving that market that we might recognize today as clearinghouses, perhaps as many as 60 at one point.<sup>5</sup> This allowed for trader choice in the selection of a clearinghouse and, presumably, competition among clearinghouses.

These examples also demonstrate a more fundamental point: Exchanges and clearinghouses are in very different, but interrelated, lines of business and serve very different economic functions. To see this, let’s look at the core functions performed by CCPs. I think most analysts would include at least five core functions. All play a role in managing risk in the markets served by the CCP. The first core function is multilateral netting of open positions and payments. The second is calculation, collection, and custodial management of margin and collateral payments. The third is the adoption of procedures, such as “delivery versus payment,” that mitigate settlement risk. The fourth is mutualization of all or part of the risk of default. And finally, the fifth core function is to respond to crisis situations in the interest of the entire community of participants in the clearinghouse, not just the interest of a single trader. While other features can be identified, I believe these five adequately describe the core economic functions CCPs typically perform. Let’s consider each of these functions to see whether

the use of a CCP is necessary to perform them, starting with netting. Following counterparty substitution in a CCP arrangement, a single multilaterally netted position exists between the clearinghouse and each market participant. Thus, a “many-to-many” chain of credit is replaced by a “one-to-many” arrangement, with the CCP at the center of the arrangement. The gross obligations of the initial counterparties are, as a result, converted to net obligations with respect to a single, substituted counterparty, the CCP. This has the potential to reduce counterparty risk exposures dramatically and reduce operational costs.

Multilateral netting of obligations is, by definition, one of the results of counterparty substitution. Thus, CCPs are a convenient mechanism for obtaining the risk-management and operational benefits of netting. But is this the only institutional arrangement that can support netting? The answer is no. First, take the case of payment netting. Clearing House Interbank Payments System (CHIPS), the privately owned and operated U.S. dollar payment system based in New York, conducts continuous netting of dollar payments on both a bilateral and multilateral basis without becoming the substituted counterparty to the underlying payment obligations. Similarly, the CLS (Continuous Linked Settlement) Bank provides a hybrid clearing arrangement for foreign exchange transactions, which results in multilateral netting of the funding requirements of settlement members. At no point does the CLS Bank become a substituted counterparty to the underlying payment transactions.

What about netting of open positions? This is a more complex case than simple payment netting, because open positions involve forward obligations that may be discharged at a future date. Is counterparty substitution necessary for multilateral netting of these types of obligations? Here again, the answer is no, at least under U.S. law. The calculation of a multilateral net amount is simple arithmetic. As long as the participants in a financial market agree to conduct transactions or make payments on a multilateral net basis, and that contract is enforceable under applicable law, counterparty substitution is not necessary.

Now let’s consider the second role CCPs typically perform, the management of margin and collateral requirements, such as “mark-to-market” payments. Derivatives transactions, such as swaps, futures, and short options, require discharge of the underlying obligations at some time in the future. Because of the potential for price fluctuations between the time derivatives obligations are undertaken and the time they are discharged, participants face exposure to forward or “replacement cost” risk. To mitigate that risk,

clearing arrangements for forward transactions typically impose “variation margin” requirements on their clearing members. These payments are based upon a daily or even more frequent marking to market. As a result, traders are forced to realize their net profits and losses on a regular basis.

Is counterparty substitution necessary to mitigate replacement cost risk? The answer is no, again under U.S. law. For example, participants in the OTC swaps market often collateralize their bilateral net mark-to-market exposures without the substitution of a central counterparty. Such collateral requirements, however, can be multilaterally netted without counterparty substitution. In fact, in the 1990s, the Chicago Mercantile Exchange proposed to establish a facility to do precisely this. That proposal did not involve the legal substitution of the CME Clearing House or any other CCP as counterparty to the underlying swaps transactions. As it happens, that facility never went into operation, but that was for reasons other than its ability to perform this underlying economic function.

Now let’s consider the last three roles of CCPs: the adoption of procedures to mitigate settlement risk (such as delivery versus payment), loss mutualization, and centralized crisis management procedures.

Delivery versus payment, or DVP, is a means of assuring that related transactions, such as the delivery of securities and the corresponding payment, are coordinated and that neither party is exposed to settlement risk. Counterparty substitution is not necessary to the implementation of such procedures, which are common in payment and securities settlement systems. For example, the Federal Reserve’s own system for transferring U.S. government securities operates on a DVP basis. Yet at no time does the Fed become a substituted counterparty to the transaction. Similarly, the CLS Bank operates on a payment versus payment, or PVP, basis, again without counterparty substitution. Regardless of whether you call these processes DVP or PVP, the result is the same: settlement risk mitigation without the use of a CCP.

Loss mutualization has the effect of spreading losses across some or all nondefaulting traders. This frequently was a feature of clearinghouses for exchanges that were owned by their members. Today, however, participants in a market who wish to spread the risk of loss resulting from default can purchase insurance or equivalent risk-shifting protection. As long as they agree to purchase insurance or otherwise spread the risk of loss, there is no need for counterparty substitution. Nor is there any need for counterparty substitution for a centralized institution, such as a clearinghouse, to be given authority to respond to market crises.

Bank clearinghouses, for example, have historically exercised such power on behalf of their members.

So, it is clear that the core economic functions performed by CCPs can be provided by a variety of alternative institutions. How should public policy respond to this multiplicity of possible clearing arrangements? Even though other institutions can perform these functions, it may be the case that CCPs dominate other clearing arrangements from a social welfare perspective. If so, then there would be an argument for public policy to explicitly encourage or even mandate CCPs for all markets. It might also make sense to consolidate CCPs from different markets into a common institution. But if CCPs or consolidation do not dominate on a cost-benefit basis, then public policy should accommodate a wide range of clearing arrangements.

Like all the institutional arrangements I've discussed, centralized clearing arrangements have both costs and benefits. On the benefit side, it has been widely noted that CCPs can reduce significantly the risks to market participants and enhance the liquidity of the market.<sup>6</sup> This is because CCPs benefit from economies of scale and scope, compared with more decentralized arrangements. On the cost side, a CCP also concentrates risks and responsibility for risk management,<sup>7</sup> making it a potential single point of failure. Concentration carries with it systemic implications, since the failure of a CCP would be, by definition, a major systemic event.<sup>8</sup> This potential risk would only be exacerbated by a policy that mandated the consolidation of all CCPs into a single institution. A more decentralized clearing arrangement would disperse responsibilities for risk management across multiple institutions. This would serve to reduce the possibility that a single institution's failure might have a catastrophic impact.

But this discussion omits perhaps the most important advantage from allowing a broader array of clearing and settlement arrangements: the benefits of competition. Indeed, it is the competition for better ideas, superior risk-management procedures, and new products that best leads to market innovation in these areas. The welfare implications of such innovations can be very large. If CCPs were to be mandated as the only acceptable clearing and settlement arrangement, I fear that a good deal of financial market innovation would be stifled, with corresponding losses in economic welfare.

Take, for example, the market for credit derivatives.<sup>9</sup> I think most people would agree that there are real economic benefits generated by these instruments. At present, credit derivatives are not centrally cleared. This market may not have developed as rapidly as it

has if it had been required to utilize a central counterparty arrangement. Alternatively, the imposition of centralized clearing might have caused the market to develop in a different form, perhaps in "offshore" jurisdictions, outside the reach of regulations mandating the adoption of a CCP. This is not merely a speculative concern. When interest rate swaps were evolving in the 1980s, U.S. law required "futures" to be traded on exchanges and, by implication, centrally cleared. As a result of this requirement, the interest rate swaps market largely moved offshore. The U.S. swaps market only recovered when the so-called swaps exemption freed this market to develop its own trading and clearing arrangements. More generally, the imposition of constraints or restrictions on markets can have a significant effect on firm behavior, again with corresponding welfare implications.

Of course, customized financial instruments, such as credit derivatives, often become more standardized over time, lending themselves more easily to centralized clearing and settlement facilities. We may have reached that point with respect to credit derivatives, and I am aware of some efforts in this direction. It seems to me that the best policy prescription is to allow the market to adopt whatever clearing arrangement meets its own idiosyncratic needs while still satisfying public policy objectives.

New clearing arrangements are emerging all the time. Such arrangements may provide a wide range of risk-management and operational functions, either with or without counterparty substitution.<sup>10</sup> I expect that such arrangements will continue to evolve as financial innovation, supported by advances in computing and communications technology, continues unabated. I view these developments favorably, as they have the potential to create even greater efficiency in the clearing and settlement of financial transactions. I remain a bit wary, however, that efforts to make CCPs the preferred clearing and settlement mechanism or to force different markets to share the same CCP may suppress a good deal of this beneficial development.

As a longtime Chicagoan, I certainly would not want to imply any general criticism of CCPs. Properly structured, they do an excellent job of executing critical risk-management imperatives. I do see value, however, in policy environments that allow multiple clearing and settlement arrangements to emerge. And in that context, regulation should be flexible, nonprescriptive, and risk based to avoid thwarting market innovation. Indeed, that is precisely what the Federal Reserve Bank of Chicago recommended to the Bank for International Settlements' Committee on Payment and Settlement

Systems and the International Organization of Securities Commissions in the formulation of prudential standards for centralized clearing arrangements.

Once again, thank you for joining us at this conference, and we look forward to your continued involvement in these important policy issues.

## NOTES

<sup>1</sup>Robert E. Litan, 1998, "Institutions and policies for maintaining financial stability," in *Maintaining Financial Stability in a Global Economy*, Federal Reserve Bank of Kansas City, p. 283.

<sup>2</sup>Bank for International Settlements, Committee on Payment and Settlement Systems (CPSS) and Technical Committee of the International Organization of Securities Commissions (IOSCO), 2004, *Recommendations for Central Counterparties*, Basel, Switzerland, March.

<sup>3</sup>The Federal Reserve Bank of Chicago also participated in the consultative process leading to the adoption of the CPSS-IOSCO's *Recommendations for Securities Settlement Systems* (2001), as well as the CPSS's *Core Principles for Systemically Important Payment Systems* (2001).

<sup>4</sup>See, for example, James Moser, 1994, "Origins of the modern exchange clearinghouse: A history of early clearing and settlement methods at futures exchanges," Federal Reserve Bank of Chicago, working paper, No. WP-94-3, p. 43.

<sup>5</sup>Ulrike Schaede, 1991, "The development of organized futures trading: The Osaka rice bill market of 1730," in *Japanese Financial Market Research*, William T. Ziemba, Warren Bailey, and Yasushi Hamao (eds.), Amsterdam: North Holland Publishing.

<sup>6</sup>See, for example, CPSS-IOSCO (2004), at sec. 1.2.

<sup>7</sup>CPSS-IOSCO (2004), at sec. 1.2.

<sup>8</sup>As a result, public oversight of CCPs and economically equivalent clearing arrangements is justified.

<sup>9</sup>See Hamish Risk, 2006, "Credit derivatives market expands to \$17.3 trillion," Bloomberg.com, newswire, March 15. Risk states: "Credit derivatives are the fastest-growing part of the \$270 trillion market for derivatives, obligations based on interest rates, events or underlying assets, according to figures from the Bank for International Settlements. The market expanded more than fivefold in two years, according to ISDA [International Swaps and Derivatives Association]."

<sup>10</sup>For example, the Virtual Markets Assurance Corporation (VMAC) is a relatively new clearing arrangement. The VMAC functions as a provider of a "suite" of risk mitigation services that, according to VMAC's marketing materials, "allows participants to settle all mark-to-market amounts with a single hedge counterparty, resulting in a reduction of up to 90% in the amount of capital required...." See VMAC's website, [www.vmac.com](http://www.vmac.com). However, because VMAC provides clearing services to some, but not necessarily all, of the participants in the markets it serves, it does not appear that either VMAC or any other entity becomes the buyer to every seller and the seller to every buyer, and thus does not technically qualify as a CCP.

# Issues related to central counterparty clearing: Concluding remarks

**Jean-Claude Trichet**

I have the pleasure to conclude a very successful conference, a conference that has been special in many respects. First, this conference was jointly organized by the European Central Bank (ECB) and the Federal Reserve Bank of Chicago (Chicago Fed). As such, it marks another fruitful example of cooperation among central banks across the Atlantic. Second, it has featured research on central counterparties (CCPs), a topic that has not yet received a great deal of attention from academic researchers. I hope that this conference has contributed to stimulating more research on this very important subject. Finally, it has brought together market participants, public authorities, and academics. I am in no doubt that discussions involving people from these very different groups are beneficial for all of them. However, I am also aware that it is not always easy to initiate such discussions. This conference has also been very successful in this respect. I wish to thank the organizers of this conference at the Chicago Fed and the ECB for all their hard work.

Central counterparties play an important role in many financial markets. They interpose themselves between the buyer and the seller of financial assets, acting as the buyer to every seller and as the seller to every buyer of a specified set of contracts. This process mitigates counterparty credit risk, which is the risk that one party of a trade suffers losses because the other party cannot fulfill its obligations from the trade. Through multilateral netting, central counterparties enhance liquidity and reduce liquidity costs. Finally, central counterparties ensure post-trade anonymity.

Central banks are interested in the smooth functioning of central counterparties for three reasons:

- Central counterparties can enhance financial stability as long as they function smoothly. The failure of a central counterparty, however, can significantly destabilize financial markets. It is therefore important that central counterparties have appropriate risk-management procedures in place;
- Links between central counterparties operating in different countries can foster financial integration across those countries by allowing the participants to trade in a foreign market and to clear that trade through existing national arrangements. Links between CCPs can take a variety of forms, ranging from the establishment of direct relations between two CCPs to arrangements between central counterparties that allow their participants to mitigate the costs associated with risk control measures (for example, cross-margining); and
- Central counterparties use payment systems and other infrastructures operated by central banks to carry out their activities.

For these reasons, central banks closely follow and contribute to the discussions related to central counterparty clearing. This conference is an important element in this respect.

Let me now outline a few central points of this discussion.

## **Central counterparties must have adequate risk-management procedures**

Central counterparties play a systemically important role in many financial markets. The failure of a central counterparty can severely disrupt financial markets. Central counterparties are highly specialized in managing risks, and failures have been rare. Nevertheless, there is no room for complacency, and any

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efforts to improve risk-management methods are most welcome. As mentioned already several times in this conference, in November 2004 the Group of Ten (G-10) central banks and the International Organization of Securities Commissions (IOSCO) issued a report that set out 15 comprehensive international recommendations for promoting the safety and efficiency of central counterparties. The European System of Central Banks–Committee of European Securities Regulators (ESCB–CESR) working group is working in close cooperation with European Union CCPs to adapt these recommendations to the European context. Academic research can provide additional hints on the specific situations that are targeted by the recommendations. This has been shown at this conference by Alejandro García and Ramo Gençay or John Cotter and Kevin Dowd with their approaches to extreme market events and by Froukelien Wendt in her survey on intraday margining.

### **The governance structure of central counterparties should in principle be market driven**

The governance structure may have a significant influence on, for example, risk-management and other strategic decisions of central counterparties, as pointed out by Thorsten Koepl and Cyril Monnet. Although the optimal governance structure cannot be defined *ex ante*, the markets may in many cases be in a good position to identify and produce it. Public authorities must, however, step in whenever market failures become significant. In this respect, the ECB supports the views expressed in the recommendations by the Committee on Payment and Settlement Systems–International Organization of Securities Commissions (CPSS–IOSCO), according to which governance arrangements for a CCP should be clear and transparent in order to fulfill public interest requirements, support the objectives of owners and participants, and, in particular, promote the effectiveness of a CCP’s risk-management procedures.

### **The features of post-trading structure should also in principle be market driven**

We are witnessing fast developments in the field of financial market infrastructures, especially in Europe, but also in other parts of the world. With respect to central counterparties, I would like to mention four major developments:

#### ***Consolidation of central counterparties***

Since the start of the European Monetary Union (EMU), the number of central counterparties for financial instruments has fallen from 14 to seven in the euro area. This process of consolidation may have a

positive impact on financial stability as larger central counterparties may find it easier to diversify risks. It may also have a positive impact on the efficiency of post-trading arrangements due to network effects and issues related to interoperability. However, the failure of large central counterparties could have an even more disastrous impact on financial markets. Moreover, consolidation may eventually lead to a reduction in competitive pressures with a negative impact on efficiency. The Eurosystem has formulated this position in a policy statement on consolidation in central counterparty clearing, which was published as early as September 2001. As set forth in the policy statement, the ECB supports any form of market-led integration or consolidation process that fulfills the ECB’s requirements in terms of financial stability, open access, price transparency, and efficiency.

#### ***Expansion of activities of central counterparties***

While in the past most European central counterparties only cleared derivatives, many of them also now clear securities transactions. The effects of such an expansion have been assessed differently by different speakers at this conference. On the one hand, John Jackson and Mark Manning have found that central counterparties that diversify their activities across imperfectly correlated assets may often be able to better manage their risks than single-product clearers. At the same time, securities market participants have benefited as their exposure to counterparty credit risk is reduced. This trend towards multiproduct central counterparties could therefore be beneficial from a financial stability perspective. On the other hand, in the first panel yesterday, Diana Chan had mentioned that central counterparties that diversify their activities across imperfectly correlated assets and reduce the collateral requirements for their participants by offsetting margins related to these different activities could significantly underestimate risk exposure and collateralization requirements, thereby creating additional and unknown risks. These developments need, therefore, to be carefully observed by market participants and relevant authorities.

#### ***Creation and dismantling of vertical “silos”***

In Europe, vertical silos encompassing trading, clearing, and settlement infrastructures have been created, while other silos have been dismantled. The discussion on which structure is preferable is ongoing, and the answer may be different for different markets. While silos may help infrastructure providers to reduce operating costs and to better coordinate the prices of the different integrated services (for example, trading, clearing, and settlement), they may reduce

competition when they are misused, for example, to favor a central counterparty in the silo over its competitors outside of the silo. As the Eurosystem explained in its policy statement of September 2001, the disadvantages of vertical silos “can be overcome provided that customers can choose between systems along the value chain.... It is therefore crucial that access to essential facilities, whether vertically integrated or not, should not be unfairly impeded.”

### ***Growing need for adequate infrastructure in the field of credit derivatives***

Volume growth in derivatives—especially over-the-counter (OTC) derivatives—outpaces the cash markets, spurred on by increased interest in hedge funds and the ongoing innovation in the types of contract offered. While the interest rate contract remains the key hedge instrument (US\$187 trillion outstanding), the credit default contract (US\$6.3 trillion outstanding) is growing approximately 90 percent per year, now reaching 10,000 trades per day. Volume growth is expected to continue over the coming years, causing some concern among operations managers on the OTC market, given the lack of straight through processing and hence capacity to manage the volumes. This rapid multidimensional growth (that is, in terms of products, volumes, market participants, and secondary markets) calls for an enhancement of the post-trading infrastructure that may support more careful risk control by the various participants. As mentioned by Governor Kroszner, enhancing the post-trading infrastructure does not automatically mean to introduce *telles quelles* [“just as they are”] the same techniques that CCPs use in exchanged-traded derivatives but rather to identify the solutions that are equally effective and take into account the different features of OTC markets.

All these developments refer to the market structure that surrounds central counterparties and are highly relevant for the interests of central banks in the fields of financial stability and financial integration. As central banks, we believe that the market structure should

be market driven as long as market failures are not observed. Significant market failures, however, must be identified and, in many cases, require appropriate public intervention.

This brings me to my last point.

### **What is the role of public authorities and, in particular, central banks?**

Market forces need a sound legal, regulatory, and oversight basis to work efficiently. In the euro area with its 12 countries, and in the European Union with its 25 countries, the creation of such a sound basis requires first and foremost a certain degree of harmonization of public principles and standards across countries. Efforts in this direction are ongoing and the Eurosystem provides active support. Here I should mention the joint work by the European System of Central Banks and the Commission of European Securities Regulators toward establishing standards for securities clearing and settlement in the European Union. As indicated in the ECB policy statement of 2001, standards are to be carefully set and then implemented by public authorities with a clear interest and expertise in the respective field. It appears evident that the Eurosystem, for example, should be involved in the oversight of any major infrastructure for euro-denominated assets with a view to being able to properly address serious threats to financial stability. A paper, authored by a professor at the Woodrow Wilson School at Princeton University in 1990, addressing the performance of the derivatives clearing and settlement systems during the 1987 stock market break, concluded, *inter alia*, that “the Federal Reserve played a vital job in protecting the integrity of the clearing and settlement systems.”<sup>1</sup> The name of that professor is Ben Bernanke.

Finally, it is important that cross-fertilization of experiences and expertise of market participants, academics, and public authorities in this field continues, and as I said before, this conference has certainly contributed in this respect.

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#### NOTE

<sup>1</sup>Ben S. Bernanke, 1990, “Clearing and settlement during the crash,” *Review of Financial Studies*, Vol. 3, No. 1, pp. 133–151.

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