



EUROPEAN CENTRAL BANK

EUROSYSTEM

FEDERAL RESERVE BANK
OF CHICAGO

THE ROLE OF CENTRAL COUNTERPARTIES

JULY 2007

ISSUES RELATED TO
CENTRAL COUNTERPARTY
CLEARING

ECB-FED CHICAGO
CONFERENCE

3-4 APRIL 2006

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FOREWORD

Central counterparties (CCPs) are structures that help facilitate the clearing and settlement process in financial markets. They have long been utilised in the derivatives markets, more recently they have been adopted in cash securities markets and currently there is growing interest in further expanding their use. Typical examples of CCPs in the United States include the clearing houses for the derivatives markets in Chicago – the Chicago Mercantile Exchange Clearing House, the Options Clearing Corporation and the Clearing Corporation¹. Examples in the European Union include LCH. Clearnet Ltd and Eurex Clearing AG. A more comprehensive, but not exhaustive, list of US and European CCPs, with the characteristics of each arrangement, is included in Bliss and Papathanassiou (2006) and is reproduced in the annex.

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 new look at CCP structures.

In response to this growing interest in CCPs, the Federal Reserve Bank of Chicago and the European Central Bank sponsored a joint conference on “Issues related to central counterparty clearing” on 3-4 April 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 special emphasis on issues that arise in cross-border and cross-product transactions.

Over the two-day conference a number of industry executives, policy-makers and research economists considered a range of topics associated with CCPs, including:

- 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;
- Mutualisation 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.

The complete programme is included at the end of the publication.² This publication gives an overview³ of the main issues discussed at the conference.⁴ The first chapter provides a summary of the conference as well as an introduction to the main topics of discussion. We include the main results of a new survey conducted by the European System of Central Banks following the conference, in which the existing links between CCPs are summarised. It illustrates the typical arrangements used by CCPs and their participants to carry out cross-CCP transactions, also in the light of recent EU developments. The book also features

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

2 Special thanks to S. Germain de Urday for the valuable contribution she has made to the preparation of this publication.

3 For a similar overview, see the special issue of Economic Perspectives, fourth quarter 2006, Federal Reserve Bank of Chicago, at www.chicagofed.org/economic_research_and_data/economic_perspectives.cfm

4 Additional information, including drafts of some of the presentations, is available at www.ecb.int/events/conferences/html/ccp.en.html.

presentations by the keynote speakers, including myself (Gertrude Tumpel-Gugerell, member of the Executive Board of the European Central Bank); Randall S. Kroszner, member of the 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.

One goal of the conference was to bring together policy-makers, 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. To that end, the participants debated how CCP structures might best evolve to meet the clearing and settlement needs of the dynamic and growing financial markets around the world. The other goal of the conference sponsors was to encourage further research on the clearing and settlement of payments, with special focus on risk mitigation processes. The attempt was therefore made 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 researchers who have done seminal work in this area. This was evident in one speaker's comments about the economic literature concerning CCPs. Looking at the audience and his fellow panellists, he noted "you're all here!". Whether the conference will promote further research in this area remains to be seen. The sponsors are hopeful – and I am confident – that indeed it will.

*Gertrude Tumpel-Gugerell,
member of the Executive Board of the
European Central Bank*

I POLICYMAKERS, RESEARCHERS, AND PRACTITIONERS DISCUSS THE ROLE OF CENTRAL COUNTERPARTIES

DOUGLAS D. EVANOFF, DANIELA RUSSO
AND ROBERT S. STEIGERWALD¹

INTRODUCTION AND SUMMARY

This article provides an overview of the conference and an introduction to the topics discussed at the conference. First, it illustrates the foundations of central counterparties (what central counterparties are, what the markets want and what regulators expect from central counterparties). Then it illustrates the main topics discussed at the conference (i.e. issues concerning consolidation, risk management and governance).

I FOUNDATIONS OF CENTRAL CLEARING PARTIES

Setting the stage

A CCP imposes itself as the legal counterparty to every trade.² 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.^{3,4} 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 (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 positions 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.⁵ Some have argued that the single most important reason for the existence of CCPs is to have them serve as a collateral facility.⁶

CCPs also typically require members to make periodic payments (sometimes called variation margin) to prevent a build up of market losses. Payments equalling the “mark-to-market” from a recent settlement price – often the closing

1 Douglas D. Evanoff is a senior financial economist and vice president in the Economic Research Department of the Federal Reserve Bank of Chicago. Daniela Russo is the deputy director general payment systems and market infrastructure at the European Central Bank. Robert S. Steigerwald is a senior professional in the Financial Markets Group of the Federal Reserve Bank of Chicago. The authors also served as the conference coordinators and would like to thank Richard Lamm and Jens Tapking for their help in developing the conference program.

2 For discussions of the historical evolution of clearing and settlement arrangements, see Moser (1994, 1998), Kroszner (2000), and Schaede (1991).

3 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.

4 Haircuts are discounts applied to the market value of securities that have been posted as collateral.

5 See Koepl and Monnet (2006).

6 See for example, Considine (2001). See also Baer and Evanoff (1991) for a discussion of netting in payments more generally.

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 spill-over 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 CCP's 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.

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 (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.

In her view, 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.⁷ 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.⁸ 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?

There appeared to be almost complete agreement among conference participants in favor of some regulatory oversight of CCPs.⁹ 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 Committee on Payment and Settlement Systems.¹⁰ 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 2.

The recommendations were adopted by most of the conference participants and were making inroads into practice. In fact, Yvon Lucas (Banque de France) discussed a recent assessment of LCH.Clearnet against the CPSS-IOSCO standards. LCH.Clearnet is a multi-

7 Bliss and Papathanassiou (2006) stressed the problems associated with legal uncertainty and the efforts in both the U.S. and Europe to address the concerns.

8 See appendix 2 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) Recommendations for CCPs.

9 While not disputing the point, Ruben Lee (Oxford Finance Group) made the argument that he thought that concerns about the systemic risk associated with clearing and settlement institutions were "exaggerated."

10 See Bank for International Settlements, Committee on Payment and Settlement Systems and Technical Committee of the International Organization of Securities Commissions (2004).

product CCP that serves exchanges in Paris, Amsterdam, Brussels, Lisbon, and London. It also has a link to the Italian CCP Cassa di 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 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.

2 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 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 (Unifortune Asset Management) 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.¹¹

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 (Eurex), David Hardy (LCH.Clearnet Limited), and Kimberly Taylor (Chicago Mercantile Exchange) stressed in their panel discussion that all costs were not fixed and, although low, marginal costs were not zero. Gisler 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

11 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”.

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.

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.¹² 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, 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

12 See, for example, Berger, Hanweck and Humphrey (1987) and Evanoff and Israilevich (1995).

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 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 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 (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.¹³ 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.¹⁴

Mario Nava (European Commission) 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

13 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.

14 See McCreedy (2005) and joint statements of AFEI/Assosim/FBF/LIBA/SSDA (2005, 2006).



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.¹⁵ 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.¹⁶ 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 (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

¹⁵ 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.

¹⁶ The Directive on Markets in Financial Instruments (2004/39/EC) already required this for CCP.

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 – non-profit, 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 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 (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.¹⁷ 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 non-routine call that is triggered by a significant price change, and a non routine 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.

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 trade-off 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

¹⁷ 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.

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 (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 simulated 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 (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.

3 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, and the conference clearly succeeded in gathering together in one place researchers who have done seminal work in this area.

APPENDIX I

DERIVATIVES AND OTC CENTRAL COUNTERPARTIES

A. Organizational information on CCPs in the European Union¹⁾

Member State	CCP	Corporate form	Ownership structure	Products cleared
Austria	Central Counterparty Austria GmbH (CCP.A)b	Commercial entity	50% Wiener Börse, 50% Oesterreichische Kontrollbank	Derivatives and securities
Belgium	LCH.Clearnet S.A., subsidiary of LCH. Clearnet Group	Bank	France	See France
Denmark	Stockholmsbörsen ABc	Commercial entity	see Sweden	Group owned Derivatives
Finland	Stockholmsbörsen ABc	Commercial entity	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". Its rules have to be approved by AMF	Subsidiary of Euronext, 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 of 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, Derivatives and repos, 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	Eurex Clearing AG	Commercial entity	See Germany	Irish securities and exchange-traded funds (ETFs)
Italy	Cassa di Compensazione e Garanzia (CCG)	Commercial entity	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 MEFF Exchange 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; recognised 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, (see also France)	Equities, derivatives, repos, and swaps

1) From Bliss and Papathanassiou (2006). The list should not be considered exhaustive.

B. Organizational information of derivatives clearing organizations in the U.S.¹⁾

CCP	Corporate form	Ownership structure	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 non-stock, 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 in the U.S. founded in 1898	Exchange owned. Since 2002, CME has been (the first) publicly traded exchange in the US.	CME provides clearing to CME futures and options related to agricultural products; 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.	Commercial entity, subsidiary of LCH Ltd	See France	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 non-profit, membership organization	Futures and options
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 Security futures Exchange, the Pacific Exchange, and the Philadelphia Stock Exchange	Equity derivatives, securities options. Commodity futures and options on commodity futures

1) 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.

APPENDIX 2

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.

banks and securities regulators should cooperate with each other and with other relevant authorities.

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

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2 ISSUES RELATED TO CENTRAL COUNTERPARTY CLEARING: OPENING REMARKS

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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.

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.

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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 EUROSISTEM'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.

3 CENTRAL COUNTERPARTY CLEARING: HISTORY, INNOVATION, AND REGULATION

RANDALL S. KROSZNER¹

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 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.² I have often cited CCPs for exchange-traded derivatives as a prime example of how market forces can privately regulate financial risk very effectively.³ 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 involved in clearing certain new products, particularly over-the-counter (OTC)

- 1 Governor, Board of Governors of the Federal Reserve System.
- 2 Committee on Payment and Settlement Systems and Technical Committee of the International Organization of Securities Commissions (2004), *Recommendations for Central Counterparties* (Basel: Bank for International Settlements, November).
- 3 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 (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 (December), pp. 157-71.

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.⁴ 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.⁵ 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 margin 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.⁶ 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

4 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).

5 James T. Moser (1998), "Contracting Innovations and the Evolution of Clearing and Settlement Methods of Futures Exchanges," Working Paper (Chicago: Federal Reserve Bank of Chicago).

6 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.

against the clearinghouse's capital, including the capital owned by the non-defaulting 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.⁷ The mutualization of risk creates incentives for all 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 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 CCP ORGANIZATIONS

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 has left those bearing the risks without the capacity to manage those risks.

⁷ See Kroszner (1999), p. 603.

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 non-cleared “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.⁸

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 close-out 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 close-out procedures in the event of default of a large market participant in stressed market conditions.⁹ Further experimentation with close-out procedures may be necessary to address that concern.

8 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, see Craig Pirrong (1997), “A Positive Theory of Financial Exchange Organization with Normative Implications for Financial market Regulation,” Working Paper (St. Louis: Olin School of Business, Washington University).

9 Counterparty Risk Management Policy Group II (2005), *Toward Greater Financial Stability: A Private Sector Perspective* (New York: CRMPG II, July).

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 Report in 2001, seem to be grounded in law and regulation rather than in the practices of private-market participants.¹⁰

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.¹¹ As he noted, "Protectionism is a proven route to economic stagnation and decline."¹² This is an important, 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

¹⁰ The Giovannini Group (2001), *Cross-Border Clearing and Settlement Arrangements in the European Union* (Brussels: The European Commission, November).

¹¹ Charlie McCreevy (2006), *The Development of the European Capital Market* (London: London School of Economics, March 9).

¹² See McCreevy (2006), p. 3.

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.

4 CENTRAL COUNTERPARTIES: THE ROLE OF MULTILATERALISM AND MONOPOLY

TOMMASO PADOA-SCHIOPPA¹

It is a great pleasure for me to speak tonight at this joint conference of the European Central Bank and the Federal Reserve Bank of Chicago on central counterparty issues. Central counterparties were the topic of the very first workshop in the field of payment and settlement issues that I organised as a member of the Executive Board of the ECB. I am also happy to attend a conference co-organised 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, but which at the same time are 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 in which in a relationship between two parties a third party comes 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, i.e. the set of arrangements whereby money performs its function as a medium of exchange. Defined as "a group of independent but interrelated elements comprising 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 non-barter 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 great and lesser powers would meet to resolve issues peacefully. So multilateralism becomes, rightly I think, synonymous with peace! In sociology or politology, 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 behaviours on the basis of generalised principles of conduct.

¹ Minister of Economic Affairs and Finance, Italy, and Former Member, Executive Board of the European Central Bank.

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: policy-makers 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 behaviour of the other, irrespective of his/her own behaviour; 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 are both 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 standardisation. If two systems adopt different and incompatible proprietary networks, participants will be both 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 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 behaviour of the player experiencing it. The parable here is the well-known one of the Prisoner’s Dilemma.² 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 favourable for the users.

² The Prisoner’s Dilemma, devised by Flood and Dresher in 1950, is the cornerstone of a vast theoretical literature on cooperation in fields as different as evolutionary biology and international relations.

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 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, transport (rail, air), energy markets...

The clearing and settlement industry is a network industry which 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.

First, EU and US experience in the field of securities systems 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 US 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: (i) legal requirements indicating the clearing and settlement providers to be used; (ii) 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.³ However, in reality the complementary services are provided by vertically integrated entities which 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 stylised situation of one country, one currency, one stylised product, one market. Reality confronts us with situations where multi-currency 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 US. This seems like advocating a “genetically modified” natural monopoly!

3 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 is bad for the customers. If the two firms merge, this upward price pressure disappears and lower prices are more likely.

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 scale and scope 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. First, we should note that 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. Payment systems history provides innumerable examples. With the exception of the case of 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 and DTCC. The recent SEPA project of the Eurosystem is another example of 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: by regulation or acting as a catalyst; 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 RTGS facilities and most of them provide 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's the best way to obtain the best solutions for the most difficult problems.

5 PUBLIC POLICY AND CENTRAL COUNTERPARTY CLEARING

MICHAEL H. MOSKOW¹

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.² 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*.³ The Federal Reserve Bank of Chicago actively participated in the consultative process leading to the adoption of the recommendations and related financial stability initiatives.⁴

1 President and Chief Executive Officer of the Federal Reserve Bank of Chicago.

2 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.

3 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.

4 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).

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 firstorder 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.⁵ 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!

5 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. WP943, p. 43.

Another historical example that illustrates the possibility of delinking 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.⁶ 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 riskmanagement 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

6 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.

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.⁷ 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,⁸ 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.⁹ 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.¹⁰ 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

7 See, for example, CPSS – IOSCO (2004), at sec. 1.2.

8 CPSS – IOSCO (2004), at sec. 1.2.

9 As a result, public oversight of CCPs and economically equivalent clearing arrangements is justified.

10 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]."

substitution.¹¹ 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 riskmanagement 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.

¹¹ 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. 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.

6 ISSUES RELATED TO CENTRAL COUNTERPARTY CLEARING: CONCLUDING REMARKS

JEAN-CLAUDE TRICHET¹

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 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

¹ President of the European Central Bank.

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.”² 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.

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

7 LINK ARRANGEMENTS OF CENTRAL COUNTERPARTIES IN THE EU – RESULTS OF AN ESCB SURVEY¹

GEORGE KALOGEROPOULOS, DANIELA RUSSO, ANDREAS SCHÖNENBERGER²

On 3-4 April 2006 the Federal Reserve Bank of Chicago and the European Central Bank co-sponsored a conference on issues related to central counterparty clearing to consider what the role of central counterparties (CCPs) should be in the current financial environment. One of the outcomes of the conference was the strong desire expressed by many participants to take advantage of potential economies of scale and scope for consolidation to significantly reduce the number of CCPs across Europe. Moreover, interoperability between CCPs via some form of link arrangement was described as a viable alternative to consolidation. However, it was not quite clear what the precise meaning of interoperability is in this context or how it could be established.

More recently, on 7 November 2006 the members of the three main market infrastructure associations in the European Union (EU) – the Federation of European Securities Exchanges (FESE), the European Association of Central Counterparty Clearing Houses (EACH and the European Central Securities Depositories Association (ECSDA) – signed the Code of Conduct for Clearing and Settlement. The Code of Conduct sets out a number of measures which ultimately aim to offer market participants the freedom to choose their preferred service provider at each level of the transaction chain (trading, clearing, and settlement) and to make the concept of “cross-border” redundant for transactions between EU Member States. This freedom of choice, which is to be made possible by means of open access, interoperability and the unbundling of services, will have major implications for CCPs in the EU. In fact, CCPs may have to establish both a greater number of vertical links with the providers of trading and settlement services and a greater number of horizontal links with each other.

Both the conference findings and the requirements of the Code of Conduct point to the fact that integration in central counterparty clearing by means of interoperability will be increasingly important for the further development of the European market

infrastructure. Therefore, the European System of Central Banks conducted a survey among its members focusing on the existing link arrangements of CCPs in the EU. This document presents the main results of the survey, with a view to assessing the degree of interoperability and integration that has already been achieved.

I LINK ARRANGEMENTS BETWEEN CCPs – DEFINITION AND CLASSIFICATION

CCPs cooperate with each other for the benefit of their customers. The aim is to make the clearing of trades more efficient and less costly. Several types of cooperation or “links” between CCPs can be identified that differ in nature and purpose. On the basis of the CPSS-IOSCO Recommendations³ for CCPs of November 2004 and the Code of Conduct for Clearing and Settlement, these link arrangements can be put into three main categories.

I.1 CROSS-PARTICIPATION

One type of cooperation between CCPs is link arrangements which enable participants of a CCP serving one market to trade in another market served by a separate CCP, while clearing those trades through their existing arrangements. In this way, participation in a single CCP is sufficient to clear trades conducted in different markets. Such cross-participation is particularly helpful in traditional market infrastructures that consist of a multiplicity of exchanges and

1 This paper is based on a survey conducted by a working group of the European System of Central Banks. Special thanks are due to C. Becher, F. Hervo, F. Marlor, R. Neuschwander and P. Steccconi for the contributions provided. The paper has also benefited from the comments of the European Association of Central Counterparty Clearing Houses, as well as M. A. Callahan (Depository Trust and Clearing Corporation) and M. Weseluck (Clearing and Depository Services Inc.).

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3 Issued by the Committee on Payment and Settlement Systems (CPSS) and the International Organisation of Securities Commissions (IOSCO).

markets, each served by a separate CCP. This is the form of cross-participation link that CPSS-IOSCO Recommendation 11 refers to where it states “in the most straightforward type of link, one CCP becomes a clearing participant of another CCP without any further integration of systems”.

The Code of Conduct for Clearing and Settlement also provides for cross-participation, although it focuses on a slightly different type of link which is required in cases where an exchange is served by more than one CCP. In such cases, a link would need to be established to enable participants of the different CCPs to trade with each other, while clearing would occur through their existing clearing arrangements with only one of the CCPs. It should be noted that such link arrangements are likely to increase in the EU with the full implementation of the Code of Conduct, as it aims to establish freedom of choice for market participants at the clearing level also.

In both cases, some form of interoperability between CCPs is required. While the CPSS-IOSCO Recommendations specifically refer to the need for a CCP to become a clearing participant of another CCP to this end, the Code of Conduct does not indicate any specific conditions for interoperability, but more generally stresses the need for effective interoperability between CCPs so as to ensure that their customers have a choice of service provider.

To establish a cross-participation link, the CCPs involved need to set up a framework for the joint management of positions and, where applicable, the exchange of margins. The risk profiles of linked CCPs differ from those of ordinary clearing members due to the nature of their activities (management of balanced positions only, i.e. not carrying any endogenous risk), their risk controls (selection criteria for direct counterparties, margin requirements, additional financial requirements and other risk management procedures) and the regulations, oversight and/or supervision to

which they are subject (on the basis of coordination between the relevant regulatory, oversight and supervisory authorities). Typically, arrangements involve reciprocal recognition of the risk management framework that each CCP has in place and linked CCPs are not required to meet the same participation criteria as ordinary clearing members. In conclusion, linked CCPs have a special status and are not considered the same as ordinary clearing participants.

1.2 CROSS-MARGINING

The CPSS-IOSCO Recommendations for CCPs state that “cross-margining arrangements have some of the same implications for CCPs as links”. Such arrangements allow a legal entity participating in different CCPs serving different exchanges to reduce the overall amount of margin and other forms of collateral that it is required to post with each CCP. Such cross-margining arrangements can be attractive to the extent that they enable required margins for different products to be offset or reduced if the price risk of one product is significantly and reliably correlated with the price risk of another. In the case of CCPs providing services for a wide range of different products, such offsetting or reductions in margins can be achieved within each CCP and cross-margining arrangements between different CCPs are less viable. In the case of more specialised CCPs that provide services for only a few types of products, cross-margining arrangements between CCPs are more attractive for customers.

The purpose of cross-margining is to enable reductions in margins for entities that are participants in more than one CCP. As such, it can provide incentives to participants to expand their activities and thus trigger the need for different service providers to co-operate with each other. The establishment of cross-margining links may therefore, at least indirectly, contribute to interoperability between those service providers.

1.3 THE MERGER OF CLEARING SYSTEMS

Finally, a third and perhaps strongest type of integration in central counterparty clearing, which is also sometimes referred to as a link, occurs when CCPs merge their clearing systems into a single system. This may happen with or without a legal merger of the CCPs involved. In the case of a full legal merger, the CCPs would first merge into one single legal entity and subsequently migrate to one single clearing platform. This form of integration is often driven by mergers at the level of trading.

Alternatively, the CCPs may remain separate legal entities and only merge their clearing platforms. A participant of one CCP retains its relationship with that CCP, but all risk management is performed by the wholly integrated systems of the linked CCPs. The requirements in respect of participation, default, margins, financial resources and operations⁴, to which all CCP participants are subject, are harmonised and may thus differ from the requirements that one or both of the CCPs had in place prior to the merger.

2 RESULTS OF THE SURVEY

2.1 ANALYSIS OF THE EXISTING LINK ARRANGEMENTS OF CCPs IN THE EU

2.1.1 CROSS-PARTICIPATION LINKS

There are nine CCPs operating in the EU (in Germany, Greece, Spain, France, Italy, Hungary, Austria Sweden and the United Kingdom).⁵ Five of them (in Germany, France, Italy, Sweden and the United Kingdom) are involved in a total of four cross-participation link arrangements, the details of which are described in Section 2.2 (an overview is presented in a table attached as an annex).

In all four cases, there is essentially a special legal agreement between the CCPs involved. Cross-participation does not necessarily take the straightforward form mentioned in the CPSS-IOSCO Recommendations whereby one

CCP is a clearing participant in another. In fact, the arrangements vary from case to case. The risk management frameworks that apply to such cross-participation link arrangements recognise the special status of linked CCPs. As a result, from a regulatory or oversight perspective, linked CCPs are not considered the same as ordinary participants.

The link arrangement between the Clearing Corporation (CCorp, United States) and Eurex Clearing AG (ECAG, Germany) has been established to enable participants in CCorp to trade on the Eurex exchange, while clearing their trades through their existing clearing arrangements with CCorp. In the other three cases, links have been established between CCPs serving the same exchanges. They comprise a link between SIS x-clear AG (Switzerland) and LCH.Clearnet Ltd (United Kingdom) which both serve the London-based virt-x market; a link between Cassa di Compensazione e Garanzia SpA (CC&G, Italy) and LCH.Clearnet SA (France) which both serve MTS SpA (Italy), EuroMTS Ltd and BrokerTec; and a link between LCH.Clearnet Ltd, OMX Derivatives Markets (Sweden) and VPS Clearing ASA (Norway) which all provide clearing services for trades conducted in the joint order book for Nordic derivatives.

It should be noted that only one of these four link arrangements is exclusively within the euro area with both CCPs being located there, i.e. the link between CC&G and LCH.Clearnet SA. The other three involve non-EU CCPs and therefore in part serve the needs of clearing participants outside the EU. The link between CCorp and ECAG offers participants in the United States the option to clear trades executed on the Eurex exchange through their existing clearing arrangements. Similarly, the link arrangement between SIS x-clear AG and LCH.

⁴ An interesting feature in this context is the symmetry or asymmetry of the roles of the linked CCPs, e.g. whether margin deposits are provided by one or both CCPs.

⁵ There are other regional entities providing CCP services (e.g. the European Energy Exchange) and other legal entities within a group (for example, there are three in the MEFF Group), but they are not within the scope of this survey.

Clearnet Ltd gives participants in the Swiss CCP a better connection to the EU financial markets, while the link arrangement in the Nordic area serves the same purpose for clearing participants in Norway. As a result, the few link arrangements that do exist make only a limited contribution to integration within the EU.

2.1.2 CROSS-MARGINING ARRANGEMENTS

At present, the only example of a cross-margining arrangement in the EU is the agreement between LCH.Clearnet Ltd and the Chicago Mercantile Exchange. Under this agreement a reduction in margin is granted but the clearing of specific instruments can only be performed by the designated CCP.

In contrast, cross-margining arrangements are more common in the United States for several reasons. First, in the United States there is a greater number of specialised CCPs providing services for just one particular type of product, mainly as a result of regulatory requirements. Second, the multiplicity of applicable jurisdictions in Europe (and, in particular, the persistence of differences in national insolvency laws) makes cross-margining more difficult. Third, cross-margining is only feasible if one and the same legal entity is a member of different CCPs. In Europe, however, it is common practice for subsidiaries to be separate legal entities even if they belong to the same group of companies.

2.1.3 THE MERGER OF CLEARING SYSTEMS

The CCPs in France, Belgium, the Netherlands and Portugal have merged to form one single legal entity, LCH.Clearnet SA. This form of integration has been driven by the exchanges that the CCPs used to serve. Following the merger at the trading level (from which Euronext was formed), LCH.Clearnet SA now offers clearing services for all four markets and jurisdictions. Local market participants are remote clearing members and trades are cleared in LCH.Clearnet SA (under French Law) irrespective of where they originate. Another company in the group, LCH.Clearnet Ltd,

serves the UK market as an independent entity. In other words, there are still two “clearing engines” and distinct legal entities within the group: one for the UK market and another for the other four markets. As yet, however, no link arrangement has been established between LCH.Clearnet Ltd and LCH.Clearnet SA. The same development has occurred in the Nordic region. OMX Derivatives Markets has become the only market and clearing system for Swedish, Danish, and some Finnish derivatives as a result of the merger of the exchanges in Sweden, Denmark and Finland.⁶

A similar case of integration in central counterparty clearing driven by integration at the trading level is that of ECAG, which is the result of a merger between the German and Swiss CCPs that took place in 1998. ECAG offers CCP services for Irish securities traded in the Xetra order book of the Irish Stock Exchange (ISE) as well as a number of Finnish derivatives listed on the Eurex exchange. This model for clearing Irish equities provides an interesting example of cross-border and “cross-layer” interoperability. Deutsche Börse AG hosts the ISE’s electronic trading system, ECAG provides CCP services for all transactions and CRESTCo Ltd provides settlement services.

2.2 DESCRIPTION OF THE EXISTING CROSS-PARTICIPATION LINK ARRANGEMENTS

2.2.1 THE LINK ARRANGEMENT BETWEEN CC&G AND LCH.CLEARNET SA

In August 2004 a bidirectional link was established between these two CCPs to cover the clearing of transactions in Italian government bonds traded on MTS SpA, EuroMTS Ltd and, later, BrokerTec. It enables the members of CC&G (Italy) and LCH.Clearnet SA (France) to benefit from common CCP services without being obliged to participate in the “foreign” CCP. In order to

⁶ In December 2006 the Icelandic Stock Exchange was purchased by OMX AB and from May 2007 its subsidiary, OMX Derivatives Markets, intends to offer trading and clearing services for Icelandic derivatives products.

cover this link arrangement, as well as potential links with other CCPs, the two systems have each created a new clearing membership category – “Special Clearing Member” status in the case of CC&G and “Allied Clearing House” status in the case of LCH.Clearnet SA. There was a twofold reason for creating these categories: they were designed to take into account (a) the specific nature of a CCP (compared with an “ordinary” clearing member) and (b) some features of the relationship between the two CCPs that are not consistent with the obligations of clearing member as stated in their rule books. Inter alia, the two CCPs do not contribute to each other’s default fund, as the linked CCP would otherwise be exposed to losses arising from the insolvency of a clearing member of the other CCP. However, in order to provide for risks not already covered by initial and variation margins deposited with each other, additional guarantees (such as individualised additional margins) are requested in lieu of contributions to each other’s clearing funds.

For cross-border operations between their respective members, CC&G and LCH.Clearnet SA interpose themselves between the original counterparties as for any domestic trade. They participate in each other’s systems on an equal footing, having agreed on a common risk management strategy on a product-by-product basis. The same margining system is applied to all clearing members and, symmetrically, to inter-CCP positions. The CCPs are mutually liable for the settlement of their bilateral net positions (which result from the aggregation of their participants’ positions) but have no contractual relationship with each other’s clearing members. Margin payments are executed in central bank money in euro (through the Banca d’Italia and the Banque de France) and the delivery of securities takes place through the Express II securities settlement system operated by Monte Titoli SpA, the Italian central securities depository (CSD). CC&G and LCH.Clearnet SA participate in Express II.

The activities of the linked CCPs comply with the markets’ clearing and settlement rules. The opening of a cross position in one CCP leads to the creation of an equal and opposite position in the linked CCP, in real time. CC&G and LCH.Clearnet SA compute net positions both on an intraday basis and at the end of the day for all purposes, including margin calculations, on the basis of the gross instructions sent by market participants through X-TRM, Monte Titoli SpA’s matching and routing system.

2.2.2 THE LINK ARRANGEMENT BETWEEN SIS X-CLEAR AG AND LCH.CLEARNET LTD

These two CCPs have a co-clearing arrangement with the London-based virt-x market, which means that virt-x members can choose to clear virt-x equity trades via either system. To accommodate this co-clearing arrangement, SIS x-clear AG (Switzerland) has been granted special membership status in LCH.Clearnet Ltd (United Kingdom) that allows it to “internalise” clearing where it is the counterparty to both legs of a trade. Both systems’ clearing members deal only with their own CCP as counterparty. Likewise, each CCP deals only with its own members, with the other CCP being both the contractual and settlement counterparty for a trade executed by one of its members. SIS x-clear AG’s exposure to LCH.Clearnet Ltd is fully collateralised. There is interoperability between LCH.Clearnet Ltd and SIS x-clear AG for trades resulting from orders matched between an LCH.Clearnet Ltd member and a SIS x-clear AG member. In order to achieve this, SIS x-clear AG operates a clearing member account within LCH.Clearnet Ltd. From a legal point of view, each CCP clears trades between its own members. Where a trade is executed between an LCH.Clearnet Ltd member and a SIS x-clear AG member, it is subject to clearing by LCH.Clearnet Ltd, with SIS x-clear AG acting in its capacity as a clearing member of LCH.Clearnet Ltd. English law applies to these inter-CCP contracts.

SIS x-clear AG is an ordinary participant in LCH.Clearnet Ltd’s Protected Payments System, which is used to transfer funds between

LCH.Clearnet Ltd and its members (except that SIS x-clear AG is allowed to cover intraday margin calls by lodging extra collateral, rather than cash); and both LCH.Clearnet Ltd and SIS x-clear AG are direct members of the relevant securities settlement systems (SIS SegInterSettle AG, Euroclear Bank and CRESTCo Ltd). There is only unilateral collateralisation of inter-CCP transactions, namely SIS x-clear AG provides collateral for its open positions with LCH.Clearnet Ltd. To this end, SIS x-clear AG holds a collateral account with LCH.Clearnet Ltd. The margin requirements for SIS x-clear AG's open positions with LCH.Clearnet Ltd can be monitored via internet access. As the collateral account is mirrored in SIS Systems AG's SECOM system, its balance and collateral value can be compared with the margin requirements at any time. Securities settlement is effected through SIS SegInterSettle AG, CRESTCo Ltd and Euroclear Bank. Gross settlement is offered by all three settlement organisations, while SIS SegInterSettle AG also offers net settlement as an option. Netting naturally reduces settlement transactions to one single transaction per security, currency and trade date. However, settlement netting has no impact on the margin requirements for open positions. Inter-CCP settlement transactions are fully netted and settled during the normal settlement cycle. Settlement instructions are sent directly from the virt-x exchange to the core CSDs via a router mechanism. The router is operated by SIS SegInterSettle AG and interposes itself between the exchange, the clearing houses and the settlement agents. The router operates in real time, in line with SIS operations. The CSDs process settlement instructions on the basis of existing booking instructions, which are also maintained in the router.

Positions arising between the CCPs are maintained in real time. Settlement activities are handled in batches that are processed at the end of each business day. The evening batch cycle creates cash settlement instructions, physical delivery instructions and margin

calculations based on end-of-day positions. Instructions are available in the clearing system the morning after the batch cycle. Margin calculations between the linked CCPs are also performed on an intraday basis to monitor the risk vis-à-vis each other.

2.2.3 THE LINK ARRANGEMENT BETWEEN CCORP AND ECAG

CCorp (United States) has a unidirectional link to ECAG (Germany). This means that CCorp has the status of a Special Clearing Member in ECAG but the reverse is not true. The link was established in November 2004. From a legal point of view, trades executed by CCorp participants on the Eurex exchange are cleared by CCorp. From an operational point of view, the technical processing (excluding initial margin calculations and collateral management) is performed by ECAG, which acts as a system facilitator for CCorp and provides the infrastructure for clearing, settlement and position maintenance. The link only applies to Eurex products and regulatory permission from the US Commodity Futures Trading Commission is required for trading on terminals in the United States.⁷

The positions of all CCorp participants are maintained on the Eurex platform in a similar way to the positions of other non-clearing members which clear their trades via General Clearing Members (GCMs). However, unlike in the case of GCMs, the processing of CCorp and its participants is fully integrated within ECAG. Legally, ECAG becomes a counterparty to a Eurex trade executed by CCorp, on an "open offer" basis, and CCorp becomes a counterparty vis-à-vis its participant via simultaneous novation (since it occurs on the ECAG technical platform). CCorp acts as the "destination clearing house" for its participants. Therefore, it is responsible vis-à-vis its participants for risk management processes,

⁷ The link was established for US firms dealing via remote access on Eurex/Europe in order to solve legal problems stemming from US insolvency rules which did not adequately protect collateral and margins deposited by US firms with non-US firms.

i.e. margin processing, collateral management, default procedures and the fulfilment of all guarantee obligations. The positions of CCorp (and CCorp participants) are adjusted in real time. The calculation of margins is processed in batches.

2.2.4 THE LINK ARRANGEMENT BETWEEN OMX DERIVATIVES MARKETS, LCH.CLEARNET LTD, AND VPS CLEARING ASA

Interoperability regarding the clearing of Nordic derivatives trades is achieved by a link arrangement established between LCH.Clearnet Ltd (United Kingdom), OMX Derivatives Markets (Sweden) and VPS Clearing ASA (Norway). These three CCPs have contractual arrangements vis-à-vis each other but are not members of each other's systems. Under the terms of the link agreement, OMX Derivatives Markets acts as a "hub" CCP for all trades between the members of EDX London Ltd⁸ and the members of Oslo Børs ASA (the "hub concept"). The links apply to trading in Nordic derivatives on EDX London Ltd, OMX Derivatives Markets, and the Oslo Børs. Trading in the three markets is facilitated by the fact that one single order book is maintained for all the participating exchanges. As a result, a participant is only required to be a member of one exchange but can interact with the members and counterparties of the other exchanges on the basis of the combined single order book. Balance positions (reflecting a cross-border derivatives trade) are maintained between the three CCPs. Clearing is performed and managed locally and, where a member of OMX Derivatives Markets trades with a member of another exchange, risk exposures or balance positions will arise between the cooperating clearing organisations. Thus, the links work both unidirectionally and bidirectionally.

The hub concept means that OMX Derivatives Markets serves as the legal intermediary or CCP for all cross-border transactions between members of the other two CCPs, i.e. LCH.Clearnet Ltd. and VPS Clearing ASA. This entails operational responsibilities and certain counterparty risk-related performance

responsibilities for OMX Derivatives Markets. For example, it is responsible for managing compliance with the bilateral margin requirements (i.e. vis-à-vis other linked clearing organisations) for cross-border transactions in which it serves as the hub CCP. They include both cross-border transactions involving OMX Derivatives Markets participants and cross-border transactions between members of LCH.Clearnet Ltd and VPS Clearing ASA.

Margin payments are settled via bank guarantees. In the case of margin calls, additional funds can be provided in the form of cash or an increase in a bank guarantee. Confirmation of a bank guarantee must reach the CCP that requires the additional margin by 1.00 p.m. (CET). All securities deliveries between OMX Derivatives Markets and the linked CCPs are netted to one transaction per delivery date and per security. The linked CCPs handle deliveries in respect of all contracts. Each clearing house is responsible for ensuring that deliveries are made and received by their own members. In the case of securities deliveries between CCPs, both parties are responsible for ensuring that the delivery is carried out via their local CSDs.

2.3 FUTURE PLANS

Some CCPs declined to comment on future plans for link arrangements due to confidentiality constraints. Others reported no concrete plans for the near future but expressed their willingness to consider new opportunities for collaboration.

In May 2006 the Swiss CCP, SIS x-clear AG, and the London Stock Exchange (LSE) signed a letter of intent to provide LSE members with

⁸ EDX London Ltd was created in 2003 by OMX AB and the London Stock Exchange. The London Stock Exchange has a 76% share and OMX AB owns 24%. EDX London Ltd currently offers trading services on two linked derivatives exchanges: the Stockholm Stock Exchange (i.e. OMX Derivatives Markets which offers trading in Swedish, Finnish and Danish derivatives) and Oslo Børs. LCH.Clearnet Ltd is the clearing organisation for the members of EDX London Ltd.

a choice of clearing provider for equity trades. It is envisaged that, from the third quarter of 2007, LSE members will be able to choose between SIS x-clear AG and LCH.Clearnet Ltd (which is the only CCP serving the LSE currently). The project can be seen as a contribution to increasing competition in the field of central counterparty clearing and is in line with the spirit of the Code of Conduct which aims to offer market participants the freedom to choose their preferred service provider by facilitating access and interoperability. While supporting interoperability in general, the Code of Conduct requires that the establishment of interoperability be subject to the business case of the entities concerned and based on proper risk control. In this regard, LCH.Clearnet Ltd is in discussions with the LSE and SIS x-clear AG concerning an extension of the existing link arrangement with SIS x-clear AG to include LSE trades. This arrangement may have to be altered in the future should LCH.Clearnet Ltd make changes to its clearing services for the LSE as part of its equity systems and service integration process. These changes might for example include the introduction of options for customers in relation to the way in which their settlements are instructed and these new features would need to be supported by any co-CCP arrangements. LCH.Clearnet Ltd, the Swiss Exchange (SWX) and SIS x-clear AG have also discussed extending the arrangement to include trades concluded on SWX. The arrangement described above in relation to the virt-x market would have been substantially the same for SWX, although both CCPs agreed to restructure the management of risks arising from positions between them. SWX subsequently decided to proceed with SIS x-clear AG alone.

As regards the integration process between LCH.Clearnet SA and LCH.Clearnet Ltd (which are both members of LCH.Clearnet Group Ltd), this should lead to a harmonisation of practices and a rationalisation of infrastructures, with the ultimate aim of allowing clearing members to clear all their trades at the clearing house of their choice. However, it would be premature

to speculate about the precise details of the procedures that may be implemented by the two CCPs to provide such a service through a link arrangement.

3 CONCLUSIONS

The survey has helped to clarify the definition, purpose, and nature of link arrangements involving CCPs in the EU. In particular, three types of arrangement have been identified: cross-participation links, cross-margining systems and mergers.

- A number of cross-participation links have been established to enable participants of different CCPs to trade with each other through their existing clearing arrangements. To this end, the linked CCPs would not normally become ordinary participants in each other. Instead, there is reciprocal recognition of the risk management frameworks that each has in place and linked CCPs are not required to meet the same participation criteria as ordinary clearing members. The existing cross-participation links differ from one another, with each of them reflecting the specific conditions and risk management frameworks of the CCPs involved.
- There are only four cross-participation link arrangements in the EU. Of the nine CCPs operating in the EU, only five are currently involved in these four link arrangements. Some EU CCPs have no connection at all to other CCPs. Only one of the four link arrangements is between two EU CCPs, the other three involve CCPs outside the EU and thus make only a limited contribution to integration within the EU.
- Overall, the degree of integration in central counterparty clearing as a result of the establishment of cross-participation links in the EU appears to be rather limited. In particular, only a few markets in the EU currently offer their participants a choice of

CCP, for a limited number of products. This is likely to change with the further implementation of the Code of Conduct for Clearing and Settlement.

- Cross-margining arrangements seek to allow legal entities participating in more than one CCP to reduce the overall amount of margin that they must post. Unlike cross-participation arrangements, cross-margining would only indirectly contribute to greater freedom of choice and interoperability within the definition of the Code of Conduct, by encouraging an expansion of trading activities in general and providing an incentive to service providers to intensify their cooperation.
- Unlike in the United States, cross-margining arrangements are rarely used in the EU for several reasons. First, in the United States there is a greater number of specialised CCPs, each providing services for just one particular type of product, mainly as a result of regulatory requirements. Second, the multiplicity of applicable jurisdictions in Europe makes cross-margining more difficult. Third, cross-margining is only feasible if one and the same legal entity is a member of different CCPs. In Europe, however, it is common practice for subsidiaries to be separate legal entities even if they belong to the same group.
- Perhaps the closest form of integration is the merger of separate CCPs into a single legal entity. In the case of LCH.Clearnet SA, the CCPs in France, Belgium, the Netherlands and Portugal merged their clearing systems and legal entities. Likewise, OMX Derivatives Markets was created to clear Swedish, Danish and Finnish derivatives. This form of integration has been driven by the merger of the exchanges that the CCPs used to serve. Eurex Clearing AG (incorporated in Germany but jointly owned by Deutsche Börse AG and SWX Swiss Exchange) offers CCP services for

the trading of Irish securities in the Xetra order book and for a number of Finnish derivatives listed on the Eurex exchange.

ANNEX

Overview of the link arrangements of CCPs in the EU (based on NCBs' feedback)

	CCP	Description of link/linked CCP	Comments
Belgium	CCP services provided by LCH.Clearnet SA (France)	N/A	
Czech Republic	No CCP	N/A	
Denmark	CCP services for the Danish derivatives market served by the Stockholm Stock Exchange (Sweden)	Full consolidation with the Stockholm Stock Exchange	
Germany	ECAG (Eurex Clearing AG)	CCorp is a Special Clearing Member of ECAG providing clearing services for Eurex products to US residents	
Estonia	No CCP	N/A	
Greece	ADECH (Athens Derivatives Clearing House)	N/A	
Spain	MEFF (a company owned by BME)	N/A	MEFF RF and MEFF RV (derivatives) and MEFFClear (public debt transactions), are all independent legal entities which belong to the same holding company, MEFF.
France	LCH.Clearnet SA	Bidirectional link with Cassa di Compensazione e Garanzia SpA. It covers the clearing of transactions in Italian government bonds traded on MTS SpA, EuroMTS Ltd and, more recently, BrokerTec	
Ireland	No CCP. CCP services for Irish Stock Exchange equities transactions are provided by ECAG (Germany)	N/A	CCP service are only offered for transactions in the ISE's Xetra order book.
Italy	Cassa di Compensazione e Garanzia SpA (CC&G)	Bidirectional link with LCH. Clearnet SA. It covers the clearing of transactions in Italian government bonds traded on MTS SpA, EuroMTS Ltd and, more recently, BrokerTec	
Cyprus	No CCP	N/A	
Latvia	No CCP	N/A	
Lithuania	No CCP	N/A	
Luxembourg	No CCP	N/A	
Hungary	KELER	N/A	
Malta	No CCP	N/A	
The Netherlands	Clearing services provided by LCH.Clearnet SA (France)	N/A	
Austria	CCP Austria	N/A	
Poland	KDPW	N/A	
Portugal	CCP services provided by LCH. Clearnet SA (France)	N/A	
Slovenia	No CCP	N/A	
Slovakia	No CCP	N/A	

Overview of the link arrangements of CCPs in the EU (based on NCBs' feedback) (cont'd)

	CCP	Description of link/linked CCP	Comments
Finland	No CCP	N/A	CCP services for part of the Finnish derivatives market served by the Stockholm Stock Exchange (Sweden) and for another part by ECAG (Germany)
Sweden	OMX Derivatives Markets	Oslo Børs AS AVPS Clearing ASA and LCH.Clearnet Ltd OMX Derivatives Markets maintains a contractual link arrangement for clearing derivatives contracts with both the linked CCPs	In 2005 a link to the Copenhagen Stock Exchange and FUTOP Clearing Centre AS was discontinued when they were acquired by OMX Derivatives Markets
United Kingdom	LCH.Clearnet Ltd	SIS x-Clear AG has been granted a special membership of LCH.Clearnet Ltd OMX Derivatives Markets is not a member of LCH.Clearnet Ltd but is a "Cooperating Clearing House" with which LCH.Clearnet Ltd has concluded a link agreement for co-clearing derivatives trades in the combined order book of the EDX London and OMX markets LCH.Clearnet Ltd has a cross-margining arrangement in place with the Chicago Mercantile Exchange	

CONFERENCE PROGRAMME

EUROPEAN CENTRAL BANK AND FEDERAL RESERVE BANK OF CHICAGO JOINT CONFERENCE ON ISSUES RELATED TO CENTRAL COUNTERPARTY CLEARING

MONDAY, APRIL 3, 2006

OPENING REMARKS

Gertrude Tumpel-Gugerell, Member of the Executive Board of the European Central Bank

PANEL I

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

KEYNOTE SPEECH AT LUNCH

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

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

Central counterparties

by 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

by Froukelien Wendt, De Nederlandsche Bank

Valuation of collateral in securities settlement systems for extreme market events

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

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

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

Discussant: Jean-Charles Rochet, University of Toulouse

KEYNOTE SPEECH AT DINNER

Tommaso Padoa-Schioppa, Minister of Economic Affairs and Finance, Italy, and Former Member of the Executive Board of the 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

INVITED SESSION III

CCP RISK MANAGEMENT

Chair: Jens Tapking, European Central Bank

Comparing the pre-settlement risk implications of alternative clearing arrangements

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

Default risk mitigation in derivatives markets and its effectiveness

by Rajna Gibson and Carsten Murawski, Swiss Banking Institute

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

KEYNOTE SPEECH AT LUNCH

Michael Moskow, President of the 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 of the European Central Bank

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