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Clearing and Settlement in the EU

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**DIRECTORATE GENERAL FOR INTERNAL POLICIES
POLICY DEPARTMENT A: ECONOMIC AND SCIENTIFIC POLICIES**

ECONOMIC AND MONETARY AFFAIRS

Clearing and Settlement in the EU

STUDY

Abstract

This report examines the role of post-trading clearing and settlement systems in European securities markets and what regulatory risks they pose to financial stability. Although post trade clearing and settlement are sometimes referred to as the 'plumbing' of financial markets, this understates their fundamental importance in providing vital linkages among components and participants in the financial system, enabling them to work together smoothly. A well-regulated clearing and settlement system is crucial for the efficient operation of the economy.

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EXECUTIVE SUMMARY

This report examines the role of post-trading clearing and settlement systems in European securities markets and what regulatory risks they pose to financial stability.

Clearing involves matching a buyer for every seller and a seller for every buyer in a securities transaction, thus reducing counterparty risk. Settlement is a process involving the irrevocable delivery of a security in a transaction for payment (usually cash). Although post trade clearing and settlement are sometimes referred to as the 'plumbing' of financial markets, this understates their fundamental importance in providing vital linkages among components and participants in the financial system, enabling them to work together smoothly. A well-regulated clearing and settlement system is crucial for the efficient operation of the economy. An important role for public policy therefore is to ensure that these systems function well when confronted with market stresses. The 2007-2009 global credit crisis exposed vulnerabilities in the EU clearing and settlement system and in particular revealed weaknesses in controlling systemic risk and liquidity risk.

EU regulatory developments for clearing and settlement have not kept pace with financial innovation and liberalisation (1.3-1.4)

In the last twenty years, financial markets have undergone dramatic changes caused, in part, by innovation in instruments traded and in the growing scale and scope of global financial institutions and cross-border capital flows in liberalised international capital markets. Financial regulation and supervision have not kept pace with these changes as was demonstrated in the global credit crisis of 2007-2009. These market developments have accelerated in recent years and have brought the infrastructure and operations of financial markets – trading on and off exchanges, and post-trading clearing and settlement systems – under closer scrutiny because of the potential for systemic and other financial risks that threaten financial stability and economic development.

Although the operations of clearing and settlement systems in the EU and US generally proved resilient in the recent crisis, they have come under extraordinary stress on a number of occasions in recent years mainly due to operational and capacity problems in processing both exchange-traded instruments and over-the-counter instruments across multiple currencies. This was demonstrated in 2006 when there was a substantial backlog of unprocessed credit default swap contracts that created systemic problems for US and European derivatives markets. As a result, EU and US officials pressured leading banks to adopt reforms in the documentation and storage of data for post-trade transactions in the credit derivatives and credit default swap markets and in the adoption of a trade information warehouse managed by the US Depository Trust and Clearing Corporation.

EU public policy has mainly relied on private sector approaches to promote more competitive and sound clearing and settlement systems (2.7-2.8)

European post-trading systems for clearing and settlement are highly fragmented because of barriers in market practices and technical standards, legal barriers, and taxation. The clearing and settlement system in the EU has attracted much policymaking attention in recent years. Before the financial crisis began in 2007, EU legislative, regulatory and industry initiatives had mainly focused on private sector approaches to achieving consolidation through increased linkages between post-trading bodies for clearing and settlement with the possible emergence of 'a single European central counterparty.' (Lamfalussy Report, 2001, 16). Public policy's role was focused on competition issues and removing national barriers that would hinder consolidation. The Giovannini Report (2001) identified fifteen barriers – market practices and technical standards, legal/regulatory, and taxation – and the Giovannini Group's Second Report (2003) issued some specific measures to overcome the barriers.

Responding to these report, the European Commission issued a Communication in 2004 setting out a roadmap for future action with the aim of enhancing the efficiency and stability of EU clearing and settlement arrangements.¹

EU public policy has, however, avoided legislative intervention in the regulation of clearing and settlement and instead focused on encouraging exchanges, clearing houses, and settlement depositories to improve price transparency, unbundling of accounts in vertical silos so that the costs of trading, clearing and settlement could be estimated separately in order to put downward pressure on prices, especially for cross-border EU transactions, and to increase access and interoperability between trading and post-trading bodies. The Commission has utilised legally non-binding instruments, such as the 2006 Voluntary Code of Conduct for Clearing and Settlement and the industry association's 2007 Guideline on access and interoperability, to drive this process. The principles-based framework of the Code and the Guideline have driven industry efforts to consolidate central counterparties (CCPs) across EU markets. **Appendix D** depicts the significant progress in horizontal consolidation that has occurred through interoperability between EU Central Counterparties (CCPs) for the clearing of cash financial instruments (ie., equities and bonds). Further horizontal consolidation among CCPs should build on these industry efforts in eventually establishing a single EU central counterparty.

Although market approaches have achieved some beneficial results, the nature and extent of the financial crisis demonstrated vulnerabilities in the EU regulatory regime (3.1.1-3.2.1).

Although these initiatives have borne some fruit in the form of increased linkages between clearing houses and economies of scale in the provision of clearing services, the nature and extent of the financial crisis demonstrated major weaknesses in the EU clearing system, especially with respect to the massive losses in the collateralised debt obligation market and related exposures in the over-the-counter (OTC) market for credit default swaps. As a result, in October 2008, Internal Market and Services Commissioner Charlie McCreevy called upon the industry to reduce some of these risks by moving the clearing of credit default swaps (CDSs) onto a European central counterparty by 31 July 2009. In response to the commissioner's call, ten major CDS dealers met the deadline and began clearing CDS contracts on European reference entities, and on the indices based on these entities, through one or more central counterparties based in EU states. In addition, the Committee of European Securities Regulators (CESR) and the European System of Central Banks (ESCB) addressed systemic risk and other financial stability issues with the publication in June 2009 of voluntary 'Recommendations for securities settlement systems and central counterparties in the European Union.'² The adoption of these recommendations is an important first step in developing adequate regulation and supervisory practices with the aim of improving risk management and mitigation techniques in European clearing and settlement systems.

Nevertheless, this report argues that more regulatory intervention is needed to achieve both the reduction of some of the Giovannini barriers as well as enhance clearing and settlement arrangements for securities and derivatives transactions. Accordingly, we propose further consolidation of centralised clearing with the eventual emergence of a European CCP subject to prudential regulation, which could more efficiently reduce system-wide risks by improving pricing and price transparency for standardised CDS instruments (3.1.1-3.1.2, 3.2.3, 3.3).

¹ See European Commission, 'Clearing and Settlement in the European Union – The way forward, Communications from the Commission to the Council and European Parliament, COM (2004) 312 final (28.04.2004)

² CESR/ESCB (2009). See Appendix B.

A Single EU CCP would reduce systemic risk if it has broad scale and scope across a number of asset classes and instruments (3.1.2, 3.1.3, 3.2.1-3.2.4).

In arguing that EU regulatory efforts have been inadequate, the report describes how collateralised debt obligation (CDOs) and credit default swaps (CDSs) markets collapsed with no pricing or liquidity because no-one knew how to value the complex instruments and that investors had little faith in the creditworthiness of their counterparties. The characteristics and complexity of these financial instruments limited the ability of investors and regulators to assess their risk. The proposal for a EU CCP would facilitate pricing transparency and reduce significantly the counterparty risk problem which would mitigate credit risk by mutualising risk to other participants in the CCP. Also, for the EU CCP to reduce systemic risk, its scope of operation would have to be broad in measuring and managing credit exposures, and in enforcing margin requirements and default procedures, across a number of asset classes and instruments based on standardised contracts.

However, CCPs are useful in certain circumstances, but not in others (2.1.2, 3.1.3, 3.2.3, 3.2.4).

A CCP clearly helps in the situation where executing a trade involves assuming bilateral credit risk. One will likely do fewer trades with a counterparty whose creditworthiness has deteriorated significantly, especially with longer-dated instruments. Liquidity can thus disappear as the perception of high credit risk spreads throughout the market. As this usually does not concern how to price the underlying financial instrument, it is more about finding creditworthy counterparties with whom to do business. CCPs can serve a useful role by mitigating the effect of bilateral credit risk deterioration, especially during a liquidity crisis.

It is important to recognise, however, the situations where CCPs will be of little help: during the credit crisis, the market did not know how to value the financial instrument itself, such as the CDOs and CDSs based on sub-prime debt. It was not only the complexity of the instruments, but also the assumptions built into the valuation methodologies which had used statistical models to predict the probability of certain types of homeowner default. Investors suddenly perceived that these models had become invalid. As a result, there was no known sound basis to value these instruments. It should be recognised that a CCP probably would not have been able to remedy this problem, and under some circumstances, as discussed in the paper, it could make matters worse.

Furthermore, a single EU CCP should build on existing industry efforts at horizontal consolidation in sectors such as cash equities where significant CCP consolidation has occurred based on best practices of interoperability (**Appendix D**). These extensive linkages between CCPS should provide the platform on which further consolidation occurs, eventually leading to a single EU CCP covering all asset classes and standardised instruments or a consolidated network of EU CCPs with a presiding CCP tightly bound together for maximum netting effect in a hub and spokes model (**3.3**).

The central bank has an important role in providing CCPs with guarantees and prudential oversight (3.2.1).

Although the report discusses some situations where a CCP could actually exacerbate market stress, by increasing, for instance, concentration risk, these risks would be mitigated by central bank or supervisory oversight applying prudential controls. This will in turn demand the provision of a Lender-of-Last-Resort function and hence greater regulatory oversight of clearing and settlement. A central bank guarantee of the creditworthiness of a CCP could raise a number of issues. It is suggested that this should be discussed now by policymakers before one of the large CCPs encounters difficulties.

In discussing the role of the central bank, it is necessary to consider the effects of the moral hazard that could affect the CCP's risk management practices because of its perceived guarantee from the central bank. A discussion of these issues should include which instruments should be migrated to the CCP and which instruments may, if migrated, cause significant financial stability problems.

Major recommendations

1. A pan-European CCP (3.2.1, 3.3)

A well-regulated European central counterparty (CCP) would mitigate counterparty risk and thus promote financial stability, whilst achieving the competition and efficiency objectives of EU financial policy. We argue that the single CCP model is the best model for Europe measured in terms of efficient use of capital and reduced net exposures. Globally, there would be maximum netting opportunities through a single global CCP across the widest number of assets and instruments. Europe would have a first-mover advantage if it wanted to host the global CCP. The Commission should therefore design an action plan to achieve full consolidation across the EU within a few years. Horizontal consolidation of CCPs would eventually allow counterparties to increase their netting capabilities across many more asset classes on European-referenced entities and indices based on these reference entities. The potential for global clearing should be considered immediately which would require negotiations with the US, Japan and other regulators of major financial markets.

The European CCP should be structured along an hour glass model for trading and post-trading activities. The CCP would be sandwiched between many competing trading and settlement platforms and would handle all national and cross-border transactions. An EU CCP might possibly trigger consolidation among and with settlement systems and so create a pan European utility similar to the US Depository Trust & Clearing Corporation in due course. An EU CCP should build on existing consolidation through interoperability that has already occurred in some CCP sectors (eg., cash equities) **(Appendix D)**.

Alternatively, if it proves impracticable on constitutional or other grounds for EU institutions to create a single EU CCP, then they should require by regulation existing EU multimarket CCPs to form a CCP network whose operations would be subject to enhanced interoperability with maximum capacity for netting across most asset classes and standardised financial instruments. The design of such a network could build on existing consolidation that has occurred in some EU CCP sectors such as cash equities.

This recommendation is premised on the idea recognised in the Lamfalussy Committee's Final Report that the provision of central counterparty services in modern capital markets is a public good in an economic sense. As a public good, the provision of these services should be regulated by state authorities and possibly provided by state controlled entities if efficient and safe private provision cannot be obtained. It also means that the central bank or prudential regulator would have to ensure that the CCP was creditworthy and had the financial capacity to fulfil its obligations to the market, especially in times of market stress. The time to explore the role of the central bank in this area is now, and not when a future CCP finds itself in trouble **(3.2.1)**.

2. Registration and enhanced capital requirements for non-standard instruments (3.2.4, 3.3)

There will always be less-standard instruments traded between market participants who are less systemic. The attractions and benefits of a central CCP are such that the risk-return trade-off probably does not favour the banning of those instruments that are non-centrally cleared instruments. Instead there should be:

First, a minimal solution involving the central registration and disclosure of all instruments not centrally cleared.

Second, a requirement for those holding credit or market risks to hold capital against risks they cannot naturally absorb/net, irrespective of whether they are called a bank, dealer or investor with the possibility that non-standardised contracts which are not centrally cleared will require more regulatory capital.

Nevertheless, there should be a deeper discussion and consideration regarding what instruments should be migrated towards CCPs, and which ones might in the long-term cause significant problems for a CCP (ie., long-dated OTC contracts that become illiquid and/or hard or impossible to value).

3. The establishment of an equivalent to the Continuous Link Settlement Bank (3.3) and the adoption of a single DVP method for securities settlement for European CSDs (2.5)

Regarding settlement, what is needed in Europe is an equivalent for the credit markets of the Continuous Link Settlement Bank (CLS Bank) in foreign exchange. This institution would be responsible for addressing operational inefficiencies in the settlement system and thus would go beyond what the CLS Bank actually does today in settling foreign exchange transactions. This could take the form of a single institution that instantly settles net exposures between its members once it determines that a credit event has occurred, independent of trading or clearing venue. The ECB's Target2 Securities settlement programme for the Eurosystem would potentially require the ECB to be a member of this institution. Further, the ECB's involvement would mean that it would be difficult for it to avoid assuming the risk or net loss of a defaulting member. The ECB's role would have to be considered carefully to mitigate moral hazard on the part of participating members (ie., banks) in this settlement institution.

The ECB's Target2 securities framework (2.5) will dramatically change the landscape of securities settlement in Europe and necessarily involve the central securities depositories, agent banks and custodian banks in more cross-border consolidation, especially for the settlement of cash financial instruments (eg., equities and bonds). Increased EU regulatory harmonisation of settlement practices that affect systemic risk should be considered. For example, delivery versus payment procedures in EU central securities depositories affect principal and settlement risk (a form of systemic risk) and therefore should be harmonised if possible by adopting one of the three DvP procedures recommended by the Committee on Payment and Settlement Systems (2.5).

Generally, an efficient economic model of clearing and settlement for the EU would involve the following:

Horizontal consolidation of clearing and settlement in all markets, breaking down vertical silos, and harmonising clearing and settlement procedures that affect system-wide risk (2.5, 3.3) and maximising network netting opportunities across all assets and instruments.

The establishment of a single debt securities near-time settlement system – a mutual financial institution of which the ECB is a member **(3.3)**.

A regulatory mandate to establish horizontal clearing and settlement for standardised financial instruments, or the migration of credit derivatives trading onto CCPs, should not be viewed as a panacea. There will always be the problem of the assumption of risk by the CCP and the CSD's settlement risk and principal risk exposure in complex financial markets. Further, the role of the European Central Bank should be examined at a deeper level, especially in times of market stress.

4. Common legal principles and rules for the creation, perfection, and protection of collateral interests in securities (4-4.4).

Although we suggest more uniformity across national legal systems is needed in devising common principles and rules for the creation, perfection, and protection of contractual and proprietary interests in securities, we believe that this should be limited to certain key areas of systemic importance in the clearing (ie., novation) and settlement process. Regarding the protection of proprietary interests in securities, the use of the place of the relevant intermediary approach (PRIMA) as set forth in the Settlement Finality Directive and the Financial Collateral Directive should be encouraged, and extended to a broader number of system participants and instruments. European policymakers should resist any further efforts to adopt the Hague Convention because it creates regulatory risks with potentially large social costs for the EU financial system and economy.

1. Introduction

The global financial crisis has raised many important issues regarding the prudential regulation and supervision of financial markets, including the institutional structure and operation of post-trading systems for securities transactions. Post-trading infrastructure consists mainly of clearing and settlement systems. The efficient operation of financial markets depends on clearing and settlement systems that are competitive and sound. *Clearing* typically involves a clearing house, which acts as a buyer for every seller and a seller for every buyer in a securities transaction, and the calculation and collection of margins as part its risk management function. This mitigates counterparty risk – that is, the risk that a party to a transaction defaults on its obligations. *Settlement* is a process whereby a security in a transaction is exchanged irrevocably for payment (usually cash). An efficient operating and well-regulated clearing and settlement system is vital for economic growth and financial market development in any advanced economy. Nonetheless, clearing and settlement lies outside the spotlight of high visibility economic policymaking and has a rather unglamorous image, often referred to as ‘the plumbing in the building’³. Nevertheless, clearing and settlement systems serve as essential infrastructure for financial markets and are more like the ‘central nervous system’ of the financial system (Litan, 1998, 283). Though vital to the operation of financial markets, clearing and settlement systems are usually forgotten until a crisis occurs.

This Report examines the clearing and settlement system in the European Union, including its regulation, supervision and relevant legal framework. The report considers how clearing and settlement systems operated in the recent credit crisis and whether this experience justifies further institutional and regulatory reform. Despite significant institutional and market consolidation in many areas of EU financial markets, the clearing and settlement systems for securities trading in EU financial markets remain fragmented and costly – especially for cross-border trading of financial instruments – and at a competitive disadvantage with major clearing and settlement systems outside the EU.⁴ Changes in financial markets over the last few years have raised important questions regarding the role of regulation in this area, and in particular whether the development of the institutional structure of clearing and settlement should be left to the market or whether some sort of regulatory or legislative intervention is needed. The Lamfalussy Committee observed in its Final Report in 2001 that if the private sector was not able in due course to deliver a more efficient pan-European clearing and settlement system, then public policy intervention would be necessary to push the process forward.⁵

³ The European Commission website has equated clearing and settlement to “the plumbing in the building of the EU financial market: vital, but unglamorous and forgotten until something goes wrong.” See http://ec.europa.eu/internal_market/financial-markets/index_en.htm

⁴ The Legal Certainty Group (2008), *Second Advice on solutions to legal barriers related to post-trading within the EU*, p. 17.

⁵ The Report of the Committee of Wise Men on The Regulation of European Securities Markets, (The Final Report) (Brussels, 15 Feb. 2001) p. 16.

Now that the Markets and Financial Instruments Directive (MIFID) was implemented in November 2007 providing investment firms and other market participants with the right to access any regulated exchange, including multilateral trading facilities, but without the equivalent right to choose a clearing house or central counter party in another EU market nor does MIFID cover relations between post-trade infrastructure,⁶ it is necessary to examine whether further EU legislation is necessary to promote further consolidation of post-trading systems for securities and derivatives transactions.

This Report examines the recent developments in the clearing and settlement system of the European Union and the relevant regulatory and legal framework. It does so by linking the analysis to recent events in financial markets, including the impact of the global credit crisis and how systemic risk and liquidity problems caused gridlock in European and global capital markets in 2007 with particular emphasis on the collateral debt obligation and credit default swap markets. Moreover, the report sets forth some recommendations for EU policymakers that involve establishing single a European Central Counterparty and adding more harmonisation to EU legal rules that govern settlement systems. In doing so, the report also discusses the regulatory risks involved in departing from the existing light touch EU approach which has fostered much competitive activity in recent years leading to significant horizontal consolidation (ie., CCP cash equity market) across regulated markets in post-trading infrastructure and the rise of vertical silos (ie., Deutsche Borse/Clearstream). The reports concludes that regulators need enhanced regulatory tools for the over-the-counter credit default swap market and institutional consolidation of the provision of central counterparty services is needed based on public good grounds.

Specifically, the Report considers the following areas: Part I examines the structure of European clearing and settlement systems and its recent evolution and regulatory developments. Part II analyses the role of the central counter-parties (CCPs) and their function in reducing credit risk and systemic risk. It also traces the development of EU clearing and settlement regulatory practices and recent industry developments in response to the Code of Conduct's adoption in 2006. Part III examines market failure and systemic risk in clearing and settlement systems and how redesigning certain aspects of Europe's clearing system can enhance financial stability. In doing so, it will analyse what the regulatory role should be for ensuring the safe operation of the CCP and what benefits there would be for migrating credit default swaps for clearing onto CCPs. The section will also assess the risks posed by the OTC markets, and examine the current status of OTC trading, transaction processing, and risk management infrastructure that supports the wholesale segment of the OTC markets. This section will also examine issues related to settlement and in particular will examine the role of the Continuous Link Settlement Bank (CLS Bank) for foreign exchange markets and how this particular type of settlement can serve as a settlement model.

Part IV analyses some of the relevant legal issues that relate to financial stability in EU settlement systems. In doing so, it is submitted that the effective operation of settlement systems depends on clear and dependable legal frameworks. It then examines the role of legal certainty in the dematerialised and immobilised securities markets and how effectively the Settlement Finality Directive and the Collateral Directive support financial stability by regulating the cross-border taking of collateral interests in securities and other post-trading transaction issues.

⁶ Specifically, MIFID addresses the restrictions on the location of clearing and settlement. Article 34 permits remote access for investment firms to foreign CCPs/CSDs, and also allows market participants to designate settlement location for trades (but not for clearing) so long as links are in place and there is home/host regulatory approval. Article 46 allows regulated markets (ie., exchanges) to choose a CCP/CSD to clear and settle transactions (for example, see London Stock Exchange's decision in 2008 to allow its trading names to have their equity transactions cleared by both LCH.Clearnet Ltd and SIS-x-clear. MIFID does not cover relations (linkages) between post-trade infrastructure.

1.1. The Clearance Process - generally

Once a securities trade is agreed on an exchange, the counterparties to the transaction become legally bound to exchange cash and securities at a future date. The first stage of this transaction prior to clearing and settlement involves the process of verification whereby the parties compare and, if necessary, reconcile discrepancies in the transaction or settlement details. Ordinarily, the verification process includes setting the price, quantity and settlement date for the trade and occurs just after the time of the trade. This is generally considered to be preliminary to the post-trade process of clearing and settlement. Once the trade's contractual terms and conditions crystallise and become legally binding, the clearing process begins. The European Commission has defined clearing as the process for calculating and establishing net positions in settlement, and for ensuring that adequate securities and cash are available for settlement (European Commission, 2005). Clearing essentially involves the matching of a buyer for every seller and a seller for every buyer and calculating and collecting margins to covers the clearer's position risk. In this way, the clearer confirms who owes what to whom following the trade by establishing the respective obligations of the buyer and seller and ensuring that all the conditions and prerequisites for settlement are in place.

1.2. The Settlement Process and changing structure of financial markets

Settlement in securities markets traditionally involved the seller of a security delivering a physical certificate (either debt or equity security) to a purchaser/investor in return for irrevocable payment (usually cash).⁷ This is known as delivery versus payment which essentially constitutes settlement. Settlement could also take place as part of a collateral transaction where the holder of the collateral interest (creditor) would receive possession irrevocably of the physical certificate (the security) if the borrower (debtor) defaulted or breached the loan agreement. Historically, securities markets were heavily paper-based and by the 1960s the United States securities markets had the largest amount of paper certificates ever in circulation with the result that there were several market breakdowns because of inadequate capacity to process the substantial number of paper-based transactions. Although central securities depositories (CSDs) had held and maintained the certificates and would transfer them to other CSDs upon payment, the system was not able to cope with all the paper transactions.

By the early 1970s, advances in computer technology were altering the structure of securities markets and the way in which cross-border trading was processed in settlement systems. Indeed, the dramatic increase in cross-border securities trading and the large volume of collateralised arrangements involving securities lending necessitated that settlement systems accommodate the need for rapid execution of trades and the transfer of interests in securities without reference to the physical possession of certificates. As a result, most publicly-traded securities are held today in dematerialised form⁸ in which the security is evidenced by computerised or electronic entries in a system maintained by the issuer or by a record holder acting for the issuer. These indirect holding systems often involve multiple tiers of intermediaries between issuer and investor, thus precluding physical possession and delivery of securities in certificated form⁹. Other important features are that interests in securities are reflected on the books of various intermediaries and depositories, transfers are effected by electronic book entry, and the need to transfer the instruments in which participating interests are held rarely arises.

⁷ Payment could also take the form of an exchange of two securities notes.

⁸ A security in dematerialised form is a security the issue and holding of which are evidenced solely by computerised or electronic entries in a system maintained by the issuer or by a record holder acting for the issuer. By contrast, the phrase 'physical securities' is generally used to refer to certificated securities.

⁹ The great majority of these securities are held in omnibus customer accounts in which no information about the individual is recorded in the financial intermediaries and securities depositories that occupy the upper tier of these indirect holding systems.

For example, Euroclear is an international central securities depository which manages one of the largest indirect holding systems for settlement services, involving a network of over 2,500 participating financial institutions and intermediaries throughout Europe that engage in cross-border securities transactions (Euroclear, 2006, p.3).

1.3. The structure of European clearing and settlement

Europe has traditionally had nationally-based securities trading and post-trading systems. This resulted in a fragmented infrastructure for clearing and settlement. Europe's economy and financial markets have become substantially more integrated in recent years resulting in a much greater demand for cross-border trading and lending in securities and for more robust cross-border arrangements to facilitate these transactions. The evolution of European clearing and settlement systems has differed depending on the type of securities being traded, with more effective cross-border arrangements already in place for bond trading. However, clearing and settling cross-border trades in equity instruments is far less developed and poses particular policy and regulatory challenges (Giovannini Report, 2001). Similarly, market structures for exchange-traded derivatives have evolved very differently in comparison to the markets for fixed income and equity markets. Previous reports have documented the fragmented nature of the EU clearing and settlement infrastructure which is essentially based on different national institutional structures (Giovannini Reports 2001, 2003). The Lamfalussy Report (2001) emphasised the importance of restructuring the clearing and settlement systems in Europe in order to reduce the relatively higher costs of cross-border trading in securities and by eliminating cross-border institutional and legal barriers.

The Giovannini Reports (2001, 2003) concluded that a reduction in these barriers would increase EU financial integration by improving economies of scale and scope in cross-border trading and by reducing transaction costs for issuers and investors, thereby enhancing liquidity and overall capital market development in EU securities markets.¹⁰ The Giovannini Report (2003) suggests that EU legislative intervention may be necessary to reduce some of these barriers. Others contend, however, that consolidation of clearing and settlement in the EU should be left to market forces and subject to rigorous competition law principles and that this will lead to an optimal level of consolidation in clearing and settlement arrangements without EU regulatory intervention (Milne, 2007).¹¹ The threat that increased consolidation in clearing and settlement undermines competition by potentially providing monopolistic pricing power to a few clearing houses and settlement institutions has been addressed by the EU courts, which have upheld the application of competition law principles to the provision of post-trading services.¹² A major issue addressed in this report will be what optimal institutional model should be promoted, if any, by European policymakers for Europe's clearing and settlement system, taking into account efficiency and safety and soundness objectives.

¹⁰ See Giovannini Group (2001), *Cross-border clearing and settlement arrangements in the EU*, Brussels (Nov. 2001). http://ec.europa.eu/economy_finance/giovannini/clearing_settlement_en.htm (examining EU clearing and settlement systems and describing the fifteen barriers to further integration). Giovannini Group (2003), *Second report on EU clearing and settlement arrangements*, Brussels (April 2003). http://ec.europa.eu/economy_finance/giovannini/clearing_settlement_en.htm (addressed the question of concrete steps needed to overcome the barriers and indicated a time period to achieve this).

¹¹ See discussion in A. Milne (2007) 'Competition and the rationalization of European securities clearing and settlement' pp. 370-398 in D. Mayes and G. Wood (eds.) *The Structure of Financial Regulation*.

¹² See *Clearstream Banking AG and Clearstream International SA*, Euro Ct. First Instance (2008)(upholding Commission's ruling that Clearstream Banking AG and Clearstream International abused their dominant position in the market by refusing to provide cross-border securities clearing and settlement services and applying discriminatory prices to customers outside their silo).

Subsequent expert reports have examined this fragmented structure and have concluded that fragmentation in the EU clearing and settlement infrastructure has indeed resulted in higher direct costs for cross-border trading of securities in Europe and also led to higher indirect costs and opportunity costs for parties involved in cross-border trading.¹³ Specifically, some of the direct costs include higher settlement fees for cross-border transactions within the EU as compared to domestic transactions in EU states. In July 2009, Oxera published a report for the Commission that provided data to suggest that throughout the value chain of trading and post-trade services costs are higher for cross-border transactions than domestic ones and that these costs are attributable to Giovannini barriers.¹⁴ Although the settlement of domestic securities trades within EU states is relatively cost-efficient, the costs for settling cross-border trades across EU states is significantly higher and thus poses a barrier to further EU financial integration. Some analysts assert that the high costs of clearing and settling trades in Europe is due to the control of local CCPs and CSDs which act as monopolists by charging an estimated 3.5 billion to 5 billion euros a year to clear and settle trades, four times higher than the cost to trading equivalent sums in the US market (Fairless, 2008). Although the EU compares well to the US regarding its costs for settling domestic trades, it compares poorly to the US with respect to the much higher costs for settling cross-border trades. The Giovannini Report (2003) concluded that the "EU financial market cannot be considered an integrated entity but remains a juxtaposition of domestic markets".¹⁵

1.4. Recent developments in the European clearing and settlement

EU public policy has avoided legislative intervention in the regulation of clearing and settlement and instead focused on encouraging exchanges, clearing houses, and settlement depositories to improve price transparency, unbundling of accounts in vertical silos so that the costs of trading, clearing and settlement could be estimated separately in order to put downward pressure on prices, especially for cross-border EU transactions, and to increase access and interoperability between trading and post-trading bodies. As discussed below, the Commission has utilised legally non-binding instruments, such as the 2006 Voluntary Code of Conduct¹⁶ and the industry association's 2007 Guideline on access and interoperability,¹⁷ to drive this process. The Code aims to enhance transparency and increase competition and interoperability in the post-trading sector. The Code has attracted a lot of attention because it has been a catalyst for increased transparency in prices and the unbundling of trading costs from clearing and settlement services so that they can be priced more efficiently.

¹³ See Oxera (2009) 'Monitoring prices, costs and volumes of trading and post-trading services (MARKT/2007/02/G) (see appendices comparing EU jurisdictions). all providers especially post-trade providers to provide the value-processed on improved invoicing.

¹⁴ Oxera (2009) 'Monitoring prices, costs and volumes of trading and post-trading services (MARKT/2007/02/G) pp. 3-5. However, user feedback from the report questioned Oxera's methodology and metrics in measuring costs per transaction: "To become an effective tool, further reports need to reflect also post-trade costs as a proportion of the respective value-traded – as this is what impacts investors." See also Europa Press Release (July, 2009) 'Commission publishes study on trading and post-trading costs'. See <http://europa.eu/rapid/pressReleasesAction.do?reference=IP/09/1151&format=HTML>

¹⁵ The Giovannini Report (pp. 37-8, 2003) provided data to suggest that the settlement fees of International Central Securities Depositories (ICSDs) (which settle cross-border securities trades) are significantly higher than the fees of domestic central securities depositories (CSDs) in Europe.

¹⁶ See 'Clearing and settlement: Commissioner McCreevy welcomes industry's new code of conduct' IP/06/1517 (7 Nov. 2006) (Brussels).

¹⁷ In 2007, the European industry associations for exchanges and clearing and settlement associations issued a Guideline on access and interoperability between exchanges and clearing and settlement systems. See 'Access and Interoperability Guideline' (28 June 2007) (Federation of European Securities Exchanges' (FESE), European Association of Clearing Houses (EACH), and European Central Securities Depositories Associations (ECSDA)). <http://www.fese.eu/lib/files/AccessInteroperabilityGuideline.pdf>

The 2007 Guideline on access and interoperability has created a regime of principles and rules regulating how exchanges, and clearing and settlement infrastructure can access each other, and even provides a dispute settlement mechanism.¹⁸ The Code and the Guideline and other recent industry initiatives are premised on the notion that these measures will eventually eliminate the Giovannini barriers with the result that transaction costs in securities and derivatives transactions, especially for cross-border transactions, will fall dramatically for clearing and settlement services.

Although market approaches achieved some beneficial results, the nature and extent of the financial crisis demonstrated vulnerabilities in the EU regulatory regime, especially with respect to the over-the-counter derivative market for credit default swaps (CDSs). Consequently, Internal Market and Services Commissioner Charlie McCreevy called upon the industry in October 2008 to reduce some of these risks by moving the clearing of credit default swaps (CDSs) onto a European central counterparty. In response to the commissioner's call, ten major CDS dealers met the deadline of 31 July 2009 to begin clearing CDS contracts on European reference entities, and/or on the indices based on these entities, through one or more central counterparties regulated by an EU state. In addition, the Committee of European Securities Regulators (CESR) and the European System of Central Banks (ESCB) addressed systemic risk and other financial stability issues with the publication in June 2009 of voluntary 'Recommendations for securities settlement systems and central counterparties in the European Union.'¹⁹ The adoption of these recommendations is an important first step in developing adequate regulation and supervisory practices with the aim of improving risk management practices and mitigation techniques in European clearing and settlement systems.

An important question addressed in this study is whether a more interventionist EU policy response is needed to promote competition and control the regulatory risks in the clearing and settlement system. The competition objective should address the institutional and legal barriers between states that lead to higher transaction costs for cross-border trading in securities and derivatives. These costs have put European financial markets at a competitive disadvantage with the financial markets of other major developed economies (ie., the US and Japan) that have more consolidated clearing and settlement systems and more uniformity in the relevant regulations and laws.²⁰ Nevertheless, regulatory risks will be assessed as they relate to increased competition and liberalised capital markets.

¹⁸ To monitor implementation of the Code, the Commission has set up the Monitoring Group of the Code of Conduct on Clearing and Settlement (MOG). The MOG is chaired by the Commission and consists of representatives from the European Commission as well as the European Central Bank (ECB) and the Committee of European Securities Regulators (CESR). The relevant Commission services involved are: Internal Market and Services DG (MARKT), Economic and Financial Affairs DG (ECFIN) and Competition DG (COMP).

¹⁹ CESR/ESCB (2009) (App. B).

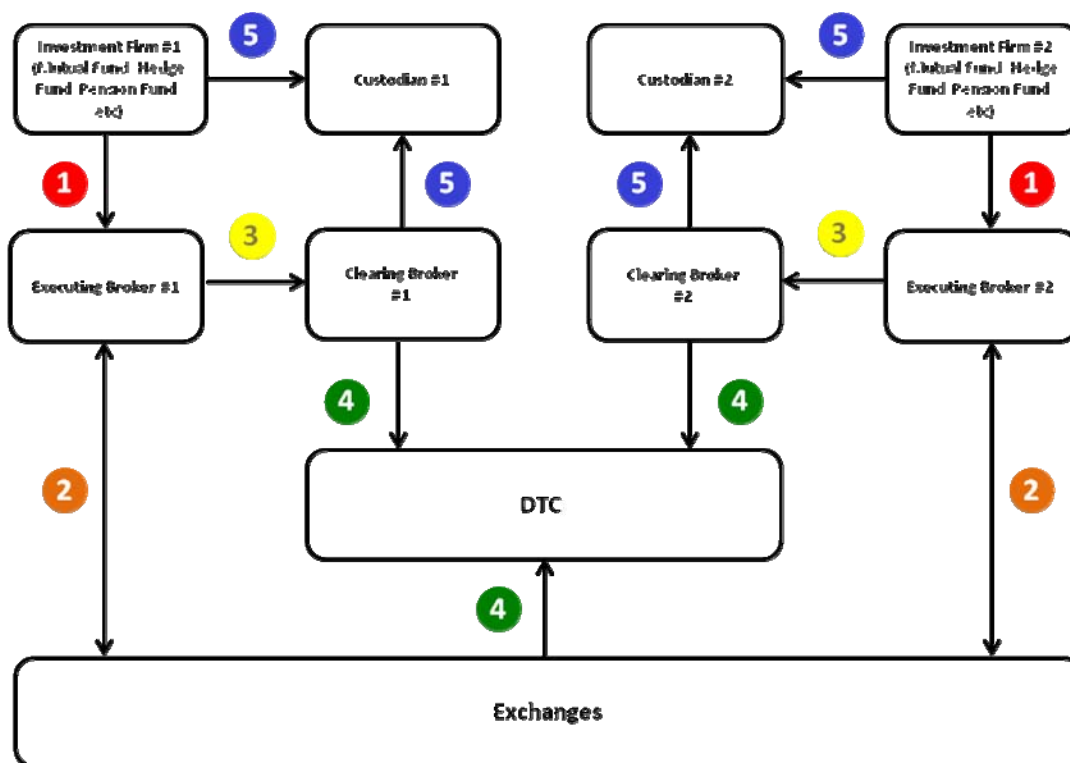
²⁰ See Giovannini Group's Second Report (2003) pp. 16-29; and the Lamfalussy Final Report, 'Report of the Committee of Wise Men on the Regulation of European Securities Markets (2001) p. 16.

2. The Clearing and Settlement system in Europe

This section examines the clearing and settlement system in Europe. It then analyses recent market and regulatory developments in European clearing and settlement and discusses the regulatory gaps that exist.

2.1.1 Clearing

The clearance of financial instruments has strategic importance for financial stability and is beneficial for the efficient workings of the financial markets. The Committee on Payment and Settlements Systems (CPSS) has defined clearing as 'the process of transmitting, reconciling, and, in some cases, confirming payment orders or security transfer instructions prior to settlement, possibly including the netting of instructions and the establishment of final positions for settlement.' (CPSS, 2001). The following schematic explains the clearing and settlement process for an exchange-traded securities market outside of central clearing.



DTC is the central securities depository and clearing house which settles and clear the trade by ensuring that the security is delivered for payment (usually cash). The process is as follows:

1. Orders are routed from the investment firms (one is a buyer, the other is a seller) to their respective Executing Brokers.
2. The Executing Brokers send the orders to the appropriate Marketplace for the security being traded. The Marketplaces respond with executions ("fills").

3. The Executing Brokers send the fills to the Clearing Broker that was designated by the investment firms. Many Executing Brokers are themselves Clearing Brokers, a term which is called "self-clearing".
4. The Marketplace(s) and the Clearing Brokers compare their shares/money to make sure that they match. This is referred to as "Street-Side matching".
5. The Investment Managers inform their respective Custodians what they should expect to receive/deliver from the Clearing Brokers, and the Custodians perform this comparison. This is referred to as "Customer-Side matching". This occurs the day of the trade (T+0).

On Settlement Date (which is usually up to 3 days after Trade Date, the date when the actual trade occurred), the Clearing Brokers will deliver/receive the match amount of shares/money to settle the trade with both investment firms.

2.1.2 Centralised clearing

Clearing has evolved in recent years to take on greater importance in the functioning of financial markets by including such activities as 'central counterparty clearing' ('CCP clearing'). A central counterparty is a specialised financial institution that mediates between the buyers and sellers of securities. The centralised clearing of financial products can occur through one of three mechanisms:²¹

1. a centralised deal registry, to which parties report as to the trades they have entered into bilaterally and facilitates transfers of collateral;
2. a single clearinghouse, interposed as the counterparty and guarantor to every trade, requiring standardised contracts including minimum initial margins and margin variations, isolating counterparty risk and minimising that risk through conservative risk management practices and multilateral netting so that individual participants have smaller exposures overall; or
3. a formal exchange, providing visibility on prices and volumes of transactions processed, broader access including to retail investors, and even less counterparty risk due to the contribution of capital from market makers.

Clearing houses traditionally performed clearing for exchange-traded derivatives and commodities. As central counterparties (CCPs), they become the buyer to every seller and the seller to every buyer of a particular set of contracts (eg., those contracts executed on a particular exchange or exchanges).²² The contractual obligations between counterparties that are participants in a CCP are modified by the legal doctrine of novation so that the CCP is substituted as the counterparty on that contract or set of contracts.²³

The European Commission has distinguished between counterparty clearing and central counterparty clearing (Commission, 2005). Counterparty clearing is the process by which "a third party interposes itself, directly or indirectly, between the transaction and counterparties in order to assume their rights and obligations". In performing this function, the counterparty clearer guarantees performance of the payment obligation in the trade by assuming the credit risk of the payor to the trade.

²¹ Acharya and Richardson (2009, chpt. 11).

²² See discussion in Papathannassiou (2010, 1)(observing that CCP services were first made available for commodities and for related exchange-traded derivatives, such as futures).

²³ Novation agreements are used to transfer the rights and obligations of one party under a contract to another party, whilst the other contracting party remains the same. All three parties – the transferor, the transferee, and the other contracting parties – are required to sign the novation agreement.

By contrast, central counterparty clearing (CCP) involves the CCP assuming not only the rights and obligations of the counterparties but also acting as the direct or indirect buyer to every seller and the direct or indirect seller to every buyer. Counterparty clearing and CCP clearing usually co-exist under what is known as the 'third party model'.²⁴

The central counterparty clearing activities of the CCPs are an increasingly important function in modern financial markets. CCPs are the counterparties for a large number of transactions on which they are able to net their gross obligations by offsetting the amount they owe and are owed by CCP participants. In this way, they are able to mutualise risk amongst a restricted number of high quality participants. Through netting, market liquidity is enhanced because the CCP can reduce its obligations, normally to a small residual amount that become debits or credits between the CCP and each of its members. The CCP's clearing members then typically act as credit intermediaries by providing counterparty clearing to a much broader range of participants who want access to the CCP. In doing so, CCPs calculate and collect margins to protect their positions with CCP participants and members.

Counterparty clearing, netting and derivatives trading began in the 1970s. The netting process was of vital importance for these markets because they were based on contracts that were closed out and usually not settled because assets were rarely transferred with finality from the investor to the seller in return for payment. Later, central counterparty clearing began to grow in European markets in the 1990s. CCPs generally could manage their counterparty risks more efficiently than individual counterparty clearers by interposing themselves between multiple counterparties. This resulted in increased liquidity through netting and substantially reduced settlement costs because of the reduced number and value of transactions that had to be settled. The management of counterparty risks in the CCP structure was superior to that of the counterparty clearer.

In addition, because the CCP's business involves it assuming the credit risk of member counterparties, they are regulated institutions and required to hold regulatory capital and maintain sophisticated risk management systems to measure credit, market and operational risks. As is the case with banks, the CCPs benefit from economies of scale and scope and therefore have an incentive to grow their balance sheets and become systemically important players in the financial sector.

It should be emphasised that the CCP's clearing operations are separate from the settlement process. Nevertheless, in EU countries there are examples where clearing forms part of a value chain which extends from trading through clearing all the way to settlement. This is what is known as a 'vertical silo'²⁵. It is not necessary, however, that clearing be included in the same entity structure that includes other functions of the securities business, such as trading or settlement.

2.2 Settlement

Settlement is the process whereby securities or interests in securities are delivered, usually against payment, to fulfil contractual obligations, such as those arising from a contract of sale and purchase. Some deliveries are made without a corresponding payment; examples are the delivery of securities collateral against a loan of securities, and a delivery made pursuant to a margin call. Although settlement is generally becoming quicker, in most markets a number of business days still elapse between trading and settlement.

²⁴ The authors appreciate the insights of the anonymous market practitioners who suggested the concept of the third party model.

²⁵ A vertical silo is where the activities of securities trading, clearing and settlement are integrated, often in one company. In contrast, horizontal integration between silos can occur where the trading activity is separately controlled from the clearing and settlement activity, but where one or all of those activities are integrated with those of other providers (Norman 2007, 6).

The settlement date for securities is usually three business days (T + 3) after the trade was executed and for listed options and government securities it is usually one day (T + 1).

In contrast, contracts in the over-the-counter markets (OTC markets) may be open for thirty years or more before final settlement. In this case, the potential credit exposure in the OTC markets is much higher. A number of risks therefore arise – ie., principal risk and credit risk – during the settlement interval. As discussed above, the risks are usually managed by the clearing process, which follows trading and precedes settlement.

Securities are cleared and settled through tiers of financial intermediaries and central securities depositories located in different jurisdictions who register and record ownership interests in securities through electronic bookkeeping. Central securities depositories (CSDs) manage the settlement of payments between buyers and sellers in securities transactions. In doing so, CSDs have three main functions. First, they ensure the existence of a security, verifying the correct number of securities in existence, and confirming that the issuer exists and is legitimate. Second, they facilitate the settlement of an exchange or transaction by ensuring that payment is executed between counterparties after a security is bought and sold. Three, they process corporate actions (ie., distribute dividends), maintain and manage assets (ie., effect of rights offerings), and they withhold tax and comply with domestic legal issues. Essentially, the CSD operates as a market utility for settling trades based on the principle of delivery versus payments.

2.3 Settlement risk and market failure – Herstatt risk

The liberalisation of modern international financial markets began in the 1970s when the collapse of the Bretton Woods fixed exchange rate regime led to increased foreign exchange risk for banks and their counterparties. The resulting increase in cross-border transactions also increased settlement risk – or what is known as “principal risk”, that is, the risk of loss of full payment or the full value of an asset delivered. Foreign exchange and settlement risk converged in the case of Bankhaus I.D. Herstatt, a leading private bank based in Cologne, which collapsed on 26 June 1974 because of massive miscalculations in foreign exchange trading. This affected the bank’s counterparties in other countries, including the United States. When it became known that the bank’s foreign exchange exposures had caused it to become insolvent, German regulators closed the bank at the end of the Frankfurt business day. The bank’s closure resulted in the settlement of the bank’s Deutsche Mark legs of some of its foreign exchange contracts for value on the day of closure, while the dollar legs of those contracts had not been finally paid. US banks had paid dollars to Herstatt earlier in the day as one leg of routine foreign exchange transactions before the bank was closed, while expecting to be paid in DMs a few hours later. The result was that Herstatt’s counterparty banks in other jurisdictions – notably the US – did not recover the funds they were owed.

The bank’s sudden closure without settling its counterparty exposures whilst New York markets were open placed the financial system at great risk. Without the Bundesbank’s intervention to cover all the banks’ foreign exchange exposures, there would have been a serious systemic crisis. This episode gave rise to the concept of ‘Herstatt risk’. Although the Herstatt bank failed primarily because of foreign exchange risk, it was the settlement risk exposure of its counterparty foreign banks that threatened global financial stability. Later collapses of the Bank of Credit and Commerce International in 1991 and Barings in 1995 resulted in similar losses arising from settlement risk.

2.4 Continuous linked settlement

These crises demonstrated that foreign exchange settlement risk can create systemic risk in the global financial system because of the large counterparty exposures between banks. This threat to financial stability led a consortium of central banks and global private sector banks to establish the Continuous Linked Settlement Bank (CLS Bank) in 2002, which now settles fifty five percent of all foreign exchange trades. It does so by operating a payment netting system that substantially reduces settlement risk by acting as a third party between the counterparties to foreign exchange transactions. In the recent financial crisis, CLS's netting system appeared to have worked as the \$3,200 billion international foreign exchange market settled without problems during the convulsions that affected the securities markets in October 2008.

Although CLS's success in managing foreign exchange settlement in the recent crisis has led many practitioners to assert that potential market failures in this area have been largely solved, the Bank for International Settlements has expressed concern about the remaining forty five percent of the foreign exchange market for which CLS is not responsible for settlement.²⁶ Some suggest that CLS could expand its range of foreign exchange coverage by offering same-day settlement of trades, such as dollar-yen, which has been difficult to achieve because of the time difference between the US and Japan, and further expanding the currencies its covers and signing up more banks as members. The success so far of CLS bank as a settlement service provider for foreign exchange provides a model for Europe in devising its own securities settlement system.

2.5 Principal Risk in Securities Settlement Systems

Although the type of settlement risk in the Herstatt case had to do with payment on foreign exchange transactions, settlement risk can equally arise in cross-border securities settlement transactions. After the Herstatt case and the October 1987 worldwide stock market collapse, this type of settlement risk drove market participants and regulators to adopt delivery versus payment (DvP) for cross-border securities transactions. The G30 had originally identified the lack of simultaneous delivery versus payment as a significant source of settlement risk, because it left one or the other party to a transaction unduly exposed to the risk of not receiving payment or the securities (G30 Report).²⁷ The G30 recommendations stated that settlement risk could be contained by reducing "the time between trade date and settlement, promoting trade guarantees and assuring the simultaneous exchange of payment and securities"²⁸.

The DvP recommendation sought to address the principal risk in securities transactions that time equals risk in receiving payment. It proposed that all countries with securities settlement systems should adopt a DvP system by 1992. The G30 DvP recommendation was followed by a report from the BIS Committee on Payment and Settlement Systems (CPSS) in 1992 that found that most G10 financial systems had adopted one of the three main DvP programmes (BIS 1992).

²⁶ CPSS (2008): "[t]he financial services industry has made significant progress in dealing with foreign exchange settlement risk, . . . [h]owever, more can be done to tackle remaining exposures and to guard against the risk of reversing progress that has already been achieved".

²⁷ To address this, the G30 published a report in 1989 containing nine recommendations that generally aimed to make global securities markets more efficient and 'potentially the source of less risk.'

²⁸ The G30 recommendations covered four main areas: 1) trade matching, 2) DvP, 3) rolling settlement, and 4) securities lending, all of which, if implemented, would address the settlement risks in global securities markets which had played a large role in causing the October 1987 stock market collapse. (G30 Report).

First, there were DvP systems “that settle transfer instructions for both securities and funds on a trade-by-trade (gross) basis, with final (unconditional) transfer of securities from the seller to the buyer (delivery) occurring at the same time as final transfer of funds from the buyer to the seller (payment)”. Second, systems “that settle securities transfer instructions on a gross basis with final transfer of securities from the seller to the buyer (delivery) occurring throughout the processing cycle, but settle funds transfer instructions on a net basis, with the final transfer of funds from the buyer to the seller (payment) occurring at the end of the processing cycle”. Third, systems “that settle transfer instructions for both securities and funds on a net basis, with final transfers of both securities and funds occurring at the end of the processing cycle”.

The CPSS report did not recommend one of the models, but instead focused on the importance of robust risk management for settlement systems because most systems provided credit to their participants and therefore it was necessary to identify the type of replacement risk, liquidity risk or credit risk to which the settlement system was exposed and to adopt the necessary controls. As a result, settlement operators were strongly encouraged to strengthen risk management and to adopt the strongest possible linkage between delivery and payment. This led G10 settlement operators to variously adopt one of the three DvP models, which led to fragmentation at the national level in securities settlement infrastructure. Although the CPSS report set forth a number of principles and best practices, it was not prescriptive regarding the type of substantive standards and institutional framework that should govern securities settlement systems. Moreover, it did not address cross-border issues and in particular did not address how efficient and safe linkages could be established between settlement systems using different DvP models. The use of a particular DvP procedure can affect principal and settlement risk (a form of systemic risk). Because the European Central Bank’s Target2-Securities **(2.6)** project will accelerate horizontal consolidation through increased interoperability between European settlement entities, it is necessary that EU policymakers examine whether the divergent DvP procedures and practices across Europe should be harmonised in order to manage more effectively principal and settlement risk. This is potentially a major regulatory gap in the EU settlement system which should be addressed.

Moreover, with the exception of competition law requirements, there has been little EU regulatory input in shaping the institutional structure of settlement facilities (ie., central securities depositories, CSDs) and their practices which are subject in the EU only to national regulatory requirements. As a result, the market has evolved along a fragmented institutional structure consisting of, on the one hand, a number of vertical silos which have led to higher costs for users (Deutsche Borse acquiring Clearstream), and, on the other hand, led to a series of mergers between international central securities depositories (eg., Euroclear) and national central securities depositories (eg., France’s Sicovam) resulting in some horizontal consolidation across European financial markets. A more coherent institutional approach is needed to address the challenges posed by growing integration in European and global financial markets.

2.6 ECB's Target2 Securities

The European Central Bank may have provided an institutional framework for achieving a rational consolidation of securities settlement services in Europe by proposing 'Target2 Securities', which will become fully operational in 2013.²⁹ The Target2-Securities project is based on the ECB's existing Target2 payment settlement system for banks. Target2 securities applies to all cash instruments (ie., equities, bonds) that are settled in central securities depositories, agent banks or custodian banks in the eurozone. Target2 securities expands the ECB's Target system to include the settlement of payments for cash financial instruments (ie., equities and bonds) which take place between eurozone entities, such as central securities depositories, agent banks and custodian banks. This is an important step in building a European-wide settlement system and will facilitate significant horizontal consolidation in the provision of settlement services in the European Union. Although eurozone CSDs are not legally required to join Target2 securities, most will have an economic incentive to do so because the settlement of cash instruments in Target2 will be much cheaper than it would be if settled through traditional international central securities depositories, such as Euroclear or Clearstream. The Target2 securities system is designed to handle all aspects of settling payments for cash instruments in the eurozone. It will not manage other aspects of settlement, however, such as corporate actions, taxation, and related domestic legal requirements that vary between member states. This means that existing CSDs with operations in the eurozone (eg., Euroclear) will continue to have much demand for their settlement services that relate to the domestic aspects of settlement (ie., corporate actions, asset maintenance and tax). Significantly, Euroclear, the largest central securities depository in Europe, signed a MOU with the ECB in 2009 to join Target2 securities. Other EU CSDs, including Clearstream, have joined as well. Also, Clearstream's Link-up market initiative which is a framework for regulating the communication of messages for the settlement of securities transactions will also be linked to Target2 securities. It is expected that Target2 securities will become the catalyst for future horizontal consolidation in EU securities settlement.

2.7 The Code of Conduct

In 2004, the Council of Ministers and the Commission considered new EU legislation to promote increased competition and lower transaction costs for parties using clearing and settlement systems across European financial markets. Responding to strong opposition to legislation by the private sector, the Commission adopted instead a voluntary Code of Conduct in 2006. The Code applies to equity instruments that are cleared and settled in Europe and which would later be extended to bonds and other fixed income securities. The Code has four main goals: price transparency, access and interoperability, account separation and unbundling, and overseeing corporate actions. The four goals rest on the principles of transparency and non-discrimination that aim to increase competition by requiring more disclosure of the costs and conditions for accessing clearing and settlement systems. Discriminatory practices that restrict access to clearing and settlement services can only be justified on grounds of differential costs that are based on legitimate institutional barriers. The principles of transparency and non-discrimination are crucial for increasing access to, and interoperability between, clearing and settlement systems in Europe (European Commission, 2006).

²⁹ See R. Barnes, (2008). 'The view from a global banking perspective and T2S'. Joint ECB-Commission conference: The Safety and Efficiency of Post-Trading Arrangements in Europe, Session 1: Central bank services and market facilities, paras. 32 & 33 (Frankfurt, 21 April 2008).

<http://www.ecb.eu/events/pdf/conferences/septa/barnes.pdf>

Nevertheless, the Code was criticised by some market participants for failing to increase competition and to foster open access to clearing and settlement services. For instance, the Code was criticised for failing to overcome barriers to interoperability, particularly in clearing.³⁰ The main objective for interoperability is to give trading firms a choice of which central counterparty (CCP) they will use. The two parties who must agree to use a CCP are the trading venue (ie., the stock exchange) that supplies the trades, and the incumbent central counterparty who must establish a link with the prospective CCP. Traders would like to have the same degree of choice in choosing a CCP that they have already in deciding which trading venue to use. However, if the trading venue owns the CCP, there is little economic incentive for the exchange to give traders this choice. CCPs had provided links to other CCPs before the Code took effect, which allowed members of one CCP to have a trade link with a counterparty who was a member of another CCP without the former CCP member being required to become a member of the latter CCP. These links were mainly consensual, and not based on competition. The trading firms were saved the costs of becoming full members of both CCPs.³¹

A major aim of the Code was to encourage competition between CCPs by allowing them to request trade links with other CCPs on terms that were transparent and non-discriminatory, thereby giving trading firms a choice of clearing venue.³² The Code encourages exchanges and clearing houses to provide horizontal access and to create interoperability between CCPs by reducing and eliminating technological barriers. Central securities depositories were also encouraged to establish horizontal links with CCPs outside their markets in order to reduce duplication in settling trades. Despite the Code, increased access to CCPs by other CCPs has been limited and significant barriers remain preventing meaningful interoperability. One explanation for this is that most CCPs in Europe are vertically owned by exchanges and trading platforms. The recent financial market turbulence has encouraged more exchanges and trading venues to acquire CCPs not only because of the revenue they generate, but also because the exchange can ensure market orderliness for their traders who derive a benefit from knowing that deals will settle at the price agreed and that the firms will have anonymity.

On the other hand, recent developments in the CCP cash equity multi-markets suggest that the Code is having a beneficial effect in generating a principles-based regulatory framework that promotes competition through a 'user-choice' model.³³ In consultation with users, the London Stock Exchange (LSE) and the Swiss clearer SIX x-clear together announced on 24 May 2006 the intention to provide member firms with a choice of clearing provider in addition to LCH.Clearnet for UK equity trades processed by the London Stock Exchange.³⁴

³⁰ See statement of Diana Chan, chief executive of EuroCCP, the UK subsidiary of the US Depository Trust and Clearing Corporation, interview in *The Financial News* (9 June 2008).

³¹ This type of link was established for the exchange virt-x through its CCP x-clear so that it could have a trade link with Europe's largest CCP, LCH.Clearnet.

³² A number of exchanges, including the London Stock Exchange, have followed this approach by allowing traders a choice between CCPs across Europe.

³³ R. Barnes (2008), 'The User perspective' FESE Convention 2008: Federation of European Securities Exchanges, Panel II, 'What Business Model for Europe's Post-trading infrastructure?' sections 8-10 (Stockholm, 18 June 2008) (citing sections 8, 9, and 10 of the Code of Conduct).

³⁴ See *Financial Times*, 'UBS drops LCH.Clearnet in favour of X-Clear' (2 Dec 2008), Jeremy Grant, ('UBS, the largest single provider of trading liquidity on the London Stock Exchange, will next week become the first LSE user to switch its clearing from LCH.Clearnet to the Swiss clearing provider X-Clear.)

This coincided with the publication on 24 May 2006 of a paper by the European Commission DG Competition entitled, 'Competition in EU securities trading and post-trading issues paper',³⁵ which stated that "CCP services could – and probably should – operate in a competitive environment, provided issues of interoperability are overcome". For some years, a precedent for this has existed with the Swiss exchange (SWX) virt-x post-trade market model that provides interoperability, which facilitates user choice of CCP for Swiss blue-chips.³⁶ Moreover, in 2007 the London Stock Exchange decided to encourage interoperability between LCH.Clearnet and the Swiss clearer x-clear, but this met with resistance from LCH.Clearnet that wanted to impose an additional charge on x-clear for access. Eventually, agreement was reached in March 2008 when LCH.Clearnet and x-clear settled on an access arrangement for LSE trades.³⁷ Indeed, increased access and interoperability between trading firms and CCPs in different EU markets are essential for achieving lower transaction costs and best execution.³⁸ The above examples of exchanges offering their trading members a choice of clearing venue have resulted in increased business for those exchanges.

Nevertheless, since the Code was adopted, there remains some doubt as to whether the voluntary code is being implemented by other exchanges and clearers. This may have had the effect of reducing the willingness of some exchanges and clearers to open access on a bilateral, or more limited, basis and to extend access to other clearers and trading firms.³⁹ More recently, however, pro-active market participants in the EU cash equities CCP sector have embraced the principles-based framework in the Code to adopt a CCP 'user choice' model that has become the rule, rather than the exception, for promoting horizontal consolidation.⁴⁰ This emerging EU CCP landscape for cash equities, while appearing to fragment as more CCPs inter-operate, in fact, allows individual firms to consolidate their respective pan-European market flows to a single CCP of their choice. This promotes competition and lower transaction costs.⁴¹

³⁵ 'Competition in EU securities trading and post-trading issues paper' (24 May 2006) (Brussels) http://ec.europa.eu/competition/sectors/financial_services/securities_trading.pdf,

³⁶ In 2003, the exchange virt-x became the first exchange in Europe to offer their traders a choice of clearing venue. See Feature 'Europe's clearers cannot see the woods for the trees', *Financial News* (9 June 2008).

³⁷ L. Jeffs (11 May 2009), *The Wall Street Journal Europe*, 'LCH.Clearnet cuts fees in response to competition; follows a rush of announcements of multiple CCP interoperability across multiple European trading platforms.' Citing Robert Barnes, managing director for equities at UBS AG, stating 'the fee cuts and agreements to clear for the multilateral trading facilities were "good news for the market."' <http://online.wsj.com/article/SB124199375479604653.html>

³⁸ The Market and Financial Instruments Directive requires that exchanges provide their members with 'best execution'. Art. 25.

³⁹ This view is supported by the statement of LCH.Clearnet chief executive, Roger Liddell, who stated "... we have no evidence that the code of conduct is being successfully implemented elsewhere. We will not therefore be prepared to contemplate any further extension of peer-to-peer clearing relationships unless appropriate access is unambiguously established across all the other markets where LCH.Clearnet has sought". See 'Europe's clearers cannot see the woods for the trees', *The Financial News* (9 June 2008). However, contrary evidence can be demonstrated by the growing number of links that represent increased interoperability in the EU CCP cash equities market. See Appendix D for completed and requested links in CCP cash equity market as of 1 September 2009.

⁴⁰ R. Barnes,(2009). "Exchange features that encourage investor activity and liquidity" pp.xvii-xxvi in H.Skeete (ed.) *Handbook of World Stock, Derivative and Commodity Exchanges 2009*. (Mondo Visione, Knebworth).

⁴¹ See *Automated Trader News* (2009), 'Chi-X Europe to become first MTF to offer participants choice through CCP interoperability' (Feb. 2009) (discussing Chi-X Europe Limited announcing its intention to introduce a "user choice" clearing model which will lead to lower clearing and settlement costs). In the article, Robert Barnes, Managing Director, Equities at UBS Investment Bank, stated "Chi-X Europe's introduction of 'user choice' is a smart pan-European response to requests for a mechanism to help reduce frictional front-to-back costs. The beauty of this model is that benefits are available to those who feel it is in their interests to switch CCPs without forcing costs on those that wish to stay. This will encourage providers to remain nimble on fees and functionality."

This supports the views of some market participants that the Code, and not legislative intervention, should be used to promote horizontal access between the large CCPs to create consolidated clearing in Europe.⁴² This may mean, however, that vertical integration between the exchanges and trading venues *and* the CCPs may have to be limited or curtailed, if necessary by regulatory intervention, in order to achieve horizontal access and interoperability. The Code's objective of establishing a level playing field will lead to increased competition and this will drive consolidation between CCPs and between CSDs. According to this view, a successful outcome for Europe would be to have a few competitive and innovative clearing and settlement providers. Increased inter-connections between CCPs and CSDs, however, might create new risks between counterparties to trades. For instance, as each CCP establishes links to others, its members become exposed to the possible failure of members of the other CCP. Providing a choice to trading firms of being exposed to counterparties of another CCP may create additional risks that can be costly. The CCP of the other counterparty may have lower risk standards and less experience than the CCP in the home market. With a few exceptions (ie., capital adequacy), there are no harmonised EU legislative standards governing the operations of CCPs and CSDs, as their operations have mainly been local in nature.⁴³ Given the growing cross-border links between CCPs and CSDs, the potential for regulatory arbitrage between jurisdictions should attract policymaker attention.

2.8 Horizontal consolidation versus multiple providers

The issue of horizontal consolidation between CCPs and CSDs raises important issues regarding the optimal institutional model for the clearing and settlement industry in Europe. Two main institutional approaches for clearing and settlement have developed in Europe: 1) increased horizontal consolidation across member states of the firms and entities involved in clearing and settlement, or 2) increased competition between multiple providers of clearing and settlement services. Emblematic of the first approach is Euroclear, the large Brussels-based financial institution, which began as a Eurobond settlement house in the 1960s and has evolved to become Europe's largest securities settlement company. Euroclear is an international central securities depository (ICSD) that settles securities trades across multiple currencies and asset classes. It has led efforts for further institutional consolidation in settlement services in Europe and claims that consolidation of Europe's central securities depositories (CSDs) could save institutions up to 800 million euros per year in settling trades (Crest, 2008). One way it has promoted consolidation is by taking over seven national CSDs, including those in Belgium, France, The Netherlands, Ireland, Norway and the UK, and has become the biggest conglomerate of CSDs in Europe. In leading the push for consolidation, it plans to launch a European platform in 2011 that will allow its customers in any of its markets to settle a trade in any other market. It estimates that savings from this new platform will exceed 350 million euros a year in back office and operational costs.

⁴² See comments Frank Versmessen of SWIFT to the *Financial News* (9 June 2008) p. VII stating "Everyone recognises this is not an easy task, but the impression I have is that the European Commission is becoming more impatient".

⁴³ Indeed, the Lamfalussy Committee raised this issue in its Final Report (2001, p. 16) when it stated 'whether clearing and settlement organizations should be authorized and supervised according to common European standards (eg., conditions for access to payment systems, information sharing and cooperation)'.

Euroclear's main competitor in Europe is Deutsche Borse-owned Clearstream, part of a vertical silo in the German market that encompasses the Deutsche Borse exchange in Frankfurt, Eurex for clearing, and Clearstream for trade settlement.⁴⁴ Clearstream is also driving consolidation in the European market, but in a different way by establishing a joint venture with six other depositories called Link-up Markets which seeks to reduce the costs of cross-border trading.⁴⁵ The Link-up markets venture is not the same business model as the Euroclear model because it is an effort by several CSDs to standardise the way they send messages to each other for trading, clearing and settlement. Significantly, Euroclear has responded to the European Central Bank's Target2-Securities project (T2S), which is expected to begin in 2013, by signing a memorandum of understanding with the ECB in which Euroclear will join Target2-Securities by agreeing to settle all of their payments in central bank money for cash instruments held by Euroclear's eurozone depositories.⁴⁶

A quite different approach seeks to enhance competition by maintaining multiple post-trading venues for clearing and settlement. Europe's leading exchanges have followed this approach by establishing their own central counterparties in order to generate additional revenues for their exchange businesses. The exchange's strategy has been driven primarily by the new legal and regulatory framework of the Market in Financial Instruments Directive (MIFID) which allows exchanges to offer related services if they achieve best execution for their clients. The creation and acquisition of these clearing houses by exchanges implies the rejection of the idea that was dominant only a few years ago that horizontal consolidation is the most efficient way of building a more competitive and open post-trading system in Europe. Rather than consolidation, clearing structures in Europe are presently fragmenting along vertical structures. The arrival of multiple CCPs appears to be the result of the voluntary Code which has as its main aim the creation of a more competitive environment.

Competition's success, however, depends on contested markets and lower transaction costs. For competition to achieve these aims, regulation is necessary to control systemic risks and to ensure efficient pricing of clearing and settlement services. CCPs and CSDs, however, may constitute essential facility-type structures (like utilities) which may require more public regulation to prevent market failure or self-regulation to ensure the efficient management of risks and to build a more open market. In considering whether CSDs and CCPs should be subject to prudential regulation, the Lamfalussy Committee observed that there may be a 'need, perhaps, to separate clearing system issues from settlement (an efficient clearing system being a public good)'.⁴⁷ The Lamfalussy committee also stated that it was necessary for European policymakers to consider 'the prudential implications of one central counterparty.' In part III, we shall take up that challenge and set forth a model for institutional reform of EU clearing for credit default swaps, but will not suggest this model for other clearing sectors (ie., cash equities) which have different market structures and little problem in withstanding the market turmoil of the Lehman Holdings and American International Group collapses in 2008.

⁴⁴ Deutsche Borse Group. Deutsche Borse operates a vertical silo consisting of its subsidiary Eurex clearing which provides CCP services for derivatives traded on Eurex, equity clearing for selected instruments traded on the Frankfurt Stock Exchange and XETRA (DB's electronic trading platform) and the Irish Stock Exchange.

⁴⁵ The CSDs involved in Link-up markets cover the market for equities settlement in Austria, Denmark, Germany, Greece, Norway, Spain, and Switzerland. See Appendix C for Links between CCPs/CSDs.

⁴⁶ Euroclear expects that T2S will not take away a lot of business because the four Euroclear CSDs operating in the Eurozone represent about 10% of its revenues. The proposed T2S system will not capture all of these settlement revenues since the CSDs will retain customer relationships, which are 5% of group revenues. See Feature 'Europe's clearers cannot see the woods for the trees', *Financial News* (9 June 2008).

⁴⁷ See Final Report of the Committee of Wise Men on the Regulation of European Securities Markets (15 Feb. 2001) p. 16, (Brussels).

Regarding settlement, it is not clear whether the Euroclear model of horizontal consolidation in settlement systems has led so far to improved efficiency in cross-border trading in the form of lower settlement costs for both domestic and cross-border trades in comparison with the multiple market approach where exchanges in a particular market own the CCP in that market and their trades are settled in national central securities depositories.

3. Market failure and systemic risk in post-trading systems

This section examines the sources of market failure in the recent crisis and the role of clearing and settlement systems in reducing systemic risk. The market-oriented systemic crisis of recent years was a breakdown in the functioning of markets for traded assets and hence arose because of underperforming capital markets.⁴⁸ During the crisis, settlement problems were particularly visible in derivatives trading, where regulators have been very concerned about deficiencies in “back-office” procedures and about settlement delays.

The turmoil of the last two years has brought new concerns to the fore. Although the existing infrastructure for clearing and settling derivatives in the end did not fail during the recent crisis, there was at times a debilitating degree of uncertainty and regulators and other policy-makers clearly believe that management of risk, particularly systemic risk, must be improved.

One of the initial reasons for regulatory interest in centralised clearing is a hoped for improvement in pricing and price transparency. When confidence collapsed in Collateralised Debt Obligations (CDOs) and Credit Default Swaps (CDSs) this was in part because no-one knew what their value might be, apart from some discredited external credit rating or equally unreliable internal model valuations. It was this lack of any credible basis of valuation that led to the questioning of the value of bank balance sheets. No one knew what the value was of assets held on the balance sheet, and hence no-one knew whether the banks were solvent. The Turner Review (FSA, 2009) argued, “The complexity and opacity of the structured credit and derivatives system, built upon a misplaced reliance on sophisticated mathematics, which, once irrational exuberance disappeared, contributed to a collapse in confidence in credit ratings, huge uncertainty about appropriate prices, and a lack of trust that published accounting figures captured the reality of emerging problems”.

This view reflects a concern about the characteristics of financial instruments hindering the ability of regulators and investors properly to assess risk. In addition to their being custom-made, a typical problem with CDOs and the underlying of CDSs was their complexity.⁴⁹ Complexity meant that few understood the structure of particular assets, and could not value them. Liquidity vanished because it was therefore impossible to sell over-the-counter traded (OTC) assets, or to use them as collateral.⁵⁰

It is also argued that due to the bilateral nature of OTC derivatives, the risk of a counterparty defaulting before the contract expires is relatively high, particularly for credit derivatives that generally have long maturities, making it more likely that the purchaser of the contract, despite buying and assuming protection, will be left unprotected. In addition, the collateralisation provisions in CDS contracts are not standardised and do not take account of how credit enhancement on one transaction affects risk exposures on related transactions.⁵¹

⁴⁸ In recent decades, the structure of financial markets has changed, shifting from a bank-based to a market-based financial system (Hendricks, Kambhu and Mosser, 2006). Financial intermediation has moved from institutions onto markets, and financial crises are now manifest in markets and in those institutions dependent on the day-to-day functioning of markets. Accordingly, the analytical interest has moved from bank runs to “market gridlock” as a source of systemic risk (Alexander, Eatwell, Persaud and Reoch, 2007, pp. 2-4).

⁴⁹ Note that the problem was complexity *not* transparency. Securitised instruments typically come with many pages of elaborate documentation, describing the character of the asset in detail – but even those who attempt to read it all seldom understand it.

⁵⁰ The **Over the counter** market is outside an organised exchange in which transactions are conducted through a telephone or computer network connecting the market participants. See Glossary (App. E).

⁵¹ See Acharya and Richardson (2009, chpt.11).

The leveraging practices of institutions like Lehman have created further major concerns about the CDS market having grown to many times the size of that of its underlying credit instruments (G 20, 2009). The Bank for International Settlements estimated that at the end of June 2008 the notional value of CDSs outstanding in major financial markets was US\$57.3 trillion (BIS, 2008). It was only in late 2008 that data released on the DTCC⁵² website revealed that net transfer of risk in the CDS market was a fraction – typically about 10% - of the notional value of outstanding CDSs (DTCC, 2008). The data confirmed the need for the current focus on operational risk (trading volumes are very high) but removed some concerns about the sheer size of the credit derivatives market, if netting can be performed efficiently – a key issue in efficient clearing and settlement.

A yet further concern is that due to the nature of CDS contracts involving the referencing of other credit instruments and the need to post more collateral as default probability increases, a downturn is likely to cause a downwards spiral of pay outs and defaults, the type of which triggered the collapse of the US insurance conglomerate the American Insurance Group (AIG) which collapsed in October 2008 and was bailed out by the US government (see paragraph 3.1.2 below). Pro-cyclicality therefore is “hard-wired” into the financial system.

It is these difficulties that have led to the now generally accepted policy conclusion that as many assets as possible should be forced into clearing systems, facilitating netting, price discovery and liquidity, and encouraging the development of simpler “plain vanilla” assets.⁵³ This section will examine the market failures that occurred in the recent crisis and propose reforms for a single EU central counterparty that can achieve maximum netting across asset classes and standardised instruments. Alternatively, if impracticable on constitutional grounds, we will propose that the EU establish a consolidated network of EU multimarket CCPs that can reap similar advantages of scale and risk minimisation.

3.1.1 Clearing, derivatives and systemic risks

As noted above, the accepted view has been that market forces should be the main determinants of the structure of European clearing and settlement systems (including issues such as the extent of the linkages between post-trading bodies, ie. CCPs and CSDs), and the market would determine whether these private sector linkages can lead in due course to the creation of a single European central counterparty (Lamfalussy Committee, 2001, p. 16). Prior to the recent financial crisis, most of the regulatory discussion on clearing and settlement systems had focused on how to improve their competitiveness and enhance their interoperability among users, institutions and infrastructures. It was recognised that the fragmentation of clearing and settlement across EU states had led to significantly higher costs for cross-border securities trading, in comparison with the costs of trading within EU states and in the United States. Competition issues such as open and non-discriminatory access, exclusivity agreements and the technical soundness and linkages between central securities depositories had attracted most of the policy attention.⁵⁴

⁵² DTCC is the US Depository Trust and Clearing Corporation, the main US central securities depository that clears and settles securities trades in US markets. See Glossary (App. E).

⁵³ See FSA (2009, pp.81-2); ISDA (2009); and US Department of Treasury (2009).

⁵⁴ For instance, the “CESAME2” Group has continued the work of the “CESAME Group” (the Commission’s Clearing & Settlement Advisory and Monitoring Expert Group), whose mandate expired on 16 June 2008. CESAME2’s work carries on the work of the CESAME Group and focuses mainly on achieving a barrier-free Single European Market for clearing and settlement of securities transactions. Oxera (2007) published a study in 2006 on the development of a methodology to monitor the evolution of prices, costs and volumes of post-trading transactions for securities markets.

In recent years, however, the dramatic growth in derivative trading, especially in CDSs and synthetic CDOs, and the consequent technical problems in processing these trades and calculating their full exposure for counterparties, has attracted regulatory concern on systemic grounds. In particular it was feared that the huge growth in both on-exchange and off-exchange derivatives trading may be putting the financial system at serious risk. The failure of the US multinational financial conglomerate, the American International Group (AIG), and its subsequent nationalisation by the US government raised important questions about how clearing and settlement systems should be regulated, especially with respect to derivatives trading. Much of the CDS market was off-exchange, and policymakers have concluded that over-the-counter markets for CDS contracts and other derivatives should be subject to more transparency and disclosure with respect to how these instruments are cleared between counterparties and how they should be settled through defined institutional structures.

Centralised data management services for OTC derivatives are already provided by the Depository Trust and Clearing Corporation's (DTCC) Trade Information Warehouse in the US and by Euroclear in Europe. While their use had already been expanding prior to the onset of recent market turmoil, national governments including those of the UK (FSA 2009) and the US (US DoT 2009) as well as international bodies such as the G20 (2009), the Financial Stability Board (formerly the Financial Stability Forum, FSF, 2008, 2009) and the EU (see Federation of European Securities Exchanges, 2009) are now all proposing some form of central clearing for CDSs. Many of the proposals involve the establishment of regional centralised counterparties, while others go as far as requiring *all* CDS contracts to be cleared by a clearinghouse or an exchange. In October 2008, Commissioner McCreevy called for the moving of all standardised credit default swap contracts with underlying assets on EU reference entities or indices based on these entities onto central counterparties established and regulated in the EU.⁵⁵

3.1.2 The failure of Lehman Brothers and the bailout of AIG.

In 2004 the US Securities and Exchange Commission (SEC) relaxed a rule limiting the amount of leverage that Lehman and other investment banks could take. **Lehman Brothers** proceeded to take on substantial exposure to low-quality mortgages by way of asset back securities and credit derivatives. As a result of the fall in the markets for subprime mortgages and securitised mortgages, Lehman faced massive losses and was forced to raise \$6 billion through a share issue. After further losses the U.S. government decided not to bailout the bank, no buyer could be found, so on September 15th 2008, the company filed for bankruptcy in the US and soon afterwards was taken into liquidation proceedings in the UK.

Lehman's 10-Q filing with the SEC on 31 May 2008 reported the fair value of its derivatives contracts outstanding at \$729 billion. The company chose fair value over notional value as it claimed the latter can overstate expected payout. By contrast, Bear Stearns reported notional value of its derivatives at \$13 trillion (Nov, 2007), J.P. Morgan at \$89 trillion (March 2009), Bank of America and Citigroup both at \$37 trillion (March 2009). Notional values give a more accurate picture of operational difficulties and although they inflate overall risk perceptions they are the correct metric for counterparty risk. Assuming that every transaction has been correctly margined and collateralised then the net number should be a small fraction of the gross.

⁵⁵ Europa Press (2009) 'Major step towards financial stability: European market for credit default swaps becomes safer' IP/09/1215 (31 July 2009).

Lehman's over-the-counter, credit default swap book had a gross notional of \$72 billion and there was initially considerable uncertainty and complexity in identifying close-out positions and replacing defaulted trades, particularly due to widespread re-hypothecation⁵⁶ by Lehman of securities posted as collateral under CDS contracts. In spite of this, Lehman's net exposure to OTC CDS contracts is estimated to have been about \$5.2 billion. As of March 2009, of Lehman's 134,000 OTC derivative (IRS,⁵⁷ CDS etc.) contracts, 99% had been terminated or novated.⁵⁸ In addition to CDS contracts, where Lehman was a counterparty, there were a large number of CDS contracts referencing Lehman, estimated to be around \$400 billion.

By contrast with its traditional, relatively low risk business of life insurance and retirement services, from 1998 the American International Group (AIG) diversified into more risky investments, taking massive exposures across mortgage backed securities, CDS contracts and particularly CDOs on asset backed securities (ABSs), many based on bad asset classes such as subprime debt.⁵⁹ In spite of its huge exposures to these products, its financial models only provided estimates of the risk of *default* of the underlying obligations. It was in the second half of 2007 that AIG began to model the risk of the value of underlying obligations *falling* (as distinct from their default) and faced the need to post collateral to counterparties and make write-downs on its balance sheet. However, by this time it was too late, with major counterparties demanding billions of dollars of collateral as a result of worsening credit markets. Needless to say, AIG did not have access to the liquidity to finance these payments.⁶⁰

To exacerbate the problem, on 17 September 2008, AIG's long-term credit ratings were downgraded by Standard and Poor's from AAA to A and by Moody's from AAA to A2. AIG was suddenly obliged to post more than \$13 billion in collateral as a result of that downgrade. With Lehman having gone into insolvency two days before and credit markets freezing, the US Treasury decided it could not let AIG take the same route, and offered a bail-out in the form of an \$85 billion credit facility, later extended to \$153 billion, in return for a 79.9% stake in the group.

It is worth noting that the majority of AIG's actual losses occurred on collateralised debt obligations (CDOs) issued from asset-backed securities (ABS). While its CDS book had a notional value of \$270 billion its actual losses were only \$3 billion, whereas its CDOs of ABSs had a notional value of \$300 billion and suffered an actual loss of \$46 billion.

All market observers have consistently exhibited great surprise at AIG's involvement in the structured credit markets. However, as the extracts from a Fitch survey show in September 2006 it was well known that AIG's activity in this sector dwarfed its peers and many of the banks:

“Insurance companies and financial guarantors continued as large net sellers of protection at US\$645 bn (up 16% on 2004), reflecting the dominant footprint of AIG Financial Products Corp (“AIG”) in this market. Excluding AIG, however, global net exposure was relatively stable at US\$277 bn sold.

.....

⁵⁶ The [pledging](#) of [securities](#) in [customer margin accounts](#) as [collateral](#) for a [brokerage's bank loan](#).

⁵⁷ Interest rate swaps

⁵⁸ *Lehman Brothers International (Europe) In Administration*, Joint Administrators' progress report for the period 15 September 2008 to 14 March 2009, 14 April 2009.

⁵⁹ Acharya (2009, p.258); Davidson (2008); and van Duyn et al., (2008).

⁶⁰ See Mollenkamp (2008).

The global insurance/reinsurance sector (excluding financial guarantors) continued as a growing seller of protection, recording an aggregate gross sold position of US\$514 bn, up 30% from US\$397 bn in 2004 and US\$258 bn in 2003. By product, synthetic CDOs represented 71% of the total and cash CDOs made up an additional 20%. In terms of quality, of the total global gross sold position by insurers, 91% was in the super-AAA segment. However, as in the past, these results are distorted by AIG Financial Products' dominant "footprint" in this market and their focus on synthetic CDOs.

.....

Excluding AIG Financial Products, the global insurance/reinsurance global net sold exposures actually fell 71% to US\$15 bn (US\$29 bn gross sold), a continuation of a trend started in 2004 and discussed further below. By product, positions were more evenly distributed, with synthetic CDOs at 29%, cash CDOs at 24%, indices at 24% and single name CDS at 17%. Similarly, the credit profile of the rest of the global industry was more varied, with 'A' representing 33%, 'AA' at 16%, 'BBB' at 15%, equity/unrated at 14%, 'AAA' at 10% and super-'AAA' at only 5%.

.....

AIG Financial Products is a major provider of credit protection on designated portfolios of loans and debt securities. The magnitude of its business dwarfs that of traditional insurance companies. Therefore, the overall North American insurance and reinsurance survey results are dominated by this company."⁶¹

3.1.3 Central Clearing Counterparties

An exchange provides a platform for trading assets that are relatively simple, with well defined structures, such as government bonds, company shares, commodities, many foreign exchange contracts and so on. The minimum transaction size is small and there are few barriers to entry. Margin calculations are standardised and public and, crucially, all participants on the exchange transact with at least one central clearing counterparty (CCP).

As discussed in **2.1.2**, the CCP stands between the participants on each side of a transaction thereby replacing counterparty credit risk with the risk of the CCP. The CCP is normally protected by a guarantee structure provided by its members. The CCP is party to every transaction and so would stand between the Buyer and Seller in a Credit Default Swap (CDS) and the Payer and Receiver in an Interest Rate Swap (IRS). If one of the external parties fails then the other is protected because their counterparty is the CCP.

CCPs reduce complexity by significantly reducing both the probability of a counterparty failing and the correlation between a trading or investment portfolio and a derivative counterparty. To illustrate the point, a buyer of protection which hedged GM risk with Lehman was exposed both to Lehman default risk and to its correlation with GM. In theory a well capitalised CCP would exhibit far less of both of these risks. In addition, a CCP offers a framework that embraces mark-to-market, collateralisation and monitoring of all positions on a daily basis, multilateral netting, mutualisation of risk, and a default fund.

However, a stand alone CCP is different from an exchange. So long as the CCP has the resources to analyse a structure and hence is happy to stand in the middle of two end-user trades, then it does not really matter how complex a product is because for a second market transaction price and terms have already been agreed, and the CCP's exposure is for a short period of time. Of course, valuations become harder with complexity and hence so too do margin calculations. Should one end-user fail, the CCP is faced with a challenging hedging or unwinding task. But these complexities are known to the CCP at the time the trade is recommended and if they are uncomfortable with the structure they can refuse the transaction. The key point is that many such transactions are only known to the CCP and the two end-users.

⁶¹ See Fitch Ratings (2006)

This is clearly not the case with an exchange where all products are available to all members, and the need to simplify products is far more compelling. To enhance transparency and for purposes of monitoring risks, CCPs could be obliged to make this information available to regulators and, more aggregate information, with a modest timelag, available to the wider public.

3.2.1 Centralised clearing and systemic risk

The move to centralised clearing offers benefits such as transparency, liquidity and reduced counterparty risk. By concentrating risk in a CCP, however, systemic risk may not be reduced. Given the structure of most CCPs and exchanges, solvent members are penalised for non performance by insolvent members: the guarantee provided by members is neither permanent nor infinite. Furthermore, complex OTC derivatives remain bilateral and it is these derivatives that are believed to have contributed most to the financial crisis.

A Central Clearing Counterparty absorbs the credit and market risk fluctuations produced when OTC derivatives are traded. Rather than this risk being buried in multiple one-to-one relationships throughout the market, it is concentrated in fewer one-to-many relationships. This means that when one market participant fails, only one relationship is affected and the size of the problem is known quickly.

A CCP can result in there being far fewer outstanding transactions since back-to-back transactions can often be netted down to a one net long or short position. This also means that settlement risk is reduced if all the trades done on one day are netted real-time or at day end. Should some termination event occur (such as a credit event in a CDS) then the termination payments and related settlement will also be reduced. Whilst the close-out of Lehman's ISDA⁶² documented derivatives contracts was considered a successful process without the market disruption that many were expecting, there is no doubt that it would have been easier if many of the transactions could have been replaced by the CCP and transferred to other members of the CCP.

It is, however, questionable whether a CCP for just CDS trades will necessarily make a substantial contribution to the diminution of systemic risk. Much will depend on the institutional structure of the CCP.

These issues have been addressed recently in an paper by Duffie and Zhu (2009). They argue that:

“For plausible cases, adding a new CCP for one class of derivatives, such as credit default swaps (CDS) is only effective if the opportunity to get multilateral netting in that asset class dominates the resulting loss in bilateral netting opportunities across other asset classes, including OTC derivatives for equities, interest rates, commodities, and foreign exchange.

For instance, if Dealer A is exposed to Dealer B by \$100 million on CDS, while at the same time Dealer B is exposed to Dealer A by \$150 million on interest-rate swaps, then the introduction of central clearing dedicated to CDS increases the maximum loss between these two dealers, before collateral and after netting, from \$50 million to \$150 million. In addition to any collateral posted by Dealer A to the CCP for CDS, Dealer A would need to post a significant amount of additional collateral to Dealer B. Collateral is a scarce resource, especially in a credit crisis. The introduction of a CCP for CDS can nevertheless be effective when there are extensive opportunities for multi-lateral netting. For example, if Dealer A is exposed by \$100 million to Dealer B through a CDS, while Dealer B is exposed to Dealer C for \$100 million on the same CDS, and Dealer C is simultaneously exposed to Dealer A for the same amount on the same CDS, then a CCP eliminates this unnecessary circle of exposures.

⁶² ISDA is the International Swaps and Derivatives Association, a private industry association based in London.

Introducing a CCP for a particular set of derivatives is helpful if and only if the number of dealers is sufficiently large relative to the exposure on derivatives that continue to be bilaterally netted..... It is far from obvious that this condition is currently met for the central clearing of credit default swaps. Any benefits of a central clearing counterparty dedicated to credit derivatives has been significantly reduced through the recent aggressive use of compression trades, which has lowered exposures in the CDS market to roughly half of their mid-2008 levels. Proposals by European regulators to have more than one CCP for credit default swaps, including one dedicated to European dealers, could further reduce the netting opportunities of a CCP.

Some important aspects of systemic risk are not captured by the criterion that we use for judging the exposure reduction offered by a CCP. In particular, we do not consider the extent to which CCPs can mitigate the likelihood and severity of knock-on defaults that propagate through the market at the failure of a large counterparty. This would depend in part on the collateral and guarantees that dealers offer to a CCP. Nevertheless, our results make it clear that regulators and dealers should carefully consider the tradeoffs involved in carving out a particular class of derivatives for clearing. This makes sense only if the class of derivatives to be cleared is big enough and if the subset of dealers clearing through the same central clearing counterparty is large enough. So far, proposals for CDS clearing have not made this case effectively. Proposals for a number of distinct new CCPs dedicated to credit default swaps raise a particular concern.”

The core of the Duffie and Zhu argument derives from the need to diversify across heterogeneous products and markets, as well as the need to spread risk across a large number of CCP members. A CCP dedicated to a single instrument (ie., CDSs) may concentrate, rather than disperse, risk, imposing potentially ruinous costs on the central counterparty. Moreover, whilst the central counterparty may have a wider perception of risk than the individual firm or trader, the systemic risk created by the chains of relationships within a disintermediated market may nonetheless fail to prevent the accumulation of systemic risk - excessive leverage will remain a key issue. Moreover, because a CCP can only deal in relatively standard transactions, it would not have captured any of the AIG trades.

Two further difficulties arise.

First, just because something trades on an exchange and/or with a CCP, does not mean that the price at which it trades is “correct” or that there is any trading depth behind the price. One only has to look at recent movements in the stock price for Citibank or GM to see massive swings: +100% and -50% within a day or two *with no trading volume*. It is not clear that moving CDSs or Collateralised Debt Obligations (CDOs) onto an exchange would have significantly reduced the confusion about valuation: one day a AAA-rated CDO tranche would have “traded” at 100, the next at 95, then 90 then 50. If at that point all AAA-rated tranches had been re-valued at 50% the financial hit would have been catastrophic. It should be remembered that during the Latin American crisis of the mid 1980s, if all debt had been marked-to-market, most of America's banks would have been insolvent. An element of confusion and the Federal Reserve turning a blind eye allowed losses to be amortised over a number of quarters. Given the sheer size of the CDO market, history may reveal that the confusion over valuations actually saved the day! Given the policy commitment to price discovery, the danger of mark-to-market resulting in excessive and potentially destructive price movements must be taken into account in the regulatory design.

Second, the consolidation of CCPs, and even the possibility of a single European CCP, will concentrate a massive potential loss should the central counterparty be unable to meet its obligations. In these circumstances it will be necessary for a Lender-of-Last-Resort (central bank) to take over the CCP's trades and provide a guarantee to avoid catastrophic market failure. The implicit role of the LoLR will create the familiar problem of moral hazard in institutions "too big to fail", demanding close regulatory oversight of the CCP's risk modelling, including the CCP's exposure to macroeconomic risk. There is a case therefore for more intensive prudential supervision of CCPs, than is presently the case, with high capital adequacy requirements, consisting of tier one capital that is primarily equity shares in the CCP or any other instruments with the equivalent capacity to absorb losses.⁶³ The objective of regulatory capital in this case would be to keep the probability of insolvency at acceptable levels; and for supervisors to encourage CCPs and their participants/members to limit the probability of insolvency and in the event of insolvency contain the disruption, such as by netting exposures and cash flows.

Nevertheless, a compelling case can be made for establishing a single EU CCP that could diversify its exposure across heterogeneous products and markets, and net its participants' and members' exposures across multiple asset classes and in standardised financial instruments. This single EU CCP could perform a public good function by minimising the net risk exposures in its domain which might not necessarily be covered by market participants in the present CCP sector. As a practical policy matter, the single CCP approach could follow one of two models.

The first model would be a single European CCP that operates within a system of multiple settlement facilities throughout the EU. It would be structured along an hour glass model for trading and post-trading activities. The CCP would be sandwiched between many competing trading and settlement platforms and would handle all national and cross-border transactions for all types of securities. Although there would not be an initial requirement that CSDs consolidate horizontally, a EU CCP would trigger consolidation among and with settlement systems and so create a pan European utility similar to the US Depository Trust & Clearing Corporation in due course.

The second model would consist of a network of European CCPs tightly bound together through best practices of interoperability with a presiding CCP managing the network. This could take the form of a 'hub and spoke' model with authorised European CCPs extending existing interoperability links throughout a EU CCP system that would be presided over by the 'hub' CCP. Over time, the CCP structure could potentially consolidate further into a single CCP institution or it could maintain its network structure and increase its capacity for netting across the system.

The establishment of a European CCP (or EU CCP system) would allow for more efficient netting of transactions across a range of instruments as diverse as bonds, derivatives, and equities. This would lead to economies of scale in back office activities such as collateral management and information technology. Although a European CCP (or EU clearing house) is ambitious and would be expensive, it would ultimately reduce users' risks, costs, and capital requirements. Moreover, netting through a single European CCP without consolidation of existing CSDs would lead to estimated lower settlement costs of approximately 97% for EU CSDs.

⁶³ Under the Capital Requirements Directive, there are no mandatory minimum capital requirements for CCPs/clearing houses. This loophole in the CRD should be addressed by the Commission and Parliament.

3.2.2 Proposals for Credit Default Swaps (CDS) contracts

It is overly simplistic to point blame for market turmoil at an individual financial product. To the extent credit derivatives and particularly CDSs were implicated in the current crisis, it was largely to the extent that they wrapped underlying exposures that were simply not sustainable. Indeed, a broad assessment of the crisis suggests that:

“The causes...derive from a cocktail of classic market failures: poor lending practices derived from moral hazard; asymmetry of information and the mispricing of risk; inadequately capitalised financial institutions funding long-term commitments out of short-term finance; lack of transparency to the market by banks, in particular, as to their exposure to toxic ABS; and driving it all, the pursuit of short-term profits”.⁶⁴

Centralised clearing may improve transparency and may be appropriate for certain standardised CDS contracts that are traded in high volumes. However, it would not be appropriate for those types of transactions where parties are seeking to hedge risks in ways that are tailored to their specific needs.

It is highly unlikely that a CCP or exchange would have the resources to transact products such as collateralised debt obligations (CDOs) issued from multiple CDOs (so-called CDO Squared) and in fact most synthetic CDOs would create problems. To transact a CDS of CDOs would also be considered too complex. By contrast, single-name CDS contracts are increasingly standard and would not present any operational or valuation problems (other than the margining challenge discussed elsewhere in this report). It is likely therefore that the plain-vanilla standard derivatives will migrate to centralised bodies but the rest will not and it is these non-standard products that created all the confusion in 2007/08.

How then do we deal with complex products? One of the solutions available to the CCP is to fully margin anything complex. This fixes the tricky quantitative challenge of valuation and margining but would likely remove the financial viability of the transaction. The net result is that either certain types of complex trades never get off the ground (arguably a good thing in the case of CDO squared) or they migrate to somewhere else such as the insurance market. Even today a large number of credit derivatives exist as insurance contracts because of market constraints (accounting treatment, regulatory capital, authorisation to use derivatives).

Reform proposals have clearly been driven by market turmoil. To the extent that some types of credit default swaps were implicated in the financial crisis and the collapse of the likes of Lehman and AIG, it is important to distinguish them from other credit derivatives and OTC derivatives in general. Interest rate, foreign exchange and equity derivatives were not involved, yet are often caught up in proposals for centralised clearing. Amongst credit derivatives, CDOs on ABSs, particularly those backed by sub-prime mortgage, caused huge liabilities when the market for their underlying obligations collapsed.⁶⁵ However, exposures under single-name CDS contracts fared well, as indicated by the successful close-out and settlement of the CDS transactions on Lehman's books.

⁶⁴ See B. McDonnell (2009). “Financial regulation after the storm: heavy hand after light touch” *Journal of International Banking and Financial Law*. p.519.

⁶⁵ See generally L. Jones (2009), ‘Current Issues Affecting the OTC Derivatives Market and its Importance to London’.

3.2.3 A dedicated European Central Counterparty for Credit Default Swaps (CDSs) alone

Through the nature of their activity, gross positions at banks and dealers are large and far exceed net positions, when netted by counter-party or by instrument. This picture is dramatically different for end-investors: dealers trade; investors position. In a systemic crisis, when there is great uncertainty about the survivability of counter-parties, market participants worry about gross exposures and dealers and banks become a great source of systemic risk.

The potential benefit for netting exposures of banks and dealers multilaterally across counter-parties and instruments is large and far exceeds the potential benefit for netting exposures bilaterally. There are therefore both macro and micro benefits to be gained by developing a small number of central counter-parties that net across a wide range of instruments. It is inevitable that margin requirements will be pro-cyclical (in an environment of market stress, higher margin requirements will be on those holding distressed assets, forcing them to sell these and other assets, spreading the distress). However, this is minimised by the greater the amount of netting and the more dealers and banks are subject to counter-cyclical capital requirements.

It is possible that in the process of moving credit default swaps and other standardised derivative contracts to be cleared on CCPs systemic risk may be increased. CCPs separated by national boundaries are much less efficient than one pan-European CCP, but they may well be more efficient than a pan-European CCP in just one instrument, such as CDS. As argued above, CCPs for one instrument reduce netting possibilities across other instruments and is only sensible if that instrument dominates all others. The maximum netting opportunities would be through a single global CCP across the widest number of instruments. In this regard there is a first mover advantage for Europe if it wanted to establish and host the global CCP – not a riskless proposition. First, it would have to establish a pan-European CCP. This could be done by requiring parts of the industry, first, to unbundle itself from vertical silos and, second, to consolidate within a short period of time or, alternatively, to develop interoperability links in such a way as to net across existing European CCPs. The latter option may be more preferable from a public policy perspective given the progress that has been made so far in interoperability in the EU CCP sector for cash instruments.⁶⁶

Reducing the systemic risk associated with the “grossing” of bank positions in a crisis is the key problem to solve, especially given the banks’ systemically important role. However, commentators often lump this problem together with matters relating to issuers and investors. The netting benefits to issuers and, to an extent, investors are small. The differences between gross and net positions are not so large. Having these transactions centrally cleared will bring less private benefit. However, there may be a tendency for these transactions to be structured so that the investor may sell-on his exposure to another investor and have that transaction centrally cleared and settled. The inter-dealer market may set the standard that others will follow in order to ensure the liquidity of instruments. The key concern for issuers and investors is settlement of the pay-out of derivative contracts, a subject to which we turn to below (section 3.3).

⁶⁶ See Appendix D.

In summary, a CCP clearly helps in the situation where executing a trade involves assuming bilateral credit risk. One will likely do fewer trades with a counterparty whose creditworthiness has deteriorated significantly, especially with longer-dated instruments. Liquidity can thus disappear as the perception of high credit risk spreads throughout the market. As this usually does not concern how to price the underlying financial instrument, it is more about finding creditworthy counterparties with whom to do business. CCPs can serve a useful role by mitigating the effect of bilateral credit risk deterioration, especially during a liquidity crisis.

It is important to recognise, however, the situations where CCPs will be of little help. During the credit crisis, the market did not know how to value the financial instrument itself, such as the CDOs and CDSs based on sub-prime debt. It was not only the complexity of the instruments, but also the assumptions built into the valuation methodologies which had used statistical models to predict the probability of certain types of homeowner default. Investors suddenly perceived that these models had become invalid. As a result, there was no known sound basis to value these instruments. A CCP would have had equal difficulty in valuing the underlying instruments and therefore would not have been able to manage effectively its various counterparty exposures based on this type of market gridlock. And, under some circumstances, as discussed above, it could have made matters worse. This is where central bank support and prudential oversight will become crucial.

3.2.4 Over the Counter Clearing (OTC) and Central Clearing Counter Parties (CCPs)

There is a widespread view today that the OTC derivative markets only exist so that banks can charge more for instruments that could be made more standard and safer if traded on an exchange and centrally cleared where they would be more visible and subject to oversight. However tempting this notion may be, it is largely false. The OTC market is not traded between banks and innocents where there are opportunities for profitable information asymmetries, but largely between banks or investors and corporations that are as large and sophisticated as banks and in some cases more so.⁶⁷

The nature of an OTC market is that the instruments traded are non-standard in some way, perhaps merely in terms of maturity. In general if they were standard they would be on an exchange. Idiosyncratic or "broken" dates can be an important factor in determining liquidity and whether an instrument will be on an exchange.⁶⁸ CCPs are likely to accept instruments that look like those traded on exchanges, but for some simple difference such as "broken" dates. Where the idiosyncrasies are greater and harder to value, a CCP may not wish to accept an OTC contract. CCPs are not institutions with deep capital. Requiring an instrument to be acceptable to a CCP may destroy useful instruments, markets, diversity and hedging possibilities. It would be odd were missing markets to be the solution to systemic problems.

The question is what is the appropriate treatment for OTC instruments that are not accepted by a CCP? The private netting benefits of a single CCP would create strong incentives for dealers and banks to focus on instruments that would be accepted. So instruments that are not acceptable would be non-standard instruments, traded between issuers and investors where the private netting benefits are small. Equally, the systemic implications are also more modest, given that these are idiosyncratic risks and investors absorb the losses. Perhaps the solution is three fold.

⁶⁷ This is not to say that large financial institutions do not make mistakes.

⁶⁸ It is interesting to note that around 90% of the trading of US Treasuries - an asset with the highest credit quality and liquidity - occurs in a small number of benchmark stocks and in the liquidity of off-the-run US Treasuries, (non-benchmark) is sufficiently worse as for the off-the-run stocks to carry a yield pick up.

First, a minimal solution such as central registration and disclosure of all instruments not centrally cleared. Second, a requirement for those holding credit risks to hold capital against risks they cannot naturally absorb/net, irrespective of whether they are called a bank, dealer or investor. And, third, a requirement for centralised settlement arrangements.

The essential point is that the private and social benefits of a CCP are maximized with a single CCP, clearing multilaterally across instruments and counter-parties. These benefits will be large for dealers and banks and we can suppose that these institutions will focus on instruments that can be centrally cleared and structure new instruments that can be centrally cleared. But there will always be less-standard instruments traded between market participants who are less systemic. The attractions and benefits of a central CCP are such that the risk-return trade-off probably does not favour the banning of those instruments that are non-centrally cleared instruments if systemic risks are internalised through capital requirements and there are other risk-mitigation measures such as centralised product registration and settlement systems.

When a derivative transaction is executed, it is normal for both parties to provide some collateral for the transaction. Unlike a bond or share purchase where settlement can only take place when the full notional amount has been paid, derivatives do not normally involve an initial payment of the notional amount of the transaction. The initial payment (“initial margin”) is calculated to reflect likely average exposure during the life of the transaction; it is accompanied by a periodic payment (“variation margin”) which reflect actual changes in the value of the derivative. For many institutions (notably Hedge Funds) the variation margin is calculated and paid daily. This means that at any point in time, the other party has collateral equal to the value of the derivative at that time plus a cushion – the initial margin. Hence, if the party failed to honour a payment the transaction could be terminated and the termination payment would be more than covered by posted collateral.

This approach tends to work very well for interest rate derivatives where rates rarely move significantly and unexpectedly and where the underlying market is very liquid even during times of great economic stress. The chart below shows the collateral posted against a 10-year interest rate swap expressed as a percentage of the notional amount of the swap. Clearly if floating rates (Libor)⁶⁹ started to rise significantly then one party would owe more and more under the swap. But this tends to happen gradually and the moves are rarely so big as to require a daily change in collateral that exceeds the initial margin (and therefore introduces the risk that the total collateral is not sufficient to cover a sudden termination). Even under the most extreme scenario, the termination payment is unlikely to be even close to the notional amount of the transaction.

The same cannot be said for Credit Default Swaps. The contract requires the Seller to make a payment if there is a Credit Event (e.g. bankruptcy) by some referenced borrower (the “Reference Entity”). The payment is a function of the Reference Entity’s recovery rate which can be zero resulting in a payment equal to the notional amount of the derivative. In theory, the moment before a Credit Event the total collateral should be equal to the notional amount minus the expected recovery rate; since recovery rates are unknown (and throughout the recent crisis have been close to 10% rather than the pre-crisis assumed normal of 40%) then the collateral should probably be at 100% of the notional just before a Credit Event.

⁶⁹ Libor is: The London Interbank Offered Rate. It is a benchmark three-month interest rate calculated daily by the British Banker’s Association that reflects approximately the lending practices of British banks.

3.3 Lessons of the Continuous Link Settlement Bank ('CLS Bank') for CCPs

The example of the CLS bank could have useful applications for reducing systemic risk in centralised clearing systems. In considering this, however, it is important to recognise that the clearing and settlement of the purchase or sale of a credit derivative is a separate issue from the "pay-out" of a credit derivative. Suppose there is a credit instrument that pays out \$100m if General Motors defaults. Lehman's originates this instrument and sells it to Barclays. In return for the consideration paid by Barclays, Lehman has a future liability. Lehman needs to set aside regulatory capital against this liability. But the sale of the security by Lehman's to Barclays can be cleared and settled fairly easily – pricing and terms have been agreed and the risk is for the period of settlement of this transfer of the security. In this part of the transaction, the sale of a security, the clearing house (or CCP) would be largely taking credit counter-party risk – not GM risk.⁷⁰

Lehman's may also through subsequent trades buy protection against the default of GM from J. P. Morgan for \$90m. And Lehman's sells \$10m of GM protection to J. P. Morgan. The process of clearing and settling the security transaction will support records of who owns what.

Let us say that when GM defaults, Lehman's owes Barclays \$100m and J.P. Morgan \$10m and J.P. Morgan owes Lehman's \$90m. J.P. Morgan is concerned that Lehman's may also be forced to default and that J.P. Morgan may not get its \$10m, and so it delays payment of the \$90m to Lehman's until it receives its \$10m. This makes it much harder for Lehman's to pay Barclays its \$100m. Uncertainty, about a \$10m payout leads to a widening illiquidity and potential insolvency across the financial system.

The point is that with derivative instruments there is a big problem of credit counter-party risk, not when securities are changing hands in the secondary market, but when it comes to the pay-out following a credit event. This problem is large in the wholesale markets and between banks where gross positions are many times net positions.

The solution should focus on keeping exposures at the net level and not the gross level. Could the existing CCPs play this role? It may look like a similar role, but the risks are very different. A clearing house in a secondary market for equities is essentially taking very modest counter-party credit risk, limited by time and agreement on price and terms. However, standing in the middle of pay-outs of credit derivatives, as discussed above, entails substantial market risk. These relatively low capitalized bodies do not have the expertise or capital to do this. If they tried to do so, they would likely be extremely pro-cyclical as a result of their modest capital base. Early signs of trouble will be met by rising margin requirements which would likely create difficulties for some.

What is needed in Europe is an equivalent for credit derivatives to the CLS Bank for foreign exchange. A single institution that instantly settles net exposures between its members once it determines that a credit event has occurred, independent of trading or clearing venue. The ECB should be a member so that in the event of a default the central bank provides temporary liquidity where it is needed and the system is merely exposed to net exposure to the defaulting institution. Individual instruments that can be accepted by this type of institution would carry lower risks and margin requirements which will help to internalize the social externalities of complex instruments for which there is little information and that are prone to settlement problems.

⁷⁰ There is some knock on effect on credit counter-party risk of a GM default and the picture is complicated by novation..

The foreign exchange and credit markets are different than equities. Daily turnover is far larger and the default of one institution will lead to substantial problems in the payments system. It makes sense that these two markets have a single CLS bank. Equity markets manage without creating a single, mutual, body like CLS bank. However, the opportunity for consolidation should be there - a process limited by the presence of vertical silos. These should no longer be permitted.

We would therefore propose the following with respect to the institutional structure of clearing and settlement in Europe:

Horizontal consolidation of clearing houses and central clearing parties with the eventual emergence of a single EU CCP that would be subject to prudential regulation by the ECB and subject to capital adequacy regulation and other prudential controls.

The establishment of a single debt securities near-time settlement system – a mutual financial institution of which the ECB is a member and would perform a netting function and other risk mitigation techniques similar to the CLS Bank.

It should be emphasised, however, that a regulatory mandate to establish a single CCP or CCP network system should not be viewed as a systemic panacea. There will always be the problem of the assumption of risk by the CCP, and the role of the central bank in sustaining the CCP at times of severe stress.

4. Legal Uncertainty and Settlement Risk

This section addresses legal uncertainty and settlement risk and has wider implications regarding the role of public and private law principles and rules in reducing the social costs (or ‘negative externalities’) of financial risk-taking. It recognises the importance of reducing the Giovannini legal barriers to cross-border transactions in securities and derivatives as promoting more efficient capital markets on the grounds of lower transaction costs. It suggests, however, that a traditional objective of private commercial law - enabling parties to contract around their obstacles, thereby reducing transaction costs for themselves - does not adequately take into account the social costs (or ‘negative externalities’) created by the risk-taking activities of market participants who are party to these contracts. Moreover, liberalised capital markets have exacerbated the social impact of these private market transactions by allowing systemic risk to spread like a contagious virus to other financial systems. It is therefore necessary that private law frameworks governing financial contracts and the acquisition and disposition of property interests in financial assets be reviewed and assessed for the potential system-wide risks they may create for financial markets and the broader economy. In this section, we examine how conflict of law rules can be regulated or harmonised across jurisdictions in an effort to reduce systemic risk in the financial system.

Traditionally, most investors in securities had a direct ownership interest in the issuers of those securities, regardless of whether or not those ownership interests were recorded on the issuer’s register or in the investor’s physical possession as bearer securities. Securities were usually held in non-fungible custody accounts with an intermediary who had direct access to the physical certificates evidencing ownership of the security.⁷¹ There was no comingling of interests in securities held in non-fungible accounts, and therefore it was possible to preserve the direct property right held by investors in securities traded in these direct holding systems. Advances in technology and the computerisation of book-keeping and registering ownership and collateral interests in securities have dramatically transformed securities trading and lending. As a result, most publicly-traded securities are today held in dematerialised form in which the security is evidenced by computerised or electronic entries in a system maintained by the issuer or by a record holder acting for the issuer. These indirect holding systems often involve multiple tiers of intermediaries between issuer and investor, thus precluding physical possession and delivery of securities in certificated form.⁷² Other important features are that interests in securities are reflected on the books of various intermediaries and depositories, transfers are effected by electronic book entry, and the need to transfer the instruments in which participating interests are held rarely arises.

These complex structures of intermediaries that record and maintain ownership interests in securities across multiple jurisdictions raise important legal issues regarding legal certainty in securities settlement transactions which implicate systemic risk and financial stability. Legal issues that affect systemic risk and financial stability have been on the EU policy agenda since the 1990s.⁷³ In particular, many experts agree that the legal uncertainty surrounding the law applicable to the disposition of interest in securities held in indirect holding systems played a substantial role in causing the liquidity crisis that caused the 1987 US stock market collapse (Oditah, 1996).

⁷¹ See RD Guynn and G Marchand, (1999) “Transfer of Pledge of Securities held Through Depositories”, p. 49.

⁷² The great majority of these securities are held in omnibus customer accounts in which no information about the individual is recorded in the financial intermediaries and securities depositories that occupy the upper tier of these indirect holding systems. See generally Bernasconi (2006).

⁷³ Businesses face many different legal regimes for the provision of collateral, with the potential for complicated conflicts between jurisdictions and uncertainties surrounding the law applicable to cross-border transfers of securities.

The significant increase in the volume of cross-border securities transactions in recent years and the trend towards dematerialisation and the use of indirect holding systems for immobilised securities certificates has necessitated the development of legal rules to keep pace with changes in the marketplace.⁷⁴ In pursuit of this aim, various expert groups have proposed the creation of a uniform conflict of laws rule that would apply the law of the place where the intermediary is located for determining the law applicable to taking and disposing of collateral interests in securities.⁷⁵ The European Community has adopted this approach for the regulation of payment and settlement finality for systemically relevant financial institutions and also adopted the approach for the taking and disposition of collateral interests in securities for a wide variety of financial transactions under the amended Financial Collateral Directive.⁷⁶ Before discussing this EU legislation and its application to cross-border securities transactions, it is necessary to identify some of the main issues and to clarify the legal concepts and principles that apply to cross-border securities transactions.

4.1 Legal certainty and collateral interests in securities

The usual approach for determining the law applicable to collateral interests in securities held in traditional direct holding systems was the *lex rei sitae* or *lex situs*, which was the law of the place where the security was located at the time of the relevant transfer or disposition (Dicey and Morris, 1993, Rule 120). This rule was based on the practical necessity that the *lex situs* of a security should be that jurisdiction where an interest in a security could be enforced.⁷⁷

Although this rule posed few complications in the case of bearer securities, the attribution of a *situs* to registered securities involves a greater degree of complexity that is based variously on a variety of legal approaches. For example, some jurisdictions regard the *situs* of securities to be the law of the place where the issuer is incorporated. Other jurisdictions regard registered securities as located at the place where the register of registered owners of the securities is maintained, while others use a combination of both approaches.⁷⁸ Although many jurisdictions have experienced satisfactory results in attributing a *situs* to registered securities held in *non-fungible* custody accounts in *direct holding systems*, the transformation of financial markets, and in particular the computerization of clearance and settlement systems, have radically altered the way in which ownership interests are recorded and maintained by intermediaries and central security depositories.

⁷⁴ Some of the international bodies that propose legal approaches to deal with the issues of legal uncertainty in cross-border electronic securities markets include the International Organization of Securities Commissions (IOSCO), the Committee on Payments and Settlement Systems, and the Hague Committee on Private International Law.

⁷⁵ See the Hague Conference Report on the “The Law Applicable to Dispositions of Securities Held Through Indirect Holding Systems”. (‘The Hague Report’). The Hague Report recommends either a uniform national conflicts of law rule for the taking of collateral interests in securities or a multilateral convention that would define an international property interest that collateral takers could obtain in securities held in indirect holding systems. The Hague Report proposal was viewed by its advocates as an important step in providing more legal certainty in determining which national law applies to the disposition of interests in securities held in indirect holding systems. This Report was prepared by Christophe Bernasconi, First Secretary of the Permanent Bureau of the Hague Conference on Private International Law. The Bernasconi Report was a response to a call by the Secretary General of the Hague Conference to assemble a group of experts to examine the need for a uniform rule of the conflict of laws to determine which jurisdictions law will govern the proprietary elements of collateral interests in securities.

⁷⁶ R. Weber and S. Grunewald (2009) *Butterworths International Journal of Banking and Financial Law*

⁷⁷ If dealing with *bearer* securities, the applicable law would be that of the jurisdiction where the collateral taker takes possession of the securities certificate at the time of the transfer.

⁷⁸ This approach provides that a party’s name on the register, rather than possession of a certificate, conveys legal rights to the securities. See Report, p. 27, n. 107.

In contrast, where securities are held through one or more intermediaries or depositories, many jurisdictions apply the so-called 'look-through' approach to locate the *situs* of indirectly-held securities by looking through the tiers of intermediaries and depositories to find one or more of the following: the jurisdiction of the issuer, the register, or the place of the registrar or of registered securities. Applying the 'look-through' approaches to ascertain the *situs* of securities in indirect holding systems produces significant conceptual and practical difficulties.⁷⁹ The major difficulty is the practical one of attempting to apply one of the above traditional approaches to determine the *situs* of securities by looking-through the tiers of intermediaries to the jurisdiction or level of the issuer, the register and/or the actual location of certificates.

4.2 Legal uncertainty and the *situs* of securities

When dealing with *registered securities*, many jurisdictions continue to apply the look-through approaches to ascertain the *situs* of securities held in indirect holding systems. Depending on the jurisdiction, this requires an examination of the various factors, including the law of the issuer's jurisdiction or the law of the jurisdiction where the securities records of the issuer (the 'register') or its official recordholder (the 'registrar') are located at the time of transfer. This task becomes especially difficult when one must examine the electronic records and entries of multiple intermediaries and depositories located in different jurisdictions in order to ascertain where an investor's securities account is maintained and recorded. This legal uncertainty regarding the applicable law for the disposition of interests in securities held in indirect holding systems increases systemic risk in financial markets. It is therefore necessary to establish another connecting legal factor that provides certainty and stability regarding the applicable substantive law for ascertaining and enforcing collateral interests in securities held in indirect holding systems.

A consensus view has emerged amongst a number of legal experts that the proprietary effects of a disposition of securities held in a fungible custody account should be determined by the law of the place where the account is maintained, and *not* the law of any other jurisdiction that might have applied had the underlying securities been held directly by the collateral provider.⁸⁰ This view rejects traditional conflict of laws approaches, such as the *lex rei sitae* or *lex sitae*, or the law of the place of the issuer or registrar, as artificial. Rather, a new approach is necessary that embodies a conflict of laws rule that applies the law of the place of the intermediary with whom the investor directly holds an account. This is known as the place of the relevant intermediary approach (PRIMA), the essential elements of which appear in the European Union's Settlement Finality Directive and the Collateral Directive.

⁷⁹ The different approaches for determining the *situs* of securities by looking through multiple tiers of intermediaries to determine the law of the issuer, the register or the registrar, and/or the location of registered securities or the place of bearer securities can pose difficult conceptual and practical problems.

⁸⁰ See Goode (1998).

4.3.1 The EU Settlement Finality and Financial Collateral Directives⁸¹

EU policymakers have followed a policy that relies mainly on using conflict of law rules to reduce the legal uncertainty regarding which countries law applies to proprietary interests in securities that are traded on a cross-border basis. The European Union adopted the *Directive on Settlement Finality* in 1998 (Settlement Finality Directive) that provided a legal framework for regulating payment and securities settlement systems. The Directive applies to the taking of cross-border collateral in financial transactions within the EU where such transactions involve a designated securities settlement or payment system or an EU central bank. The Settlement Finality Directive provides limited protection against the effects of EU member state bankruptcy laws by insulating collateral given to the system operators, certain system participants, and EU central banks.

Article 9, paragraph 2 of the Directive is important because it permits netting in settlement systems and clarifies the applicable law to dispositions of collateral interests in book-entry securities.⁸² The Report notes that the original purpose of Article 9, paragraph 2, was to benefit only EU central banks, the European Central Bank, and certain participants (ie. central securities depositories) in designated payment and settlement systems who act as collateral takers. But a number of member states have extended these protections further to include financial market participants, as defined in a more general sense. For example, the United Kingdom has adopted regulations to implement the EU Settlement Finality Directive entitled the *Financial Markets and Insolvency ('Settlement Finality') Regulations 1999*⁸³. The 1999 Settlement Finality Regulations were amended in April 2001 by the *Financial Markets and Insolvency ('Settlement Finality Amendment')*. The UK Settlement Finality Regulations applies the protections of the Settlement Finality Directive to a broader range of financial intermediaries and defines broadly the type of securities covered by the Directive. UK implementation of article 9(2) of the Finality Directive has clarified some of the issues related to the legal location of interests in securities in electronic clearing systems.

In 2002, the EU Parliament and Council adopted the Financial Collateral Directive that builds upon the Settlement Finality Directive. The Directive is intended to limit credit risk in financial transactions by creating a more uniform EU legal framework to govern the disposition of securities and cash as collateral under both pledge and title transfer structures. The Directive enhanced the legal certainty regarding the law applicable to intermediated book-entry securities used as collateral in a cross-border context. It did so by expanding the scope of coverage of the Settlement Finality Directive to “any book-entry securities collateral [or cash collateral]” and the law for enforcing rights to such collateral “shall be governed by the law of the country or, where appropriate, the law of the part of the country in which the relevant account is maintained, whether or not that country is a Member State.”⁸⁴

⁸¹ The Settlement Financial Directive and Financial Collateral Arrangements Directive are being amended. This section does not analyse these amendments. For a detailed discussion of the Directives and recent amendments to the Financial Collateral Directive, see R. Weber, and S. Grunewald (2009) ‘The European Settlement Finality Directive and the Financial Collateral Directive – Ignored But Crucial Regulations in the Current Financial Turmoil’, *Butterworths International Journal of Banking and Financial Law*.

⁸² The Report cites Article 9, paragraph 2 as follows:

Where securities (including rights in securities) are provided as collateral security to participants and/or central banks of the Member States or the future European central bank as described in paragraph 1, and their right (or that of any nominee, agent or third party acting on their behalf) with respect to securities is legally recorded on a register, account or centralised deposit system located in a Member State, the determination of the rights of such entities as holders of collateral security in relation to those securities shall be governed by the law of that Member State.’

⁸³ S.I. 1999 No. 2979, as amended with effect from 5 April 2001, by S.I. 2001 No. 997.

⁸⁴ See proposed Collateral Directive, art. 11, para. 2.

The Directive adopted the law of the place of the relevant intermediary account to determine all rights and interests in collateral interests in securities held in intermediated book-entry systems.⁸⁵

In addition, the Directive contains two specific measures intended to increase liquidity in the collateral market: (1) a clear statutory regime regarding agreements permitting the collateral taker to re-use the collateral for their own purposes under pledge structures; and (2) it would allow 'collateral substitution', whereby the collateral provider can withdraw particular securities and replace them with other securities of equivalent value if the collateral agreement so provides. The Directive was intended to lead to more efficient price determination by creating more legal certainty in the pricing of securities loans with the resultant reduction in market volatility, which has allowed companies to buy and sell, and to loan and borrow, securities more easily and at a fairer price.

The Financial Collateral Directive has provided legal certainty and predictability to a narrow, but essential, area of securities transactions and served as the basis for further proposals to adopt a uniform choice of law rule for the disposition of collateral interests in securities at the international level.⁸⁶ Also, the search for the location of a pledged interest in securities requires the entitlement holder to look only to that intermediary where the account is maintained for performance of the obligations.

4.3.2 The Place of the Relevant Intermediary Approach (PRIMA)

The need for more legal certainty in defining which legal system's rules govern proprietary interests in securities is manifest.⁸⁷ Structural changes in financial markets have necessitated the move away from holding physical securities certificates in direct holding systems to the more flexible system of holding securities through multi-tiered structures of financial intermediaries. As a result, several proposals were made to adopt a uniform conflict of laws rule that provides that all proprietary aspects of a disposition in securities should be governed by the law of the place where the immediate intermediary (with whom the investor directly holds its account) is located.⁸⁸ This conflict of laws approach is known as PRIMA – the place of the primary relevant intermediary account. The EU has adopted PRIMA in the Settlement Finality Directive and the Collateral Directive as a conflict of law rule to add legal certainty to determining which country's law applies to the disposition of property interests in securities. This has been considered an important EU policy objective to improve the efficiency of European settlement systems.

⁸⁵ At the time Directive was adopted, the European Commissioner for the internal market, Fritz Bolkestein, endorsed it by stating that "[t]his proposal would determine which law governs cross-border collateral arrangements and make it possible for market participants to conclude such arrangements in the same manner throughout the EU".

⁸⁶ Similarly, Article 8 of the US Uniform Commercial Code's definition of "securities entitlement" and other key terms reflects an accurate description of the unique form of property interest that is a central element to the indirect holding system. See J.S. Rogers, (1996). 'Policy Perspectives on Revised U.C.C. Article 8', *UCLA Law Review*. 1431.

⁸⁷ Indeed, The *Special Commission on General Affairs and Policy of the Hague Conference on Private International Law* recognised in its 2002 report the need to 'identify and illustrate the most important questions relating to' the adoption of a new instrument to govern the applicable law for determining the proprietary aspects of a transfer of interests in securities held in indirect holding systems. The Hague Report is entitled the Hague Report on "The Law Applicable to Dispositions of Securities Held Through Indirect Holding Systems". The Report was prepared by Christophe Bernasconi, First Secretary of the Permanent Bureau of the Hague Conference on Private International Law.

⁸⁸ The Report is careful to define the term 'intermediary' in a broad sense to include "all the various kinds of financial institutions through which investor's interests are held, for example, brokers, nominee companies, banks and other custodians, settlement systems and depositories." The Report, p. 2 n. 6.

Furthermore, it is also important to note that PRIMA is designed not only to reduce payment and settlement risk for large companies who are participants in wholesale financial markets, but it will also benefit small and medium-sized enterprises because it will reduce the cost of collateralized lending based on securities.⁸⁹

The essential attribute of PRIMA is to apply the law of the place of the immediate intermediary on whose books the relevant interests are recorded to questions of creation, perfection or completion, priorities and realisation of interests in respect of securities. PRIMA subjects all the interests of an investor in a portfolio of securities to the laws of a single jurisdiction, even where the issuers and certificates evidencing such underlying securities are located in many different countries. This designation of a single jurisdiction applies *only* to the proprietary elements of the substantive law of the place of the intermediary. It does not apply to the procedural rules of the designated jurisdiction, and excludes any form of *renvoi*. Moreover, PRIMA can be viewed as a reaffirmation and appropriate extension of the *lex situs* (or *lex rei sitae*) principle, in which the location of the collateral taker's interest in securities is credited to a securities account (and the beneficial ownership of the securities themselves is most likely only recorded) where the securities account is located.

PRIMA also applies regardless of whether a transfer is made by way of sale or by way of collateral transaction, and in the case of collateral transaction, it will apply irrespective of whether the transaction takes the form of a pledge or of a transfer of title. Furthermore, PRIMA applies regardless of the legal status of the collateral provider or collateral taker; and it applies regardless of the jurisdiction in which the collateral provider, collateral taker, or any other intermediary is formed or located. Where the collateral taker serves as the immediate intermediary of the collateral provider, the law of the relevant intermediary will be that of the collateral provider. Moreover, PRIMA does not purport to change existing definitions of legal interests in collateral under the substantive law of national legal systems. Rather, the Report is concerned, not with defining the legal nature of collateral interests in securities, but with creating an efficient rule to determine which legal system's principles should govern a particular interest in securities.

As discussed above, PRIMA has already been statutorily adopted in Belgium, Luxembourg, and the United States, and it is under legislative consideration in many other jurisdictions. The European Union adopted PRIMA in its Settlement Finality Directive of 1998⁹⁰ in all member states, although implementation has not been uniformed because of differences in interpretation over whether it should be applied only in relation to central banks, European Central Bank, and certain settlement system participants, or whether it should be applied more broadly to protect commercial counterparties as well. The EU also adopted the PRIMA approach in the Collateral Directive of 2002 as a general rule to all situations where collateralised securities are held in indirect holding systems and has extended the use of the PRIMA rule under recent amendments to the Collateral Directive.⁹¹

In addition, PRIMA sets forth several criteria for determining the location of the relevant intermediary. In most cases, the relevant intermediary's location should be determined by *either* the address stated in the account agreement governing the relationship between the relevant intermediary and its customer, or the address stated in the most recent account statement sent by the relevant intermediary to its customer.

⁸⁹ This might result from an increased willingness of counterparties to deal with firms possessing no, or a low, credit rating if satisfactory collateral arrangements were suggested.

⁹⁰ Directive 98/26/EC of the European Parliament and of the Council of May 1998 on settlement finality in payment and securities settlement systems, *Official Journal of the European Community*, 1998, L 166/45.

⁹¹ For a detailed discussion, see Weber and Grunewald (2009) 'The European Settlement Finality Directive and the Financial Collateral Directive – Ignored But Crucial Regulations in the Current Financial Turmoil' *Butterworths Journal of International Banking Law*.

In situations where it was difficult or impossible to determine the location of the account agreement or statement, other legal factors can be applied, such as the statutory seat of the business entity or the law under which it has been incorporated or formed. The focus of PRIMA is on the location of the intermediary, and this test applies regardless of the legal status of the pledgor/transferor or pledgee/transferee.

A major weakness with the PRIMA approach in Europe is that it does not extend the application of the PRIMA rule in cases of insolvency of the collateral provider. In such cases, the national bankruptcy law of the collateral provider will apply, thus introducing a significant level of uncertainty for the protection of creditor's rights in cross-border securities transactions. Another gap in the present EU legislation is that it does not have a specific rule to determine the location of the Intermediary under PRIMA. For instance, should the PRIMA be determined based on the address of the intermediary as set forth in the account agreement, or should it be based on the address of the intermediary as provided in the client's most recent account statement, and in determining the applicable law should the intermediary's status as a branch or subsidiary of an entity in another jurisdiction be taken into account. Other important issues that must be considered include the definition of securities and whether certain types of derivative instruments should be covered by the PRIMA approach. These issues are not presently addressed in EU legislation and could perhaps form the basis of EU law reform in this area.

4.4. Legal uncertainty and systemic risk

In summary, legal uncertainty arises, and thus increases systemic risk, because traditional conflict of laws approaches (eg. *lex rei sitae*) do not provide creditors with clear answers as to which legal system's rules for disposing of collateral interests in securities will be applied in any one transaction. The PRIMA approach is an important step towards providing a framework for analysing the relevant legal issues involved for improving legal certainty and efficiency of settlement transactions. The PRIMA approach has been adopted in the EU Settlement Finality Directive and the Financial Collateral Directive which would apply the law of the jurisdiction of the place where the immediate intermediary is located to determine the acquisition or disposition of property interests in securities. This has enhanced legal certainty in EU securities markets and clearing and settlement systems resulting in reduced credit and market risk in cross-border securities trading.

The PRIMA approach in Europe is preferred to the approach adopted in the Hague Convention (2006) that would permit parties to choose any jurisdiction to govern the disposition of property interests in securities. The Hague Convention approach would undermine investor protection and potentially create prudential concerns by allowing custodian banks and other financial intermediaries to maintain counterparty data on transactions outside EU jurisdictions and thus potentially beyond supervisory reach. Nevertheless, Europe's existing legal framework contains gaps which could be addressed by EU legislation to add further legal certainty and more efficient rules to other areas of clearing and settlement, such as the doctrine of novation, which has different applications across EU states as it relates to the procedures used by CCPS to substitute themselves as counterparties with CCP participants.⁹²

Dealing with systemic risk through regulation and law reform will naturally lead to related issues that address the impact of regulatory reforms on price transparency, access, interoperability, and unbundling of services and what role can EU regulation play in these areas. And, most important, how does the regulation of these areas of market practice affect the over-riding objective of regulating systemic risk in European and global financial markets. In designing more efficient post-trading structures that reduce systemic risk, it is necessary then to understand the nature of liquidity in financial markets.

⁹² See C. Papathanssiou (2010, p. 2-3).

There are different types of liquidity in financial markets: there is "search" liquidity - the costs related to buying and selling hard to find assets, and there is "systemic" liquidity, the cost of selling assets during times of market stress.⁹³ Given the importance of systemic liquidity, any examination of clearing and settlement and the attendant legal issues of voluntary and obligatory regulatory and legal rules must be seen within a framework for the analysis of how to promote systemic liquidity, especially in light of recent events in financial markets.

This section has supported the EU's present efforts in regulating the private law aspects of acquiring, perfecting, or disposing of property interests in securities based on the PRIMA uniform choice of law rule. The PRIMA approach would apply to all dispositions of property interests in securities issued by EU entities and settled through an EU settlement system. European policymakers should resist any future attempts to introduce the Hague Convention on Indirectly Held securities into EU law because of the regulatory risks its would pose for investors and prudential concerns regarding the management of proprietary data with intermediaries outside the EU. The recognised merits of incorporating PRIMA into the Settlement Finality Directive and Financial Collateral Directive provides a model for how harmonised legal approaches across jurisdictions can be adopted to enhance prudential regulation and control systemic risk.

⁹³ There are at times a trade-off between the two. Measures to support search liquidity, such as price transparency, may in fact reduce systemic liquidity, or measures to improve systemic liquidity may undermine search liquidity.

5. Summing up.

The themes running through this report are : 1) How European clearing and settlement systems have evolved under private sector influence without significant EU regulatory intervention and whether this 'light touch' regulatory approach has achieved competitive and efficiency objectives; 2) whether existing EU institutional structures for clearing and settlement (CCPs and CSDs) provide an adequate framework for achieving competition and regulatory objectives; and 3) whether further regulatory oversight is needed for clearing over-the-counter derivative trading, such as a requirement for credit default swaps to be cleared on a central counterparty (eg., clearing house).

Despite the progress made by the Code of Conduct in establishing transparent and non-discriminatory principles and increased interoperability between clearing houses and central securities depositories, the financial turmoil of 2007-09 has demonstrated potential gaps and weaknesses in the EU institutional framework and in the legal and regulatory framework governing post-trading structures.

The Report has examined these themes, and from them produced practical suggestions as to the development of the system of regulation and oversight of the clearing and settlement system in Europe – both with respect to the regulatory institutions operating within the system, and also with respect to the analytical framework necessary for understanding how the structure of the system, and its operations, create systemic risk and what regulatory measures and supervisory structures are necessary to control these risks.

The regulation of clearing and settlement in Europe necessarily involves an analysis of the institutional, regulatory and legal gaps both within the EU and internationally, bearing in mind the regulatory objectives of controlling systemic risk and allowing counterparties to have access to adequate liquidity. It has been argued above that some of the hoped for benefits of forcing derivatives trading into clearing systems may be difficult to realise without significant institutional and regulatory reform.

The move to centralised clearing offers benefits such as transparency, liquidity and reduced counterparty risk. However, concentrating risk in a CCP may have the result of increasing systemic risk. Given the structure of most CCPs and exchanges, solvent members are penalised for non performance by insolvent members. This means the CCP absorbs the credit and market risk fluctuations produced when over the counter derivative contracts are traded. It is, however, questionable whether establishing a European CCP for just credit default swap contracts and similar credit derivatives will make a substantial contribution to the diminution of systemic risk.

A CCP dedicated to a single instrument tends to concentrate rather than disperse risk, imposing potentially ruinous costs on the central counterparty. Moreover, whilst the central counterparty may have a wider perception of risk than the individual firm or trader, the systemic risk created by the chains of relationships within a disintermediated market may nonetheless fail to prevent the accumulation of systemic risk - excessive leverage will remain a key issue. Moreover, because a CCP can only deal in relatively standard transactions, it would not have captured any of the AIG trades. This is why the present EU policy of moving standardised credit default swap contracts onto a CCP will fail to reduce systemic risk, and may have the unintended effect of increasing it.

The potential benefit for netting exposures of banks and dealers multilaterally across counter-parties and instruments is large and exceeds the potential benefit for netting exposures bilaterally. There are therefore both macro and micro benefits to be gained by developing a small number of central counter-parties in Europe that net across a wide range of assets and instruments.

Ideally, a pan-European CCP which clears trades across most asset classes and instruments would achieve a greater scale in reducing systemic risk than the existing fragmented institutional framework in which multiple CCPs clear trades based on more limited types of assets and instruments. Under the Code of Conduct, significant horizontal consolidation has occurred in the EU CCP landscape, especially in the cash equities sector. EU policymakers should encourage these industry efforts, but require that further consolidation occur in the following phases: first, require the industry to unbundle itself from vertical silos. Second, to consolidate horizontally within a short period of time through mergers and acquisitions of existing CCP operators. Alternatively, horizontal consolidation may be more practicable if it is conducted through interoperability based on electronic links and best practice principles set forth in the Code and the Guideline (ie., price transparency and non-discrimination). This would permit interoperability links in such a way as to net across existing European CCPs and lead potentially to a centralised network or system of CCP providers that operate effectively as a single EU CCP. The latter option may be preferable from a public policy perspective given the progress that has been made so far in consolidation through interoperability between EU CCPs in certain sectors.⁹⁴

Moreover, margin requirements are typically pro-cyclical (in an environment of market stress, higher margin requirements will be on those holding distressed assets, forcing them to sell these and other assets, spreading the distress). However, this is minimised the greater the amount of netting and the more dealers and banks are subject to counter-cyclical capital requirements.

The consolidation of CCPs, and even the possibility of a single European CCP, will create concentration risk with the potential of a massive loss should the central counterparty fail to meet its obligations. In these circumstances it will be necessary for a Lender-of-Last-Resort (central bank) to guarantee the CCPs trades in times of severe market stress, thereby avoiding catastrophic market failure. The implicit role of the LoLR will create the familiar problem of moral hazard in institutions “too big to fail”, demanding close regulatory oversight of the CCP’s risk modelling, including the CCP’s exposure to macroeconomic risk.

Major recommendations

1. A pan-European CCP (3.1, 3.1.3, 3.2.1-3.2.4)

A single global CCP would in theory achieve maximum netting benefits by offsetting multilaterally the exposures of banks, dealers and other CCP participants and members across a broad range of asset classes and instruments. In its absence, the EU could either require the CCP industry to consolidate within a short period of time into a single CCP or to develop network links in such a way as to net across existing multi-market European CCPs.

The former approach would be a single European CCP that operates within a system of multiple settlement facilities throughout the EU. It would be structured along an hour glass model for trading and post-trading activities. The CCP would be sandwiched between many competing trading and settlement platforms and would handle all national and cross-border transactions for all types of securities. Although there would not be an initial requirement that CSDs consolidate horizontally, a EU CCP would trigger consolidation among and with settlement systems and so create a pan European utility similar to the US Depository Trust & Clearing Corporation in due course.

⁹⁴ See Appendix D.

The latter approach would consist of a network of European CCPs tightly bound together through best practices of interoperability with a presiding CCP managing the network. This could take the form of a 'hub and spoke' model with authorised European CCPs extending existing interoperability links throughout a EU CCP system that would be presided over by the 'hub' CCP. Over time, the CCP structure could potentially consolidate further into a single CCP institution or it could maintain its network structure and increase its capacity for netting across the system.

The establishment of a European CCP (or EU CCP system) would allow for more efficient netting of transactions across a range of instruments as diverse as bonds, derivatives, and equities. This would lead to economies of scale in back office activities such as collateral management and information technology. Although a European CCP (or EU clearing house) is ambitious and would be expensive, it would ultimately reduce users' risks, costs, and capital requirements.

2. Registration and enhanced capital requirements for non-standard instruments (3.2.4, 3.3)

There will always be less-standard instruments traded between market participants who are less systemic. The attractions and benefits of a central CCP are such that the risk-return trade-off probably does not favour the banning of those instruments that are non-centrally cleared instruments. Instruments that are not acceptable would be non-standard instruments, traded between issuers and investors where the private netting benefits are small. Equally, the systemic implications of these instruments are also more modest, given that these are idiosyncratic risks and investors absorb the losses. Perhaps the solution is two fold:

First, a minimal solution such as central registration and disclosure of all relevant information for instruments not centrally cleared.

Second, a requirement for those holding credit risks to hold capital against risks they cannot naturally absorb/net, irrespective of whether they are called a bank, dealer or investor.

3. The establishment of an equivalent to the Continuous Link Settlement Bank (3.3) and harmonised method for DvP in securities settlement for EU settlement facilities (2.5).

Regarding settlement, what is needed in Europe is an equivalent for the credit markets of the CLS Bank in foreign exchange. A single institution that instantly settles net exposures between its members once it determines that a credit event has occurred, independent of trading or clearing venue. The ECB should be a member so that in the event of a default the central bank provides temporary liquidity where it is needed and the system is merely exposed to net exposure to the defaulting institution. Individual instruments that can be accepted by the CLS Bank will carry lower risks and margin requirements which will help to internalize the social externalities of complex instruments for which there is little information and that are prone to settlement problems.

The ECB's Target2 securities framework (2.5) will dramatically change the landscape of securities settlement in Europe and necessarily involve the central securities depositories, agent banks and custodian banks in more cross-border consolidation, especially for the settlement of cash financial instruments (eg., equities and bonds). Increased EU regulatory harmonisation of settlement practices that affect systemic risk should be considered. For example, delivery versus payment procedures in EU central securities depositories affect principal and settlement risk (a form of systemic risk) and therefore should be harmonised if possible by adopting one of the three DvP procedures recommended by the Committee on Payment and Settlement Systems.

We would therefore propose the following with respect to the institutional structure of clearing and settlement in Europe:

Horizontal consolidation of clearing and settlement in all markets, breaking down vertical silos, and expanding network netting across most assets and instruments **(3.3)** and harmonising some settlement practices that have systemic effect (ie., DvP procedures).

The establishment of a single debt securities near-time settlement system – a mutual financial institution of which the ECB is a member.

There will always be the problem of the assumption of risk by the CCP and the CSD's settlement risk and principal risk exposure in complex financial markets. Further, the role of the European Central Bank should be examined at a deeper level, especially in times of market stress.

4. Common principles and rules for the creation, perfection, and protection of collateral interests in securities (4-4.4).

Europe should regulate private law contracts involving securities transactions in clearing and settlement systems that may affect systemic risk. EU directives apply a uniform choice of law rule based on the PRIMA approach for the disposition of property interests in securities settled in an EU settlement system. Other legal doctrines (eg., novation) should be examined regarding their systemic impact and possibly subject to increased harmonisation across EU jurisdictions. The PRIMA approach as applied in the Settlement Finality Directive and Financial Collateral Directive successfully demonstrates so far how private law frameworks can be regulated to serve broader financial policy objectives. The recognised merits of incorporating PRIMA into these Directives provide a model for how harmonised private law approaches across jurisdictions can be adopted to enhance prudential regulation and control systemic risk.

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APPENDIX A. COMMITTEE ON PAYMENT AND SETTLEMENT SYSTEMS AND INTERNATIONAL ORGANIZATION OF SECURITIES COMMISSIONS (CPSS-IOSCO) RECOMMENDATIONS FOR CENTRAL COUNTERPARTIES (CCPS) (BIS, 2004)

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 operation 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 fulfilment of a CCP's obligations.

9. **Money Settlements.** A CCP should employ money settlement arrangements that eliminate or strictly limit its settlement bank risks, that is, its credit and liquidity risks from the use of banks to effect money settlements with its participants. Funds transfers to the CCP should be final when effected.
10. **Physical Deliveries.** A CCP should clearly state its obligations with respect to physical deliveries. The risks from these obligations should be identified and managed.
11. **Risk 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 fulfil 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 oversight. In both a domestic and an international context, central banks and securities regulators should cooperate with each other and with other relevant authorities.

APPENDIX B. EUROPEAN SYSTEM OF CENTRAL BANKS (ESCB) –COMMITTEE OF EUROPEAN SECURITIES REGULATORS (CESR) RECOMMENDATIONS FOR SECURITIES SETTLEMENT SYSTEMS AND RECOMMENDATIONS FOR CENTRAL COUNTERPARTIES IN THE EUROPEAN UNION (MAY 2009)

Recommendations for Securities Settlement

1. **Legal Framework** Securities settlement systems, links between them or interoperable systems, should have a well-founded, clear and transparent legal basis for their operations in the relevant jurisdictions.
2. **Trade confirmation and settlement matching** Confirmation of trades between direct market participants should occur as soon as possible after trade execution, but no later than trade date (T+0)... Settlement instructions should be matched as soon as possible and, for settlement cycles that extend beyond T + 0, this should occur no later than the day before the specified settlement amount.
3. **Settlement cycles and operating times** Rolling settlement should be adopted in all securities markets. Final settlement should occur no later than T + 3. The benefits and costs of EU-wide settlement cycles shorter than T + 3 should be evaluated. The operating hours of CSDs should be open at least during the operating times of the relevant payment system (at least during Target2 operating times for transactions denominated in euros).
1. **Central counterparties (CCPs)**
The benefits and costs of establishing a CCP should be evaluated. Where a CCP mechanism or guarantee arrangement has been introduced, it should rigorously be assessed against the ESCB-CESR Recommendations for CCPs or against the checklist for guarantee arrangements respectively.
2. **Securities lending** Securities lending or borrowing (or repurchase agreements and other economically equivalent transactions) should be encouraged as a method for avoiding settlement failures and expediting the settlement of securities. Barriers that inhibit the practice of lending securities for this purpose should be removed.
3. **Central securities depositories (CSDs)** Securities should be Immobilised or dematerialised and transferred by book entry in CSDs to the greatest extent. To safeguard the integrity of securities issues and the interests of investors, the CSD should ensure that the issue, holding and transfer of securities are conducted in an adequate and proper manner.
4. **Delivery versus payment (DVP)** Principal risk should be eliminated by linking securities transfers to fund transfers in a way that achieves delivery versus payment.

5. **Timing of settlement finality** Intraday settlement should be provided through real-time and/or multiple-batch processing in order to reduce risks and allow effective settlement across systems.
6. **CSD risk controls to address participants' failures to settle** CSDs that extend intra-day credit to participants, including CSDs that operate net settlement systems, should institute risk controls that, as a minimum, ensure timely settlement in the event that the participant with the largest payment obligation is able to settle. The most reliable set of controls is a combination of collateral requirements and limits.
7. **Cash settlement assets** Assets used to settle payment obligations arising from securities transactions should carry little or no credit or liquidity risk. If central bank money is not used, steps must be taken to protect participants in the system from potential losses and liquidity pressures arising from the failure of the cash settlement agent whose assets are used for that purpose.
8. **Operational risk** Sources of operational risk arising in the clearing and settlement process should be identified, monitored and regularly assessed. This risk should be minimised through the development of appropriate systems, and effective controls and procedures. Systems and related functions should (i) be reliable and secure, (ii) be based on sound technical solutions, (iii) be developed and maintained in accordance with proven procedures, (iv) have adequate, scalable, capacity, (v) have appropriate business continuity and disaster recovery plans that allow for the timely recovery of operations, and (vi) be subject to frequent and independent audits.
9. **Protection of customers' securities** Entities holding securities in custody should employ accounting practices and safekeeping procedures that fully protect customers' securities. It is essential that customers' securities be protected against the claims of the creditors of all entities involved in the custody chain.
10. **Governance** Governance arrangements for CSDs should be designed to fulfil public interest requirements and to promote the objectives of owners and relevant market participants.
11. **Access** CSDs should have objective and publicly disclosed criteria for participation that permit fair and open access. Rules and requirements that restrict access should be aimed at controlling risk.
12. **Efficiency** While maintaining safe and secure operations, securities settlement systems should be cost-effective in meeting the requirements of users.
13. **Communication procedures, messaging standards, and straight-through processing (STP)** CSDs and participants in their systems should use or accommodate the relevant international communication procedures and standards for messaging and reference data in order to facilitate efficient clearing and settlement across systems. This will promote straight-through processing (STP) across the entire securities transaction flow.
14. **Transparency** CSDs should provide market participants with sufficient information for them to identify and accurately evaluate the risks and costs associated with securities clearing and settlement services.
15. **Regulation, Supervision, and oversight** CSDs and securities settlement systems should be subject to transparent – consistent and effective regulation,

supervision and oversight. In both a national and a cross-border context, central banks and securities regulators should cooperate with each other and with other relevant authorities regarding the CSD and securities settlement systems it operates.

16. **Risks in cross-system links or interoperable systems** CSDs that establish links to settle cross-system trades should design and operate such links so that they effectively reduce the risks associated with cross-system settlements. They should evaluate and mitigate the potential sources of risks that can arise from the linked CSDs and from the link itself.

APPENDIX C. SOME RECENT CREDIT DEFAULT SWAP CENTRAL CLEARING PARTY INITIATIVES

CME

The CMDX platform, backed by the Chicago Mercantile Exchange (CME) and Citadel Investment Group (a Hedge Fund) received regulatory approval from the SEC to clear CDS on March 13th 2009. CME is waiting to start operations as it continues to look for customers and financial institutions to take an equity stake in the new venture. It is offering financial institutions up to 30 percent stake in the new venture, lower capital requirements and index and single name CDS clearing for members. However its efforts to attract members and stakeholders so far seem to be overwhelmed by strong dealer support for ICE's initiative. It plans to use its existing central counterparty, CME Clearing, to clear CDS in a joint venture with Citadel. CME's execution platform will be regulated by the CFTC as a derivatives clearing organization. CME expects to trade indices (US and European investment grade, high yield and crossover) and single name CDS (components of indices plus other liquid names). It has the benefit of allowing all counterparties to face it rather than only the largest financial institutions. New participants are expected to add an extra \$400-\$500m to its guaranty fund of \$7 billion.

Euronext Liffe

Liffe, backed by NYSE Euronext and LCH.Clearnet launched its CDS clearing service on 22nd December 2008. It uses LCH.Clearnet, an independent clearing house in London, to clear CDS as part of its Bclear service which already clears OTC equity derivatives. The primary regulator for LCH.Clearnet is the UK Financial Services Authority (FSA). Initially it expects to trade the iTraxx Europe, Crossover and Hi-Vol indices. NYSE Euronext has signed up more than 30 clients and LCH.Clearnet plans to introduce its own Eurozone clearing service by the end of 2009.

The Eurozone service would be managed by Paris-based LCH.Clearnet SA, which is a Eurozone bank and regulated by Banque de France. There is currently limited information on the products that will be cleared through, and member eligibility for, this service. LCH.Clearnet has no US CDS clearer but opened an office in New York in mid-March 2009 to pursue opportunities.

Eurex

Off to a slower start than the other initiatives, but on April 1st 2009 commenced a pilot program, with 15 market participants. Eurex are planning a full launch in July 2009. It plans to use Eurex Clearing, its existing clearing provider in Europe to clear CDS in Europe. Eurex expects to trade indices first, followed by single name CDS. Any entity meeting its requirements can face it as a counterparty, the main requirement being EUR 5bn in capital. They are offering a joint venture model to the sell-side with up to 90% share with shared governance, product development and investment risk.

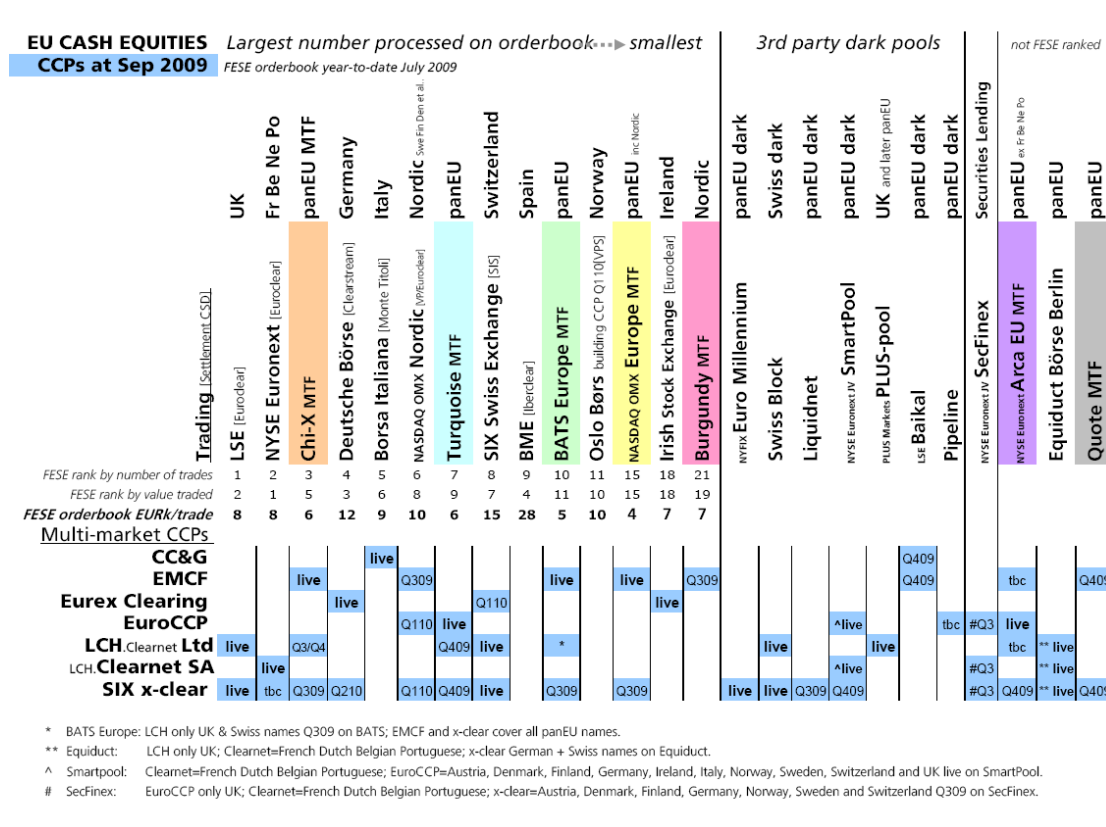
ICE

Intercontinental Exchange (ICE) started the transfer of existing bilateral CDS contracts to its clearing house as of March 9th 2009. Existing contracts on the Markit CDX indices are being transferred by way of novation to ICE Trust, which will process and clear the contracts going forward. ICE has the greatest support from dealers (potentially because of their association with The Clearing Corp). ICE acquired The Clearing Corporation (TCC) in Oct 2008 and has set up ICE US Trust along with TCC and nine major dealers (BofA, Citi, CS, DB, Goldman, JPM, Morgan Stanley and UBS) to clear CDS in the US. ICE US Trust is a limited purpose trust bank that is regulated by the Federal Reserve and the New York State Banking Department.

ICE's plans for Europe are to set up ICE Trust Europe to clear CDS. ICE Trust Europe will function within ICE Clear Europe, its existing FSA-approved London-based clearing provider that clears OTC energy futures. ICE is in conversations with the FSA to expand ICE Clear Europe's remit to clear CDS. It is not yet clear if ICE will link its US and European CDS clearing platforms. It expects to trade indices and single name CDS. Any entity meeting its requirements can face it as a counterparty, the main requirement being EUR 5mm in capital.

APPENDIX D. CCP LINKS CHART

EU Cash Equities multi-market CCP landscape



The above chart shows the present position (Sept 2009) of CCP interoperable links in an increasingly consolidated European cash equities market:

Down the left side are the CCPs that serve more than one EU market - listed alphabetically.

Blue boxes include live dates - where available. Across the top, separated by vertical lines, are

- Exchanges and Multilateral Trading Facilities ranked from left to right by largest number of trades using the most recent Federation of European Securities Exchanges (FESE) July year-to-date statistics – see European Trading July 2009 table. On the CCP landscape slide, the more blue per row, the more markets that can be consolidated by that CCP – with higher weightings of fee saving potential where blue boxes cluster to the left: today CCP fees correlate more with number of tickets than value processed. In fact it is this fixed cost per ticket aspect of CCP tariffs in an environment of shrinking trade size that increases basis point costs to brokers as brokers process the same value of client business. Added to the CCP chart are average trade sizes measured in EUR thousands (EURk) per trading platform. So with average trade sizes for Chi-X at 6k/trade and Deutsche Boerse at 12k/trade, broadly it requires 2 trades on Chi-X to process same value as 1 trade on Deutsche Boerse; this impacts the comparative clearing costs associated with Chi-X, for example.

- EU third party dark-pools.*
- SecFinex Securities Lending platform - today an OTC market with potential capital risk-weighting benefits via CCP - majority owned by NYSE Euronext.
- New entrants not yet ranked by FESE.

Note that Burgundy is planning to start with EMCF and add interoperable CCPs later; Ireland uses a separate instance of Eurex Clearing.

APPENDIX E. GLOSSARY OF TERMS

Affirmation of a trade confirmation: A procedure in a confirmation process, whereby a single record of the trade is created by one party evidencing the full terms of the trade and the counterparty verifies and agrees to that record.

Arbitrage: the exploitation of price differences in connected markets.

Back office: a part of a firm that is responsible for post-trade activities.

Basis Point: 0,01 of a percent. 100 basis points equal 1 percent.

Bid-ask spread: The difference in price between the highest price that a buyer is willing to pay for an asset and the lowest price for which a seller is willing to sell it.

Central counterparty (CCP), or clearing house:

An entity that substitutes itself between the counterparties to the contracts traded in one or more financial markets, becoming the buyer to every seller and the seller to every buyer of specific sets of contracts or obligations.

Central securities depository (CSD): an infrastructure that holds or controls holding of financial instruments in paper or electronic form belonging to all, or a large proportion of the investors in a particular securities market. The CSD effects the centralised transfer of ownership of such securities by electronic entries on its books or records.

Clearing: The process of establishing settlement positions, including the calculation of net positions, and the process of checking that securities, cash or both are available. It is the process used for managing the risk of open positions.

Clearing member: a clearing house member.

Code of conduct: agreement in 2006 between executives of European securities trading firms facilitated by the European Commission with the aim of offering market participants the freedom to choose their preferred provider of clearing services.

Collateral. An asset or third party commitment that is used by the collateral provider to secure an obligation to the collateral taker. Collateral arrangements may take different legal forms; collateral may be obtained using the method of title transfer or pledge.

Confirmation: A document identifying the details of a trade and any governing legal documentation, as agreed upon by both parties. Legally, the document serves as the final record of the transaction.

Confirmation process: The process by which trade details are verified with a counterparty, with a view to obtaining a final record of the trade. This is generally done by exchanging a confirmation proposal via fax, mail or electronic communication.

Counterparty credit risk: the risk that a counterparty will not settle an obligation for full value, either when due or at any time thereafter. Credit risk includes pre-settlement risk (replacement cost risk) and settlement risk (principal risk).

Counterparty: the opposite party in a financial transaction.

Credit event: an event that may trigger the exercise of a Credit Default Swap contract. Credit events include, for example, failure to pay (interest or principal when due), bankruptcy or restructuring.

Custodian: the party that safekeeps and administers assets on behalf of the owners.

Dark pools (post-trade): venues that process 'dark liquidity' orders and publish information post-trade (eg. price and size). Dark pools aim to reduce information leakage while finding anonymous liquidity with the objective to minimise market impact on execution.

Dark liquidity: an order not yet executed nor displayed pre-trade. 'dark liquidity' resides in 'dark pool' venues.

Default Fund: A fund composed of assets contributed by a CCP's participants that may be used by the CCP in certain circumstances to cover losses and liquidity pressure resulting from defaults by the CCP's participants. Also known as clearing fund.

Derivative: a financial contract, the value of which depends on the value of one or more referenced or underlying assets, rates or indices.

Depository Trust and Clearing Corporation (DTCC): the main US central securities depository (CSD) that clears and settles securities trades.

Front office: a firm's trading unit and other areas that are responsible for developing and managing relationships with counterparties.

International central securities depository (ICSD): an entity that settles domestic trades involving international securities (ie., global depository receipts), or settles trades involving cross-border transactions in various domestic securities.

Interoperability: where one infrastructure service provider – typically a clearing house – creates a business relationship with another. It is the opposite of a 'silo' structure, where a clearer may be owned by an exchange, or the clearer is owned by the CSD (ie., Euroclear owns)

Leverage: A financial ratio that compares some form of owner's equity (or capital) to borrowed funds. The higher are the borrowed funds with respect to own capital, the higher is the leverage.

Margin: An asset (or third party commitment) that is accepted by a counterparty to ensure performance on potential obligations to it or cover market movements on unsettled transactions.

Marking to market: The practice of revaluing open positions in financial instruments at current market prices and the calculation of any gains or losses that have occurred since the last valuation.

Master Agreement: An agreement that sets forth the standard terms and conditions applicable to all or a defined subset of transactions that the parties may enter into from time to time.

Multi-lateral netting: Netting on a multilateral basis by summing each participant's bilateral net positions with the other participants to arrive at a multilateral net position. Such netting is often conducted through a central counterparty (but it can also be done by other entities). In such cases, the multilateral net position represents the bilateral net position between each participant and the central counterparty.

Netting: The offsetting of positions or obligations by trading partners, participants or counterparties. Netting reduces a large number of gross positions or obligations to a smaller number and can sharply reduce settlement volumes.

Novation: The replacement of a contract between two initial counterparties to a contract (the transferor, who steps out of the deal, and the remaining party) with a new contract between the remaining party and a third party (the transferee).

Open interest: The total number of open derivative contracts on a specific underlying asset or reference entity.

Over the counter: market outside an organised exchange in which transactions are conducted through a telephone or computer network connecting the market participants.

Position: the stance an investor takes vis-à-vis the market. An investor's position is said to be long (short) when she buys (sells) a financial instrument.

Portfolio compression: See Multi-lateral netting.

Reference entity: A corporate, a sovereign or any other form of legal entity which has incurred debt, on which a credit default swap is written.

Restructuring: One of the credit events that may trigger the exercise of a credit default (CDS) contract. The term denotes a change in the legal terms of an issuer's obligation, such as the reduction in the obligation principal, the reduction in the contractually agreed interest payments and the deferral of interest or principal payments.

Settlement: the completion of a transaction, whereby the seller transfers securities or financial instruments to the buyer and the buyer transfers money to the seller.

Spread of a Credit Default Swap (CDS): The coupon of a CDS contract expressed as a percentage of the notional amount. For example, a spread of 400 basis points for a five-year CDS with a notional amount of € 10 m implies a payment of €400.000 per year, or €100.000 per quarter, as payments are made quarterly. The spread reflects the probability of default of a reference entity: the higher the spread, the higher the probability of default.

Straight-through processing (STP): the capture of trade details directly from front-end trading systems and complete automated processing of confirmations and settlement instructions without the need for manual intervention.

Glossary derived from the Committee on Payment and Settlement Systems (March 2003), *A glossary of terms used in payments and settlement systems* (BIS: Basel).

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