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Central Counterparty Clearing: Constructing Framework for Evaluation of Risks and Benefits

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Abstract

Central Counterparty Clearing (CCP) has recently become more common in Europe, not only in the derivatives markets, where it has been common phenomenon already a few decades, but also in equities markets. In the European Union, the main factor motivating the evolution of clearing arrangements is the ongoing process of European economic integration, mainly the introduction of the euro, the ongoing organisation of an internal market for financial services and the corresponding objective of creating a pan-European financial infrastructure for payments and securities clearing and settlement.

Central counterparty clearing houses have a general influence on the functioning of financial markets. They can increase the efficiency and stability of the financial markets to the extent that their smooth functioning results in a more efficient use of collateral, lower operational costs and more liquidity. Market players actively try to achieve economics of scale and scope with mergers and harmonising technical processes related to one of the most fragmented area in the securities market infrastructure: securities clearing and settlement.

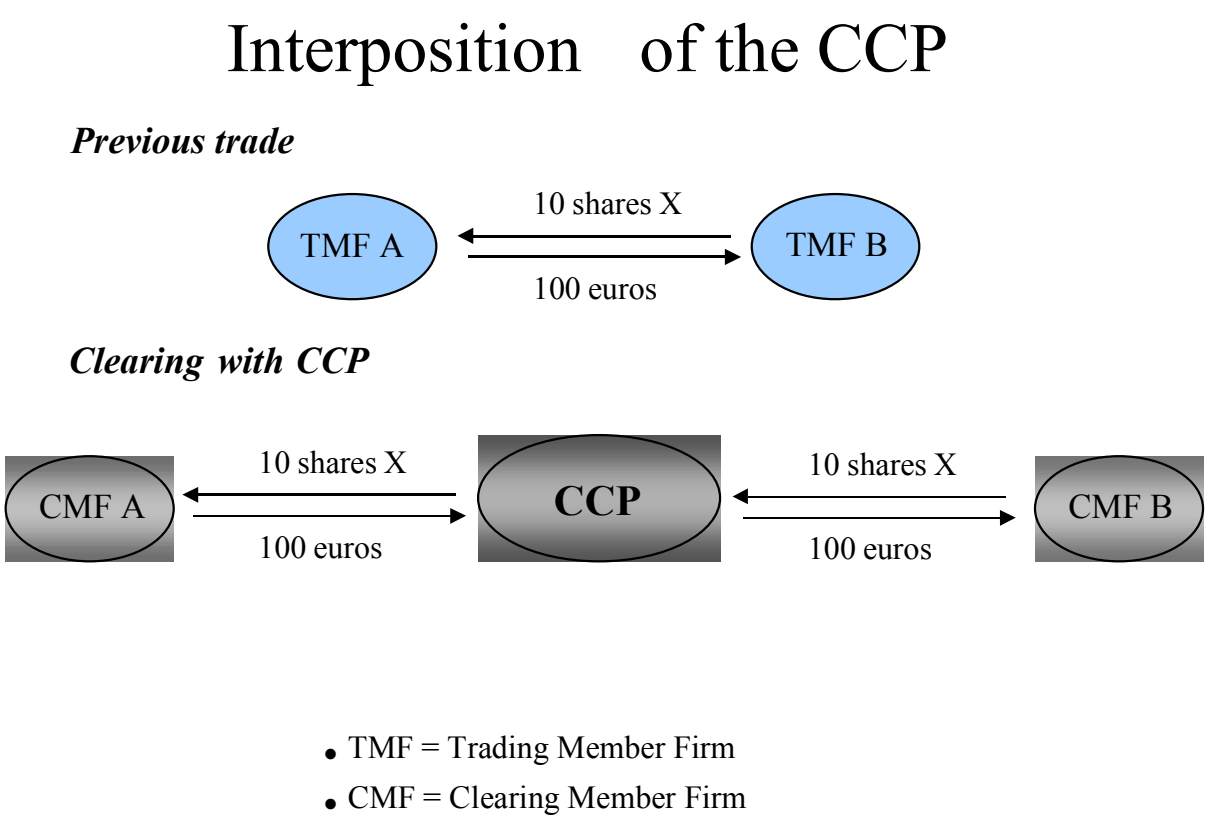
The big market players dominate the current CCP market in Europe. But it is not only the big players who can achieve utilities from functioning of CCP. Depending on the structure of CCP – it can also enable small players stay on the market and make it possible for issuers of a regional market place to achieve market funding. This has been the tendency, which can be seen in the current EU accession countries.

The aim of this paper is to evaluate risks and benefits related to the functionality of CCPs in the integrating markets and construct a framework for possible future risk-benefit –analysis in Finnish/Nordic-Baltic clearing and settlement infrastructure.

1 Introduction

The process of clearing and settling a securities trade includes several key steps. After **trading**, the obligations of the counterparties resulting from the trade are calculated, which is known as **clearing**. The process ends with the **settlement** of the obligations, which involves the final transfer of the securities (delivery) in exchange for the final transfer of funds (payment). A clearing house acts as a **central counterparty (CCP)** when it interposes itself as a legal counterparty to both sides of a transaction. Thus, from the point of view of market participants the credit risk of the CCP is substituted for the credit risk of the other participants (figure 1).

Figure 1.



- TMF = Trading Member Firm
- CMF = Clearing Member Firm

Currently, central counterparty clearing can be seen as an integral part of the modern post-trading processes. Central counterparties are increasingly being favoured by market participants in a widening range of markets from derivatives to other instruments. CCPs were established originally to protect market participants from counterparty risk in exchange-traded derivatives markets. In other words, derivative contracts traded on an exchange were executed with a single counterparty, the clearing house, which processed all transactions and guaranteed performance.[1] Recently, more over to derivative markets CCPs have started to offer clearing services also to cash and over-the-counter (OTC) markets. In Finland there exists one CCP-like functioning only in the derivatives exchange inside the HEX Integrated Markets.

[1] Central counterparties were either part of a derivatives exchange or independent entities.

Central counterparty (CCP) is an entity that interposes itself between counterparties to trades, acting as the buyer to every seller and the seller to every buyer[2] of a specified set of contracts, such as those executed on a particular exchange or trading system. CCPs legally interpose themselves as **principal** to each side of the transaction. The legal process of replacing the original counterparties and becoming the single counterparty for all participants is generally called **novation.** Through novation, a CCP creates more certainty in trading. This is not to say that a CCP removes counterparty credit risk from a market, but it manages and redistributes that risk by establishing rules on who will bear the losses that occur from a participant default. Novation replaces market participants´ exposure to bilateral credit risks with a standard credit risk to the CCP. The timing of novation has important implications for the distribution of counterparty risk between the CCP and its clearing members.[3]

CCPs normally apply very strict access criteria and accept only financially strong participants. They often have two-tiered membership structures, where only **general clearing members** or **direct clearing members**[4] have a direct relationship with them. They often have a requirement of bank status. The other participants (indirect participants) are forced to use a general clearing member, often a competitor, to gain access to the clearing system.

To protect themselves against a clearing member default, CCPs have evolved a variety of risk management procedures, like strict access rules, own funds, different clearing/guarantee funds. An anticipatory stress testing and marginal payments are also important tools of risk management. **Initial margin** is deposited at the start of the transaction by clearing members. **Variation margin** is called when positions are revalued during the course of a transaction, using "marking to market" – procedure. CCPs usually also have access to additional default resources, such as mutual guarantee funds or insurance cover, and require clearing members to fulfil financial requirements to reduce the likelihood of default.

One can distinguish at least three different types of netting-levels: **margin-level, obligation-level and settlement-level** (figure 2). To protect themselves and the clearing house against clients´ defaults, members are generally required to set a minimum level of margin for their clients according to the rules set down by the clearing house. Under **net margining** clearing members are permitted to net together the long and short positions of different clients and post margin on aggregate net positions. Under **gross margining**, members are required to deposit margin with the CCP sufficient to cover the gross positions of their clients. In practise, net margining systems predominate.[5] In spite of that, a CCP can do both, net and gross deliveries to the SSS.

CCP can offer an additional service by netting cash or securities deliveries/obligations. **Bilateral netting** reduces the bilateral flows between each pair of counterparties to one single net obligation. **Multilateral netting** provides for the netting of all obligations stemming from participants in the system and produces one single obligation due to or from each counterparty within the netting group, i.e. it minimises the number of obligations to be settled and thus brings efficiency

[2] CPSS – IOSCO 2001.

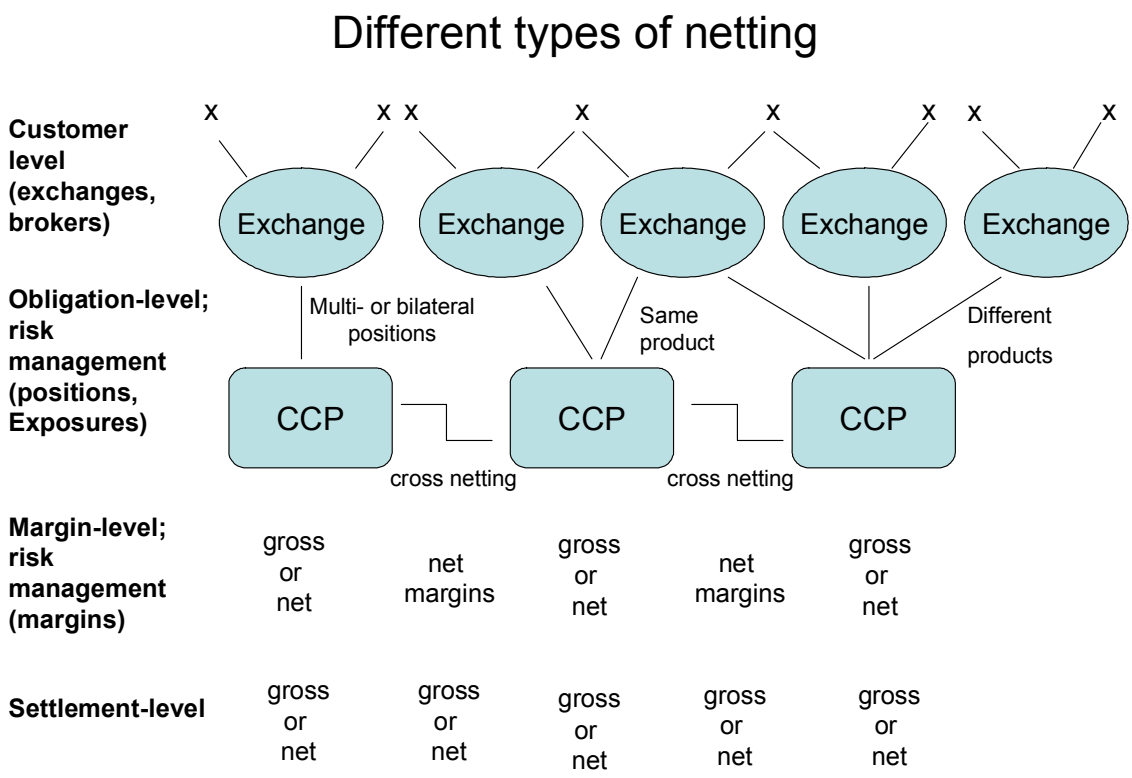
[3] The moment at which novation occurs depends on the CCP´s rules.

[4] General clearing members clear and settle both their own positions and positions of indirect participants. Direct clearing members are allowed to clear and settle only their own positions.

[5] Bank of England 1999, 2002.

gains. There can be distinguished two different types of multilateral netting: settlement netting and contractual netting. **Settlement netting** takes place when all participants´ mutual obligations are offset, resulting in a single position in a specific security to be delivered or received, and a single cash payment to be made, for each participant vis-à-vis all other participants. Service can be provided either by a CCP or by securities settlement system (SSS), which is on the contrary, to contractual netting, which can be provided by CCPs only. **Contractual netting** is used to reduce individual contractual obligations to a single obligation vis-à-vis a CCP, thus reducing the impact of trading volumes on market participants´ balance sheets and books.

Figure 2.



The existence of a CCP is motivated – in participants´ point of view - by the profits it can produce. The adoption of a CCP directly reduces counterparty credit risk. In addition, CCP offers two main advantages to participants: the above mention capital adequacy impact and the anonymity of trading. The benefits of a CCP are becoming increasingly apparent in a globalised market with increasing cross-border activity. In addition to offer efficient processing, permit anonymous trading and offer multilateral netting benefits reducing operational and capital costs, a CCP also contributes to risk reduction but it depends on how well it manages the financial, legal and operational risks. Inadequately protected CCPs could exacerbate systemic risks but well run and well-protected CCPs can help contain systemic risks. The possible threat of systemic risk, even though a small one, is one reason why the central banks are interested in the functioning of CCPs. Regulators have complementary interest and responsibilities including for more day-to-day issues, and these authorities need to work closely together.

At present, there are several central counterparty clearing houses operating in Europe and in the USA. Although the current European securities clearing and settlement infrastructure is highly fragmented and inefficient, there are several pro-

jects under consideration to set up new CCPs in countries where there is currently no such market infrastructure. Economies of scale and network externalities seem to favour a high degree of concentration. Therefore, some major global investment banks have been expressed support by for the idea that Europe should only have one central counterparty clearing house, which would be a multi-currency and multi-product (equities, bonds, derivatives and commodities) service. One of the main arguments articulated in this debate is that the creation of a single CCP in Europe would create clearing arrangements that mirror those in the United States, where clearing arrangements are more consolidated, and therefore more cost effective than in Europe. However, there exist also strong arguments against the idea of a single-CCP. ECB´s study (Occasional Paper No. 5/2002) shows that a critical comparison between the US and European cases leads to different conclusions in the case of derivatives and in some respects, clearing arrangements in the US are less integrated than those in Europe.[6]

The risk reduction and efficiency improvements arising from a CCP are expected to outweigh their costs in most markets, particularly in all high-volume, developed markets. Over time CCPs may come to be viewed as a core part of the market infrastructure in almost all markets, much as central securities depositories (CSD) have become over the past decade. However, there is no single view, particularly within the euro area, about the infrastructure that should prevail. Neither the forthcoming chapters answer that question but evaluate risks and benefits related to functionality of CCPs. Chapter 2 discusses on what features of a market affect the suitability of central counterparty clearing and provides an assessment of advantages and disadvantages of using CCPs. Chapter 3 takes the regulatory view to the subject considering interests of central banks, standardisation and corporate governance issues. At the end - before the concluding remarks - the aim of the chapter 4 is to deliberate some possible future prospects of central counterparty clearing – from risk perspective and from integration perspective.

The desirable aim of this paper is to catch up with readers who have basic knowledge of functionality of securities settlement systems. This paper summarises aspects from relevant articles written about the subject, e.g. Bank of England (1999, 2002), Riksbanken (2002) and ECB (2001, 2002) and tries to widen the scope of those by gathering elements (e.g. views of market participants) relevant for possible forthcoming risk-benefit –analysis in Finnish/Nordic-Baltic clearing and settlement infrastructure.

[6] ECB 2002.

2 What features of a market affect the suitability of central counterparty clearing

Clearing houses have often been in the shadows of the derivatives exchanges. But this has been changed. It is evident that the central counterparty services that clearing houses provide can be an increasingly important part of the modern financial landscape.

In addition to exchange-traded derivatives markets, the risks associated with non-performance arise in many other markets, including some with a much shorter settlement cycle, e.g. rising volumes can lead to rise in counterparty risk and remote members, who may not be known very well, may rapidly spread possible disturbances. In equity markets where an electronic order book is employed to match trades, participants may not be able – or even have no intent[7] – to manage counterparty risk through their choice of counterparty. As a result, central counterparty services have recently emerged in a variety of **cash markets** where they deliver other valuable benefits of cost saving, confidentiality, risk reduction and capital efficiency.[8]

Meanwhile, CCPs have also extended the range of their services in **derivatives markets**, with a number of CCPs now clearing a range of **OTC contracts**. In **repo markets**, contractual netting offers the advantage of centralised risk management for all the multilateral positions of a specific participant. In practice, CCPs generally provide these services directly to only a limited range of clearing members, but other market participants can benefit indirectly, as clients of the direct members.[9] The advantages of a central counterparty increase if the same counterparty can be used for the cash, repo and derivatives markets, while the marginal cost of adding new instruments in an existing central counterparty system would probably be low.[10]

Not all the markets and asset categories are necessarily suitable for central counterparty clearing. The potential benefits that a central counterparty can bring may come at a cost and in some markets sufficient benefits may simply not be available.

Whether a market is suitable for central counterparty clearing can therefore be determined by e.g. exchange, multilateral trading facilities (ECN, some of ATS with standardised instruments), OTC trading and single dealer ATS (which may avoid clients from taking risk on ATS operators which could be a broker) and trade-off between potential costs and benefits to market participants (including any social costs and benefits). Counterparty credit risk should only be an unwanted by-product of trading activity, rather than a risk deliberately taken by market participants to enhance returns. This would suggest that, in general, firms want to take on market risk – in other words, to take on exposure to the future price movements of a particular asset. Alternatively, the type of trading may preclude a detailed assessment of counterparty credit risk. If the credit quality of market participants is relatively uniform and counterparty exposure is an inherent but unwanted conse-

[7] Because of the demand of best execution.

[8] Euronext´s 'mother' exchange, SBF, adopted a CCP model for its trading operations (without rolling settlement) in 1990, probably the earliest adopter outside futures and options.

[9] Bank of England 2002.

[10] Riksbanken 2002.

quence of trading in the market, sharing risk by pooling or insurance is more likely to be attractive because of the limited opportunity to reduce risk by screening of counterparties based on credit analysis.[11] However, a central counterparty is not the only possibility of controlling counterparty credit risk, i.e. traditional trading limits and collateralisation offer the other ways to control counterparty credit risk. In addition, e.g. Leinonen (2003) proposes T+0 settlement to minimise counterparty risks.

Another key feature of a market affecting its suitability for central counterparty clearing is the scale of counterparty exposures. In general, counterparty risk will be of greater concern to market participants where credit exposures are more volatile or prolonged. In some markets, pre-settlement credit risks may already be low – perhaps when the price volatility of the instrument being traded is relatively low or the settlement cycle is short (as in most cash markets). In such cases, the additional benefits of a central counterparty may not be materialised.

If the traded good is standardised, and market participants have created offsetting[12] exposures, a central counterparty can make settlement by offset feasible, because it is the counterparty to every trade.[13]

International standards like CPSS-IOSCO recommendations[14] suggest that in particular, establishing a robust risk management system that a CCP must have generally requires significant initial investments and ongoing expenses. Thus, individual markets should assess carefully the balance of the benefits and costs of a CCP. This balance will depend on factors such as the volume and value of transactions, trading patterns among counterparties, and the opportunity costs associated with settlement liquidity. A growing number of countries have determined that the benefits of implementing a CCP outweight costs.

In the markets that currently operate without a CCP, market participants and relevant public authorities should collaborate to assess the benefits and costs of establishing and using such an organisation. There are broadly two alternatives:

- Build and operate a new CCP.
- Use the services of a CCP already established in another centre or for another trading market.

Although to date most markets that have decided to use a CCP have opted for the former option, the latter should not be dismissed, particularly for smaller markets or where a CCP is already used for other products, such as exchange-traded or over-the-counter derivatives. Although added concentration of risk may result, it can be appropriately managed and in many cases will be outweighed by the economy of scale benefits that can be gained from use of an existing CCP. The cost of adapting and increasing the capacity of an existing CCP is likely to be considerably lower than the costs of building a new CCP. In addition, the operating costs of the one CCP can then be spread over a greater volume of transactions, with a consequently lower unit cost.

[11] Bank of England 1999.

[12] Settlement by offset means that a firm can extinguish a position by entering into an equal and opposite trade with any other central counterparty participant.

[13] Bank of England 1999.

[14] Committee on Payment and Settlement Systems (CPSS) - International Organization of Securities Commissions (IOSCO) 2001.

To summarise, market participants must weight the advantages[15] of central counterparty against the costs of establishing and using one. If the market can be integrated into an established central counterparty, whose technical system is already available, the costs may well be limited. That could also be the opportunity for establishing the Nordic-Baltic CCP using OM-technology[16].

2.1 Benefits of using CCPs

The primary force behind the creation of CCPs is the economic interest of capital market participants in **lowering the market side risks and costs of post-trade processing**. The benefits for market participants can be divided into e.g. following rough categories:

1. Trading benefits
   - Traders value anonymity. The facilitation of full post-trade anonymity through the introduction of CCP benefits both users and trading platforms.
   - CCPs help to narrow trading spreads. The reduction in market impact allows a trader to offer tighter spreads to buy-side institutional clients. Narrower spreads in turn attract further trading activity to the order book.
2. Risk and capital benefits
   - Basel II will add on efficient capital allocation. The adoption of the Basel II capital adequacy proposals will reinforce the need for banks to allocate the capital necessary to support their operations more efficiently.
   - Decreased (counterparty) credit risk. Use of a CCP offers two credit exposure enhancements. First, it facilitates multilateral exposure netting, which typically reduces overall credit exposure. Secondly, it consolidates bilateral exposures into a single low risk exposure with a CCP.
3. Balance sheet benefits
   - Increased return on capital via cost reduction.
   - Improved credit standing. Firms may elect to retain the released capital and thereby improve their credit standings (contribution to profitability).
   - Reduced leverage ratios. Use of a CCP in the repo market has a further benefit by enabling users to net cash assets and liabilities and reduces leverage ratios.
4. Operational benefits
   - CCPs can reduce back office tasks for longer run. Use of a CCP and its risk management methods introduces significant savings at the operational level.

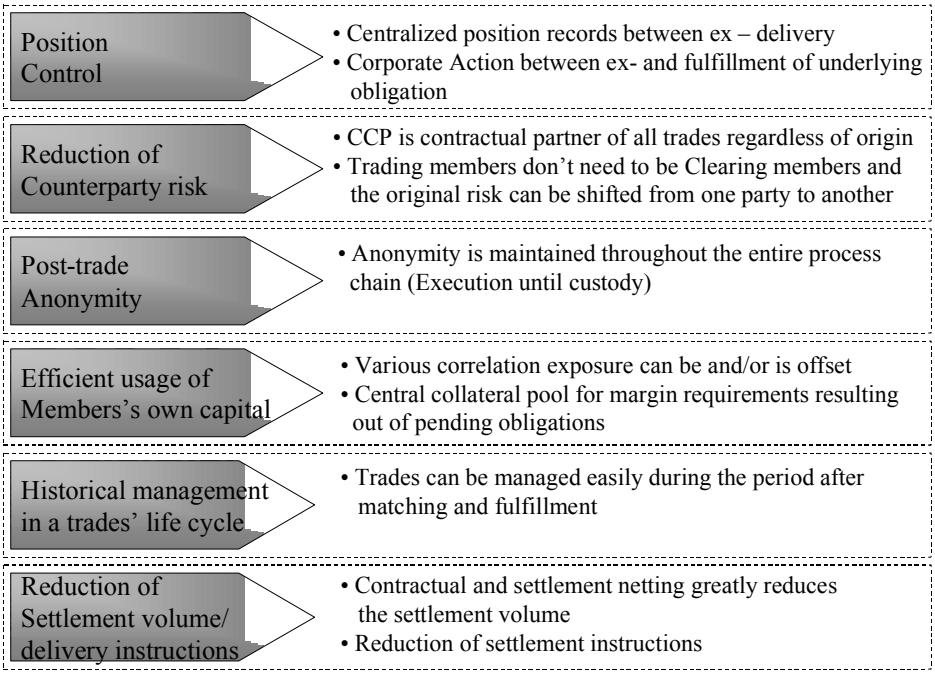
[15] See also: Section 2.1 Benefits of using CCPs.

[16] HEX has been the only Nordic exchange not using OM-technology, but it is intend to do so gradually after merging (4.9.2003) with the OM.

- Reductions in overall market costs. While discussion of costs often focuses on merger activity at the settlement level, much of this anticipated saving can be achieved at the clearing level through the expansion of netting and choice in settlement platforms.
- Netting cuts settlement costs via fewer trades proceed to settlement. Cost reductions are valuable also for private investors.
- Increased straight-through-processing (STP). By standardising market processes, documentation and systems and processing trades through a single channel, STP can be increased greatly and costs reduced, thus optimising the level of capital required to support operational risk.

There are several other reasons, but those mentioned above, explaining why demand for services provided by CCP has increased, particularly within the euro area. First, the growing volumes in securities trading have increased the demand for netting. Second, the internationalisation of securities trading, the introduction of new electronic platforms, the switch to order-driven anonymous trading systems in national stock exchanges have made it increasingly impossible for trading parties to control counterparty risk themselves. There is therefore, a rapidly growing need for guaranteed clearing and settlement.[17] In the figure 3, there is another practise, from functional point of view to classify benefits of CCP services.

Figure 3. Benefits of CCP services



Source: Eurex.

CCPs have both cost and efficiency benefits for market participants. CCPs generally offer straight-trough-processing (STP) facilities aimed at reducing back-office bottlenecks. However, gains from the reduction in operational costs have to be balanced against the fees and the implicit costs which intermediaries have to

[17] ECB 2001.

pay. The netting of exposures reduces the capital required to support participants´ trading activity and helps to improve price liquidity on markets. The redistribution of counterparty credit risk creates social benefits if the risk is reallocated to a grater number of participants better able to bear that risk.

Central counterparty clearing creates benefits also by providing risk management services to the market participants. When engaging in a securities trade, market participants are exposed to the risk that their trading counterparties will not settle their obligations when due (liquidity risk) or will not settle their obligations at all (counterparty credit risk). In order to protect themselves against such risks, market participants can take protective measures such as exposure limits and collateralisation. CCPs manage risks for their members, replacing exposures to multiple counterparties with a single exposure to a single central counterparty. CCPs thus enable market participants to trade without having to worry about the creditworthiness of individual counterparties. This does not mean that CCPs eliminate counterparty credit risk, but they manage and redistribute it much more efficiently than market participants could do in isolation. The CCPs do not remove either liquidity risk, because not all CCPs guarantee timely securities delivery, although they guarantee timely delivery for money.[18]

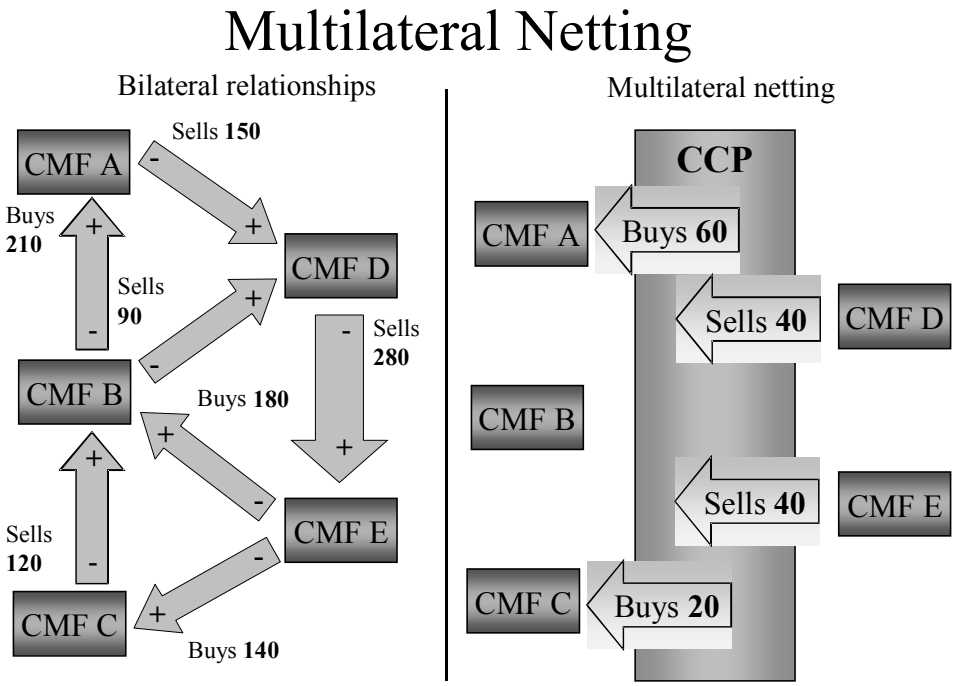
Central counterparty clearing also helps to maintain anonymity where the trade execution process itself is anonymous, which can be a valuable service when market participants fear a market impact as a result of their trading activities. The other benefits CCPs can provide depend on the types of functions they offer, but chiefly among them is netting. Netting can offer lower settlement costs, improved liquidity and higher levels of automation that help minimise processing costs within trading firms.[19] However, it depends also on the legal framework, e.g. under indirect holding settlement procedures are obviously compatible to netting.

Multilateral netting (figure 4) allows for a substantial reduction in the number of settlements and, therefore, in operational costs, including settlement fees for clearing members. In securities trading the same security is often sold back and forth between market participants. As a result of these transactions, number of exposures can arise that offset one another completely or partially. In addition, 'netting by novation', a service offered by CCPs, allows for a reduction in individual contractual obligations, thus affecting market participants´ books and balance sheets. To the extent that national legislation limits the trading volume of a participant to a certain fraction of its balance sheet, netting by novation could create more trading opportunities for the participants. Basel II, with its handling of e.g. operational risk, could be major incentive to a wider establishment of CCP clearing. Netting by novation may help to reduce the capital required to support participants´ trading activity.

[18] See also: Section 2.2 Risks faced by CCPs and their management.

[19] Central Counterparties Dialogue 2001.

Figure 4.



Source: Clearnet.

Central counterparty clearing does not create benefits in terms of market liquidity and efficiency only for the individual participant but also for the economy as a whole. Trading with a single counterparty stimulates trading and improves the functioning of capital markets in general. For instance, the trading volumes on the EuroMTS repo market have currently increased significantly, which may be attributed at least partly to the introduction of the possibility of using a CCP.[20]

2.2 Risks faced by CCPs and their management

Risk can be transferred to the CCP in two ways legally. **Novation** replaces the original contract between the buyer and seller shortly after the trade with two new contracts between the CCP and the buyer and the CCP and the seller. **Open offer** implies that buyer and seller are reputed never to have entered into a bilateral contractual relationship. In this situation the CCP is considered to have stepped in between them at the very moment the transaction was executed.

All CCPs must have sound risk management because they assume responsibility for aggregate and reallocate risk among their participants. If a CCP does not perform risk management well, the CCP could increase the risk to market participants. Without well-developed risk management mechanisms, also multilateral netting can entail large risks. Without sufficient risk management to ensure settlement, the default of even one participant with very small transaction values can stop the

[20] The EuroMTS rules give intermediaries the possibility to trade repos on an anonymous basis relying on LCH as the CCP or, alternatively, to disclose their identity and, possibility, to "refuse" a counterparty on the basis of its creditworthiness.

process in such a settling, if CCP´s risk management techniques fail to provide a sufficiently robust backing that would ensure settlement also in stress situations. In order to realise the advantages of a netting system, the market must have access to an institution offering secure multilateral/bilateral net settlement.

As traditionally, central counterparties have only been found in the derivatives market and the need for efficient risk reduction is particularly evident in such markets. Replacement cost risks are much larger and more difficult to manage in the derivatives market than in the cash market, as the risk exposure extends over a longer period of time. Share transactions are currently usually settled within three days after a deal is concluded (T+3). Thus, the derivative transactions give rise to longer exposures and thereby greater replacement cost risks and require good risk management. The repo market comes somewhere in between these two, with durations that are shorter than on derivatives market but longer than on spot market.

Potential costs and risks accompany the benefits of a central counterparty. As with any risk pooling or insurance scheme, central counterparties are vulnerable to adverse selection. Firms with above-average creditworthiness may choose not to use the central counterparty, because it reduces their comparative credit advantage. In particular, if the central counterparty sets uniform margin requirements to protect itself against firms with average credit quality, more highly-rated counterparties may decide to trade bilaterally so that they do not have to provide margin. Trades through the central counterparty will then be biased towards the less creditworthy firms.[21] On the other hand, the most of the modern CCPs offer competing additional services, which may attract also those creditworthy firms.

The risks faced by a central counterparty are mostly similar related to those overall securities clearing and settlement. However, acting as a CCP brings its own special features, because it can easily take a role of a 'centre piece' in the market.

- **Systemic risk**; a risk that inability of one institution to meet its obligations when due will cause other institutions to be unable to meet their obligations when due. A failure of a large CCP could be a potential source of systemic risk.
- **Counterparty (credit) risk**; a risk that a counterparty will not settle its obligations for full value at any time. The whole principal amount could be at risk. A CCP redistributes counterparty risk through novation.
- **Pre-settlement risk**; a risk that either counterparty will default before the final settlement. This risk is also called **replacement cost risk**. The default of counterparty may leave a CCP in a position that the original transaction has to be replaced in prevailing market prices.
- **Liquidity risk**; a risk that a counterparty will not settle an obligation for full value when due, but some unspecified time thereafter. A CCP may be exposed to liquidity risk, if members do not meet margin calls in a timely fashion. If the CCP has insufficient liquidity to meet demands followed by delay, it may have to delay making repayments also. Liquidity risk is part of the settlement risk. Securities borrowing is a way to allow settlement in time. CCPs´ rules may have clauses that delay final delivery when there are problems with settlement.
- **Investment risk**; a failure of institutions outside the immediate clearing membership may also create risks for a CCP. Many CCPs use a network

[21] Bank of England 1999.

of private banks to make fund transfers to and from members and may therefore be exposed to settlement bank risk. If margins and other default resources are invested in the market by the CCP, they may also face investment risk.

- **Legal risk**; a risk that a party will suffer a loss because laws or regulations do not support the rules of the securities settlement system, the performance of related settlement arrangements, or the property rights and other interests held through the settlement system. Legal risk also arises if the application of laws and regulations is unclear (i.e. a specific type of operational risk). Where the legal status of CCP´s netting arrangement is not protected by national law, or where it clears cross-border trades, it may be exposed to significant legal risks.
- **Operational risk**; a risk that deficiencies in information systems or internal controls, human errors or management failures will result in unexpected losses. A CCP is also vulnerable to operational risks, i.e. normal business risks.
- **Technology risk**; a CCP is vulnerable to technology risk – at least, if it does not use software of its own. Technology risk can be also a part of operational/strategic risk. [22]

It is of vital interest for overseers to ensure that central counterparty clearing houses as an industry adopt appropriate and effective procedures to tackle the risk of default. Supervisors' role is to inspect individual CCPs. Currently; the CPSS-IOSCO is establishing risk management recommendations for CCPs[23].

Safeguards against the default or insolvency of a participant can take three forms. First, there are safeguards designed to minimise the probability of failure of a market participant. In particular, strict access rules with adequate financial and operational requirements for membership of the clearing house fulfil this purpose. Second, there are safeguards designated to minimise the loss to the CCP if a market participant should fail. This category relates to margin requirements that collateralise the current and potential future credit exposures stemming from the trades of a participant. Margin has to be paid in cash or high-quality bonds by the participant itself. Another possibility for minimising losses is to limit the build-up of such exposures by periodically settling positions, especially in the derivatives markets, or making margin calls. In very volatile markets, sophisticated systems calculate, if necessary during the day, additional margin requirements that have to be provided immediately. There is a need for stress tests flexible enough. Third, there are safeguards designed to cover losses that exceed the value of the defaulting member's margin collateral. For this purpose, central counterparty clearing houses maintain supplementary resources such as capital, pre-funded guarantee funds, asset pools and guarantees. A problem could arise if those guarantees are not liquid enough.

From the perspective of the counterparties, the credit risk of the CCP is substituted for the credit risk of the other counterparties. As long as the CCP effectively manages the risk that it assumes, a CCP tends to reduce the risks to counterparties and systemic risk in the market it serves. Consequently, a risk management failure by a CCP could impose significant credit losses on its counterparties. In the extreme, it might default on its obligations, forcing its members to close out

[22] Bank of England 2002, Co-ordination Committee on Clearing 2002, CPSS-IOSCO 2001.

[23] The recommendations should be under public consultation in spring 2004.

and replace their contracts with the CCP. Short of that, a CCP might avoid default but only by imposing significant losses on its members under the terms of loss-sharing agreements. In either case, because a true CCP acts as counterparty to all trades in one or more markets, the losses would be widespread. Furthermore, should a CCP default – it would be unable to perform its services going forward. The loss of a CCP´s services or its imposition of significant losses on its members would disrupt the liquidity of the markets it serves, until its services could be replaced or its members could rebuild their capital. Particularly in the case of loss of a CCP´s services, but also in the case of significant losses to its members, market liquidity could remain impaired for an extended period. In the first place, it is possible to use 'soft ways' to compensate, e.g. liquidity risk. A CCP usually has a rule in its bylaws, where it states that it is possible to postpone the settlement date in severe situations.

A priority, of course, should be to avoid defaults and fortunately, CCP failures have been extremely rare, though the examples of Paris in 1973, Kuala Lumpur in 1983, and Hong Kong in 1987 demonstrate that they can occur. Two of those crisis happened in commodities market (Caisse de Liquidation, Kuala Lumpur Commodity Clearing House) and one in futures markets (Hong Kong Futures Guarantee Corporation).[24] However, liquidity problems with settlement delays have been more common and can cause serious problems to brokers.

2.3 Assessing of the advantages and disadvantages of using CCPs

Central counterparty clearing can create benefits not only to individual participants, but also to the economy as a whole. However, in many markets, the costs and benefits of a CCP may not be equally or proportionally shared between different market participants. Generally, large, active participants will have most to gain from use of a CCP, because they deal with most of the counterparties and have greater volume of trades in each security that can be netted. On the other hand, utilisation of the CCP functions can be difficult for small market participants. CCPs are often organised so, that it is almost impossible for small brokers to become direct clearing members of a CCP, which hinders small players´ possibilities to operate in the market. But this does not have to be the case. Depending on the structure of a CCP – it can also enable small players to stay on the market and make it possible for issuers of the regional market place to achieve market funding.[25] It should be carefully considered how the costs of development and use of a CCP can be allocated to ensure an equitable outcome for all market participants and thereby encourage broad support and participation.[26] It is also a question of governance[27]. It is important that market participants and other contact groups of the CCP have a possibility to participate to the governance of CCP.

Following what has been said above; could services offered by any one CCP be vital for the entire financial markets? If yes, there should be concrete involve-

[24] See: APPENDIX 1.

[25] This has been the tendency, which can be seen e.g. in the current EU accession countries.

[26] G30 2003.

[27] See also: Section 3.3 Corporate Governance.

ment of public authorities, for example in the form of rules. If not, the public authorities could concentrate on ensuring open and fair access to the markets. Open and fair access should ensure the soundness and efficiency of clearing and settlement systems and guarantee a level playing field. That would put in the effect the opinion shared by most of relevant authorities, that the process of EU/global consolidation should be driven by the private sector (market driven) and authorities only have a role as a catalyst,

Another subject is efficiency. Related to efficiency improvements, as acknowledged in Giovannini Group (2001), the importance of removal of cost inefficiencies in clearing and settlement is a necessary condition for the development of large and efficient financial infrastructure, in particular for the European context. Recent researches reveal the existence of substantial economies of scale related to both depository and settlement activities. On average, the centralised US system is found to be the most cost effective settlement system and may act as the cost saving benchmark[28]. However, settlement institutions from Europe and Asia-Pacific regions show highest potential in unit cost savings. Similar results were found for relatively smaller service providers where a doubling of settlement and depository activities would increase cost only by 2/3. The findings also suggest that operating cost for carrying out cross-border settlement appear to be much higher than operating a domestic CSD. Moreover, the evidence indicates that operating cost decreased continuously over time, possibly due to investments in implementing new systems or upgrading settlement technology.[29] It can be supposed that similar kind of findings prevail also in central counterparty clearing. On the other hand, in the U.S. securities clearing and settlement CCPs have been integral part of any post-trading infrastructure. In fact, the above mentioned paper implies a great structural difference between Europe and U.S. as in the latter trades tend to be processed via CCPs.

At least, it is evident that investments in implementing new systems and upgrades of settlement technology are costly but it can be argued that they continuously improve cost effectiveness in the long run, but on the other hand, also the continuous change is costly. The results of the above mentioned research clearly support the formation of mergers and alliances among smaller settlement institutions, i.e. expansions of pooling of depository and settlement businesses is likely to enhance savings in unit cost for small and medium sized institutions. Against this background, it seems to be relevant — at least for small players — for considering the question whether to build a new CCP or to integrate in already existing one or to set up a new joint-CCP. An implication that can be derived from CSD-side is that expansions are cost effective in post-trading activities. This would also imply a preference for multi-product CCPs.

Since the interposition of a single counterparty makes it easier for market participants to manage counterparty credit risk, the number of trading opportunities increases. As a result, market liquidity increases, trading is stimulated, transaction costs diminish and the functioning of capital market improves, but from the risk perspective, the effects of a central counterparty are not only positive. Although central counterparty clearing brings about a significant reduction in risk for the participants, this must be weighted against the concentration of risks into one central counterparty. Transparent risk management is one of the most important require-

[28] Covers only the cash markets.

[29] Schmiedel – Malkamäki – Tarkka 2002.

ments that a CCP has to follow. And, this is a field where authorities have an important role to play. In addition, it is more than common that a single CCP does not accept all e.g. shares listed in the certain stock exchange for clearing. Normally it accepts only shares from the main list. This can cause even discrimination among issuers — likely the small ones — whose shares are not accepted by a CCP and decrease of trading with other shares than those of a main list.

Currently, there can be seen two dominant market places in Europe: Euronext and Deutsche Börse. In addition, London Stock Exchange has lately gained room from Deutsche Börse. There is a same kind of structure related also to CCPs. The aim of this chapter is try to describe possible differences/similarities of the functionality of the three major CCPs in Europe: Clearnet, London Clearing House[30] and Eurex.[31]

1. Clearnet SA

Clearnet SA is a credit institution under French law and supervised by French authorities. Clearnet is a subsidiary of Euronext Paris, thus belonging to the Euronext Group with Euroclear holding[32].

Clearnet operates as a clearing house for Euronext[33] markets. It clears equities, warrants, exchange traded funds, bonds, equity and index futures and options with its multi-currency clearing platform Clearing 21, which aims to permit cross-product margining.[34] In addition, it acts as a clearing house for EuroMTS and clears outright bond trades and repos traded OTC.

According to the French legislation, clearing houses must have the status of a credit institution and the full ownership right over the deposits and margin calls of its members, whether in cash or securities. A clearing member can be either a general clearing member or an individual clearing member depending on capital requirements. Legal basis of CCP service is novation. By novation, Clearnet becomes subject to the rights and obligations arising from the transaction. At the end of the clearing day, Clearnet assume net payment and delivery obligations through multilateral netting.

Credit institutions, investment firms and entities, whose single purpose is to provide clearing services for financial instruments and which are within the scope of the prudential supervision of the Commission Bancaire can be admitted as members. Some additional criteria, like minimum capital requirements also have to be fulfilled.

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[30] LCH and Clearnet announced a merger in the 25th of June 2003. More about the merger, see also: Section 4 Future prospects – From integration perspective.

[31] Description of selected CCPs; see: APPENDIX 3.

[32] New corporate structure (2004) of Euroclear group (Euroclear plc) consists of CrestCo, Euroclear France, Euroclear Netherlands and Euroclear Bank.

[33] Established by merger between the Belgian, Dutch and French exchanges. Portugal joined in 2002. Since 1.2.2001, Clearnet SA has been the single preferred clearing house for the Euronext markets.

[34] The implementation of the Clearnet Clearing Model is an on-going process. Clearnet rolled-out its Clearing 21 (C21) cash clearing system in 2002 to Brussels and Amsterdam. In 2003 the system has been implemented in derivatives in Brussels and linked to the LIFFE CONNECT trading platform. All French and Belgian derivatives products currently traded on the LIFFE CONNECT trading system are cleared through C21 Derivatives. C21 connection to the Amsterdam derivatives market finalised in autumn 2003. LCH.Clearnet will progressively migrate to common systems architecture.

The financial guarantee of Clearnet is based firstly on a 'defaulter pays' approach, where margins are the first level of financial resources of Clearnet. There are two types of margin requirements:

- initial margin deposits, whose aim is to cover the upcoming risk on the open positions registered with the clearing house; and
- Variation margin or margin calls, which cover the price difference between the original price of the registered position and the marked-to-market price.

Valuation of exposures and margin calls is performed at least daily. Additional deposits are required for positions bearing risks that appear to be insufficiently covered by existing deposits. Regarding futures and options, intraday price variation limits apply. If a limit is breached, an intraday margin call is made. In addition, there exist other risk control measures such as individual exposure limits, market share limits and insurance agreements including an unconditional 'parental' guarantee from Euronext.

2. London Clearing House

London Clearing House (LCH) is a public limited company and supervised by British authorities. It is owned by its members, the London International Financial Futures and Options (LIFFE), the London Metal Exchange (LME) and the International Petroleum Exchange (IPE) and is run on a non-profit basis. LCH operates as a clearing house for LIFFE, IPE and LME. EquityClear offers CCP services for equities transaction in London Stock Exchange (LSE) and virt-x exchange[35]. RepoClear offers CCP services for repo and cash bond transactions in European government bonds and other bonds. SwapClear offers CCP services for interest rate swaps. EnClear offers CCP services for energy contracts on the US-based Intercontinental Exchange (ICE) and the European Energy Derivatives Exchange N.V. (Endex).

Users of exchanges and markets served by LCH must either be members of LCH or have a direct or indirect clearing relationship with a member of LCH. LCH sets minimum capital requirements for clearing members.

LCH guarantees the financial performance of contracts up to and including delivery, ensuring that delivery has been made accurately and on time, that the relevant documentation is complete and payment is received. Depending on the market in question, LCH either becomes counterparty to each trade through novation or through open offer. In the case of open offer, there is never any underlying legal bilateral contract between the original trading counterparties.

LCH uses three forms of safeguards against the default or insolvency of a participant:

- Safeguards designed to minimise the probability of failure of a market participant; financial and operational requirements for membership in the clearing house. Members also have to satisfy day-to-day operational requirements, including the adequacy of their back-office and banking arrangements.

[35] The new pan-European exchange was formed by Tradepoint and the SWX Swiss Exchange. Currently, SWX has 100% ownership of virt-x.

- Safeguards designed to minimise the loss it suffers if a participant should fail; margin requirements that collateralise the current and potential future credit exposures. LCH calculates initial margin on all open positions held by members and collects variation margin and has a possibility to make intraday calls for more margin if necessary in fast-moving markets.
- Safeguards concerned with who bears any losses that do arise; capital, pre-funded guarantee funds, asset pools, credit lines, and guarantees to cover losses that exceed the value of the defaulting member's margin collateral.

3. Eurex Clearing AG

Eurex Clearing AG is a wholly owned subsidiary of Eurex Frankfurt AG[36] and supervised by German authorities. It operates as a clearing house for Eurex exchanges in Frankfurt and Zürich. It clears futures, options and options on futures on financial instruments, like interest, bonds, index and stocks. It operates as a clearing house for Eurex Bonds and Eurex Repo and clears repurchase agreements and cash bonds of ECN markets. It also operates as a clearing house for Frankfurt Stock Exchange and Xetra and clears equity transactions executed on the floor or via the Xetra, trading system of Frankfurt Stock Exchange.

The management and processing of pending transactions for CCP-compatible securities takes place in CCP´s Gross Delivery Management (GDM). The GDM generates DVP instructions for the net obligation and gross transactions and transfers these to the CASCADE, securities settlement system as OTC instructions. In addition, Eurex Clearing AG acts as a clearing house for European Energy Exchange. Eurex Clearing steps in the transactions, becoming the seller to every buyer and buyer to every seller at the moment the trade is executed (open offer), and guarantees the fulfilment of all obligations received by the clearing house. The amount of margin to be deposited is determined using the Risk Based method.

Eurex Clearing AG uses different forms of safeguards against the default or insolvency of a participant, which comprise:

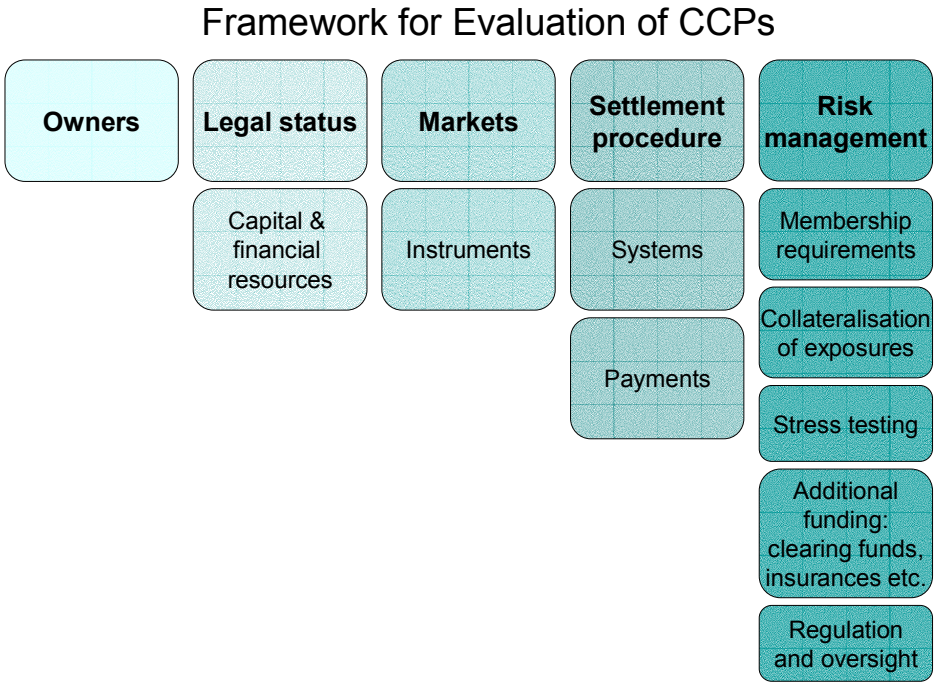
- Strict access criteria; only clearing members may be parties to contract with Eurex Clearing AG. Clearing members must be licensed by national supervisory authorities.[37] Minimum equity capital requirements are EUR 12.5 million for direct members and EUR 125 million for general members.
- Risk based margining; margining encompasses the entire process of measuring, calculating and administrating the collateral that must be put up to cover open forward positions. The level of margin required from each member is recalculated on a daily basis.
- Clearing fund; irrespective of the provision of other margin, clearing members have to make a contribution to a clearing fund. The contribution has to be provided in the form of bank guarantees and/or cash or securities collateral.

[36] An international CSD, which is subsidiary of Deutsche Börse AG. Deutsche Börse has 100 % ownership of Clearstream group since 2002.

[37] Since Eurex Clearing AG has introduced the possibility of remote clearing, a banking permit is no longer required.

Above was only a short description of main functions of major CCPs in Europe, based on fact finding analysis of ECB, work done by CPSS-IOSCO and the rules of described CCPs. The figure 5 attempts to construct a framework for evaluation of CCPs describing the main aspects to consider in the evaluation process. The current structures of major three CCPs differ from each other. Clearnet is for-profit company. It operates under the French legislation and therefore needs a status of credit institution while LCH is not-for-profit public limited company owned by its members. Eurex Clearing AG is a wholly owned subsidiary of Eurex Frankfurt AG. Also, the markets where these CCPs operate differ from each other. Clearnet operates as a clearing house for Euronext markets and LCH offers a wide variety of clearing services e.g. to its owners and to LSE, virt-x and other members of LCH. Eurex Clearing operates as a clearing house for Eurex exchanges in Frankfurt and Zürich clearing different types of financial instruments (bonds, repos, and cash). Although, there exist differences between major CCPs it seems evident that all the major European CCPs comply with the basics of the current EACH standards of risk management[38] and CPSS-IOSCO recommendation (4)[39] for CCPs. In spite of quite good compliance of current standards and recommendations, it should also be considered that clearing and settlement infrastructure is under a process of change and there come new requirements, e.g. from different infrastuctures and processes of accession countries. One example of trying to answer the new challenges is the work done by the ESCB-CESR working group[40] and work currently undertaken by G10 countries (CPSS-IOSCO) in this field.

Figure 5.



[38] EACH 2001, http://www.fese.be/each/information.htm.

[39] See: APPENDIX 2.

[40] European System of Central Banks (ESCB) – Committee of European Securities Regulators (CESR) 2003, See also: Section 3.2 Standardisation.

3 Oversight, Standardisation and Corporate governance

3.1 Interests of Central Banks

Central banks have an interest in ensuring the smooth functioning of securities clearing and settlement systems because of the potential impact a major disruption may have on two of their key responsibilities: the smooth implementation of monetary policy and the smooth functioning of payment systems and overall stability.

The main reason why central banks are interested in function of the CCPs from oversight-perspective is that problems with this type of clearing and settlement can spread through the financial system and cause serious disturbances and the growing globalisation of markets creates new sources of risk.

Clearing houses typically undertake activities which support the securities settlement process, such as the matching and netting of trade orders. Problems on the clearing side could, therefore, spill over to the settlement side. Moreover, in the case of cross-product clearing and/or cross-currency clearing, there is a risk of contagion from one market to another in the event of the failure of a central counterparty (or even in the event of doubts over the creditworthiness of the central counterparty).

Where no central counterparty service is provided, counterparty credit risk is managed on a decentralised basis by each participant contracting in the market. Therefore, when a central counterparty is used, the systemic implications of an inappropriately designed clearing or risk management system, or of a management failure, are correspondingly larger than if the clearing house does not offer central counterparty services.[41]

The question of central counterparty clearing gives rise to an important trade off. A central counterparty, by definition, concentrates and re-allocates risk. As such, it has the potential either to reduce or to increase the systemic risk in the market. It can provide substantial efficiency gains for market participants and can lead to more liquid capital markets. On the other hand it can have following effects on financial stability:

- **Concentration of risk**; potential problems can arise as a result of the large risk concentration entailed in central counterparty clearing. The repercussions of insufficient risk management can be substantial.
- **Contagion effect**; in the case of cross-product and cross-currency clearing, risks are concentrated to an even greater extent and may spill over from one market to another.
- **Moral hazard**; the concentration can also lead to 'moral hazard' problems if the central counterparty can be considered to be 'too big to fail'.
- **Information asymmetry**; the market participants may hesitate to trade with counterparties they have little information about. This 'information asymmetry' is particularly true in times of financial crisis when there is a general suspicion that counterparties may be close to collapse. The existence of a single counterparty reduces the level of information asymmetry

[41] ECB 2002.

only if there are no doubts about the solvency and competency of the central counterparty clearinghouse itself. If there were fears about the solvency of a central counterparty, the whole market might stop trading.

- **Excessive risk-taking** (limited liability); participants may use CCPs to externalise risk, i.e. they may not bear all the cost/losses from trading and may trade less prudently, thus increasing the overall level of risk in the market.
- **Race to the bottom**; the hard competition between central counterparties (race to the bottom) entails the risk that these service providers may try to improve competitiveness by applying more lenient risk management standards.[42] In addition, it should keep in mind that also the cost reduction is in high priority in the CCPs' business plans.

Another interest of central banks appeared when analysis of various EU accession countries infrastructure has revealed that some of the CSDs in accession countries also act as CCP or provide services which are similar to those provided by CCPs. The key issue is that the functioning of a CSD must not be affected by the potential default of a CCP. There are currently discussions on the functions performed by CCPs and CSDs as well as on the need to separate them. On the discussions so far, it seems to be that the effects of a default of a CCP would have adverse effects on the securities markets. In addition, the effects would be even worse if the CCP and the CSD were the same entity. In the case the CCP and CSD belong to the same corporation, central banks have a tendency to prefer balance sheet protection of the two entities.

Central counterparty clearing could have adverse effects on financial stability. There is a need for transparent oversight and regulation. At the international level as well as at the national level, securities regulators and central banks should closely co-operate, and in case of CCP that serves markets in multiple jurisdictions, regulators should make co-operative arrangements. Currently, the supervisor´s particular role is still undefined.

3.2 Standardisation

Several international initiatives completed in the past few years have the goal of maintaining financial stability by strengthening the financial infrastructure. There exist also many attempts to standardised functions of CCPs. Part of those are prepared by authorities and the other part by market participants.

CPSS-IOSCO Recommendations

CPSS-IOSCO recommendations were published in the end of 2001 and the 19 recommendations and accompanying explanatory texts identify minimum standards that securities settlement systems should meet. The recommendations are designed to cover systems for all types of securities (functional approach), for securities issued in both industrialised and developing countries, and for domestic as well as cross-border trades.

Recommendation 4 deals with central counterparties by emphasising that the benefits and costs of a CCP should be evaluated. Where such a mechanism is in-

[42] ECB 2001.

troduced, the CCP should rigorously control the risk it assumes. CPSS-IOSCO recommendations list also the key questions for assessment of implementation[43]. For further assessment CPSS and IOSCO have published a draft 'Assessment methodology for Recommendations for securities settlement systems' in September 2002. The methodology is primarily intended for use in self-assessments by national authorities or in peer reviews of such self-assessments. It tries to give more accurate picture from assessment process than the original broad-perspective CPSS-IOSCO paper[44]. In addition, CPSS-IOSCO is currently preparing specific risk management recommendations for CCPs, which should be ready for public consultation in the first quarter of 2004.

ESCB-CESR Standards

CCPs are rather poorly covered in CPSS-IOSCO recommendations. Thus a group of authorities from larger countries have restarted the work in the spring of 2003 to achieve common recommendations for CCPs.[45]. However, an example of current work is ESCB-CESR aim to produce European standards based on the CPSS-IOSCO recommendations in the first quarter of 2004[46]. The objective of these standards is to enhance the safety, soundness and efficiency of the securities market infrastructure and, therefore, they basically address the activities of CCPs and CSDs. In addition, there is a separate, more accurate standard to the CCPs. The standard emphasises the importance of CCP risk management, but sets out more detailed consideration of the risks assumed by CCPs and techniques used to manage such risks. The standard thus sets out a list of the principal risks associated with CCP operations and for each risk category proposes a high level standard for managing those risks. The standards emphasised partly also the role of custodian banks because of their active role in the field of clearing and settlement.[47]

The Giovannini Group Reports

The Giovannini Group, whose role is to advice the Commission on the issues relating to EU financial market integration and efficiency on euro-denominated financial markets published in the end of 2001 the first of two reports dealing with clearing and settlement of cross-border securities transactions in the European Union. The first report reviewed the current arrangements, highlighting the main inefficiencies in terms of national differences in technical requirements/market practices, taxation and the legal treatment of securities. The intention is to identify clearly the sources of these inefficiencies, assess their justification and consider the scope for their removal. In a follow-up report (published in April 2003), the Group attempts to provide actions to remove of 15 barriers identified in the first report in a strict time frame (max. 3 years). The Group also identifies the party responsible for that action. In addition, the Group examines issues relating to the fu-

[43] CPSS-IOSCO 2001. See also: APPENDIX 2.

[44] CPSS-IOSCO 2002.

[45] CPSS-IOSCO Task Force on Securities Settlement Systems; standards should be under public consultation in spring 2004.

[46] Standards were under public consultation until the end of October 2003.

[47] ESCB-CESR 2003.

ture infrastructure for providing cross-border clearing and settlement services within the Union, including central counterparty clearing.[48] However, the report does not identify in its structural analysis a preferred model for delivering pan-European Union clearing and settlement services, describing this as a matter primarily for the private actors involved.[49]

The Group of Thirty Recommendations

The new Group of Thirty (G30) report 'Global Clearing and Settlement – A Plan of Action' consists 20 recommendations for improving global clearing and settlement, which largely reflect current practises and priorities, but call for increased interoperability, reduced risk and improved governance of post-trade processing houses. While CPSS-IOSCO recommendations set forth 'minimum standards' to be met at the 'earliest opportunities' by all settlement and clearing houses, the G30 is promoting 'best practise' that the most advanced post-trade processing firms should achieve within the next five to seven years. The report promotes to expand the use of central counteparties with its recommendation 6. This recommendation endorses CPSS-IOSCO Recommendation 4 (central counterparties)[50], which promotes the assessment of the benefits and costs of CCPs and asserts the need for CCPs to have rigorous risk control. The G30 Recommendation 6 is more emphatic, taking the view that CCPs are strongly expected to bring substantial benefits to most markets. The G30 recommendation also emphasises the need for harmonised practises and standards and explicitly encourages the evaluation of using the services of existing CCP as an alternative to building a new system.[51]

EACH Standards

CCPs themselves have also developed risk management standards that draw on their common experience and expertise. At the beginning of 2001, senior executives of the European Association of Central Counterparty Clearing Houses (EACH) developed risk management standards for their organisations. Subsequently, CCP-12, a group that includes CCPs from Asia and the Americas as well as Europe[52], has been working to revise the EACH standards and broaden their acceptance among CCPs. Finding the common position among the market participants has proven to be very difficult, the group has currently stopped the work and shared their ideas with the CPSS-IOSCO Task Force.

The scope of the EACH standards is confined to the core risk management controls necessary for central counterparty clearing houses.

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[48] The Giovannini Group 2001, 2003.

[49] See also: Section 4 Future prospects – From integration perspective.

[50] CPSS-IOSCO 2001, see also: APPENDIX 2.

[51] G30 2003.

[52] The CCP-12 is composed of following entities: 1) the Australian Stock Exchange, 2) the Brazilian Clearing and Depository Corporation, 3) Eurex Clearing, 4) the Chicago Mercantile Exchange, 5) Clearnet, 6) Hong Kong Exchanges and Clearing Limited, 7) the London Clearing House, 8) SD Indeval, SA de CV, 9) Singapore Exchange Limited, 10) The Canadian Depository for Securities Limited, 11) The Depository Trust & Clearing Corporation, 12) The Options Clearing Corporation, and 13) the Tokyo Stock Exchange. See also: APPENDIX 3.

The standards cover:

- counterparty risk,
- valuation and margining,
- money settlement and custodial arrangements,
- financial resources of the clearing house,
- default arrangements,
- risk management arrangements and resources,
- IT arrangements and resources of the clearing house and
- disclosure of risk management practises and of the nature of the clearing house 'guarantee'.[53]

In addition to the above mentioned standardisation, there is a need for technical standardisation, e.g. system interfaces. Clearnet´s clearing model C21 is an example of using common technology in Paris, Brussels and Amsterdam. When LCH – Clearnet merger is going to finalise they will progressively migrate to common systems architecture. OM is also a remarkable technology provider and it is evident that possible forthcoming Nordic-Baltic CCP would use common OM-based clearing system. To summarise, it can be argued that IT technology and risk management tools combine the core functions of CCPs.

3.3 Corporate governance

Traditionally, a key component of a well functioning corporate governance system is the bankruptcy law and related insolvency procedures. Governance arrangements among CCPs vary. Traditionally, central counterparties have been user-owned, but profit-making limited companies are becoming more common in this role to encourage efficiency with incentives and reward shareholder institutions that sponsor innovation and investment for the costs they incur and the risks they take. Competitive and profit-making central counterparties may have an incentive to lower their costs, for instance, by lowering standards for risk management or for operational security.[54] According to Ruben Lee (2002), the main function of a CCP from corporate governance point of view is minimising the transaction costs. The contact groups of the CCPs are owners, participants, users (e.g. brokers), managers, CSDs and exchanges and it is important to guarantee participation to governance of a CCP also for outside of owners. And specifically related to CCPs – it is also important to widen governance aspect to cover systems themselves (system-governance).

There is a question about so-called agency-costs. A principal-agent relationship arises as soon as a principal (e.g. the board of the CCP) uses the services of an agent (e.g. the management of the CCP) in order to achieve its goals. The objectives of the agent may differ from those of the principal, since the agent has its own private interests. Under these circumstances, the principal has to bear so-called agency costs in terms of lower productivity of the agent and/or costs of controlling the agent. Informal power has also a great importance. The ownership

[53] EACH 2001.

[54] Riksbanken 2002.

structure becomes even more important if one takes into account the fact that a central counterparty often holds monopoly position in the market.

According to the CPSS-IOSCO recommendations, the governance arrangements for CSDs and CCPs should be designed to fulfil public interest requirements and to promote the objectives of owners and users.

- Public interests; The general public is interested in safety, i.e. risk prevention.
- Owners´ interests; Owners are interested in the efficiency of the institution.
- Users interests; Users are consumers buying clearing and settlement services and they are interested in receiving the best price with the lowest possible technical investments.[55]

ESCB-CESR standards identify the relevant public policy interest. It requires fitness and propriety for managers in line with requirements applicable to managers of securities firms and credit institutions. The standard allows for different board structures. It calls on CSDs, CCPs and custodians with a dominant position in a particular market to have consultations and other mechanisms to ensure effective user representation. In addition, the standard discusses the potential conflicts of interest between the operator of a system and its users, as well as those that can arise within the organisation and requires that these conflicts be identified and managed.[56] In addition to the above mentioned, the access to the systems has an important role when considering governance of these systems.

EACH has intentionally avoided comment on the debate concerning the ownership, governance and pricing policy of clearing facilities in Europe. However, EACH considers the relationship between the organisational structure of CCPs and their risk management as a key importance to the systemic risk mitigation. It has to be argued if EACH´s risk control principle[57] (risk management arrangements and resources) that emphasises the need for there to be senior, independent risk management specialist at all clearing houses, regardless of their ownership structure is of considerable relevance. Equally, do we subscribe to crude supposition that a clearing house owned by a profit maximising exchange will trade-off risk management standards for greater throughput and income or that a clearing house owned by its clearing member participants will be persuaded by them to adopt lax risk management standards in order to lower capital costs?

Even if the central counterparty's risk management procedures are in theory sound, their effectiveness is still dependent on the competent implementation of those procedures by its management. The concentration of operational risk in a central counterparty is considerably greater than that in any individual participant in a decentralised market, and the repercussions of incompetent management would be correspondingly larger.

Corporate governance rules are a crucial ingredient for determining the prosperity of capital markets and clearing and settlement infrastructure, CCPs included. All forms of ownership have their advantages and disadvantages. From public authority's point of view, it is important to understand these in order to follow up on problems that can arise from the different forms. Full disclosure of corporate gov-

[55] CPSS-IOSCO 2001.

[56] ESCB-CESR 2003.

[57] EACH 2001.

ernance practises helps markets work efficiently. A sound corporate governance framework will be achieved by finding the right balance between regulatory based incentives, penalties and market practices, but priority is market discipline.

4 Future prospects

4.1 From risk perspective

CCPs are designed to centralise risk control and management for those trading in the markets for which the CCP clears. The systemic importance of existing CCPs has increased in recent years as they have expanded the range of markets in which they operate. It is clear that CCPs can bring at least following substantial benefits to a market:

- they can reduce unwanted credit risk taken on by counterparties as a by-product of trading, which also facilitates anonymous trading on an exchange or trading platform if market participants so desire,
- they enable multilateral netting to occur, which reduces the settlement risk on delivery date. This multilateral netting of trading positions also increases the trading that each firm can undertake on a given proportion of its balance sheet, potentially increasing liquidity in a market,
- a single net movement of collateral to the CCP from each clearing member should also reduce the risk of failed trades while the standardised back-office processing required by a CCP might also reduce costs for market participants to the extent that processes are not already standardised.

On the other side, there has been also raised views counter the CCP. [58] It has even been argued, if there is any advantage to establish a CCP for cash-markets. The expansion of CCPs creates risks of 'all eggs in one basket' underlining the need for cautious risk management practises. The probability of a CCP failure should be very small but the consequences on the system as a whole could be much bigger. That systemic risk means central banks have a strong interest in CCP risk management, and particularly in how those procedures are designed to deal with extreme events.

Over the last years, CCPs in Europe have rapidly developed new lines of business. To keep pace with these changes, new margining methodologies have also been introduced. An important goal for CCPs, which clear many different markets, will be to develop integrated, transparent modelling techniques that can pro-

[58] A very recent research (Leinonen 2003) introduces a possible solution based on an international, harmonised and simplified institutional structure operating in an open real-time network structure. All deals are settled in immediate, T+0, real-time, which means that all assets and funds are delivered immediately and thereby removing settlement risk. According to this model the CCP would be an unnecessary institution.

vide a sophisticated assessment of the aggregate risks to the CCP.[59] This is important from stability aspect, because otherwise it is possible that all market players do not realize how much and what kind of risk they face as a whole.

The key is risk management. To assume and manage the risk, the CCP can choose among a variety of funding options, ranging from margins and reserve funds collected from clearing members to additional insurance and the CCP´s own capital. These arrangements need to provide the highest level of soundness and safety to markets, ensuring that the CCP always has sufficient resources (e.g. liquidity, quantity) to handle even major participant failures, eliminating post-trade uncertainties. Related to funding options, CCPs´ own rules, e.g. accession rules are very important tools in risk management.

Current trend to offer clearing of cash market instruments in addition to derivatives entails risk increase for the central counterparty, while the efficiency gains to – at least large – market participants can be considerable. For one thing, as is the case in all clearing operations, central counterparty clearing has economies of scale that make it more efficient to utilise one and the same system for the various markets. Large fixed investment cost that arises on the margin is reduced in relation to the size of the system, thereby reducing the average cost. In addition, if a central counterparty manages both cash and derivative sides of a market place, it can take advantage of the participants having offsetting positions on both sides. In this way, counterparty can have less capital than would have been required for two separate central counterparties.[60] For OTC-markets, using of central counterparty can bring structural element and more transparency.

At the same time when risks faced by a central counterparty become more complicated, there is a growing need for daily stress-tests and other sophisticated risk management methods. Stress testing provides insights into several aspects of the financial resources the CCP may need. In addition to risk management methods, the standard-setting work should take into consideration the aspects related to legal risk, because a well-founded legal framework supports a CCP´s risk management and operations. Also, the money settlement and requirements of Settlement Finality Directive are most important, because funds transfers to the CCP should be final when effected.

4.2 From integration perspective

Although, there has been progress in financial market integration process, the European securities clearing and settlement industry remains highly fragmented. Integration implies access for all users to the same services on the same conditions, regardless of the location of the user or provider. Integration can take two different forms. Horizontal integration exists when institutions at the same level (trading, clearing, settlement or custody) merge or adopt other forms of co-operation. Vertical integration exists when institutions merge into so-called silos (comprising trading, clearing, settlement and custody in a single entity). Recent

[59] Bank of England 2002. There is little published research work which considers the margining of portfolios, and even less which considers other default resources. Keppo (1997) offers a general model of portfolio margining that also takes into account the conditional probability of member defaults.

[60] Riksbanken 2002.

examples of consolidation demonstrate that vertical integration (which can maximise straight-through-processing, STP) does not preclude horizontal integration (in order to maximise netting benefits) at a later stage. Recent example of horizontal integration is Swedish - Finnish OM-HEX merger, which was confirmed on the 4th of September 2003. The operations of OMHEX base on two divisions: HEX Integrated Markets and OM Technology. New Nordic marketplace comprises of Swedish OM, former Finnish HEX Group – Estonian and Latvian market places and CSDs included. OM Technology offers CCP solutions to various markets around the world.

Consolidation implies a greater concentration among clearing and settlement providers and can be achieved not only through structural changes (e.g. mergers and acquisitions) but also through strategic measures (e.g. outsourcing, alliances, joint ventures, and reorganisations within financial institutions). So far, consolidation has resulted, more or less, in merely the restructuring of legal entities. This notwithstanding, consolidation of technical platforms is likely to take place sooner or later. Full consolidation may prove difficult to achieve in the short run. Rather than aiming at full consolidation through mergers, other forms of integration in central counterparty clearing can be considered, such as co-operation (dialogue, shared standards, collateral optimisation arrangements, and shared technology investment), joint ventures and interoperability.

Although one has to acknowledge, there is a slow consolidation process going on in central counterparty clearing in Europe. The London Clearing House (LCH) and Clearnet announced a merger at the end of June 2003. It followed a similar deal last year in settlement, with the merger of Euroclear and London´s Crest. LCH - Clearnet merger process was confirmed on 22nd December 2003 and it will lead to the creation of Europe´s largest group of central counterparty clearing houses.

The merger has been complicated because LCH is user-owned while Clearnet is controlled by Euronext, the for-profit company. Under the merger, users will own 45.1 per cent of the shares and 45.1 per cent will be owned by three exchanges – Euronext (41.5 %) and the International Petroleum Exchange and the London Metals Exchange (3.6 %). Due to the regulatory and legal complexities, it has been confirmed that the merger will not lead to the creation of a single clearing house governed by a single legal framework. On the contrary, it has been achieved a common solution that **LCH.Clearnet SA** is a credit institution under French law (formerly Clearnet). It is the sole clearing house and central counterparty for markets operated by Euronext (excluding Euronext.liffe). LCH.Clearnet SA clears trades for Powernext and also clears repos and bonds. **LCH.Clearnet Ltd** (formerly LCH) is the central counterparty clearing house for the exchanges Euronext.liffe, IPE, LME, and others including Endex, LSE, and virt-x[61]. LCH.Clearnet Ltd also offers a broad range of services in relation to the OTC interest rate swap, bond and repo markets. LCH - Clearnet merger can serve as a catalyst for further CCP consolidation in Europe.

Similar to mergers of SSSs, the merger of LCH and Clearnet will probably increase the technical efficiency of cross-border securities clearing in Europe. However, the merger will also lead to a higher concentration of credit risk in one institu-

[61] virt-x, the pan-European securities exchange launched on May 2003 its central counterparty service through the alliance between the LCH and SegaIntersettle´s (SIS) newly created x-clear unit.

tion. It is therefore important to closely monitor the risk mitigation measures of the two clearing houses to avoid the potentially severe disruption of financial markets which a failure of the merged entities would cause.

Some recent mergers in the sector will effectively bring about a less fragmented structure but to make sure that an efficient EU-wide clearing and settlement system will become operational, charging the same for domestic and intra-EU transactions, regulatory action may be required to complement market developments. Currently EC directives do not set out legislation for CCPs but rather address overarching principles such as the single passport. The Investment Services Directive (ISD) consists a principle that an institution which is regulated in one EU country should be allowed to perform the same activities in other EU countries. Because there are very different definitions in different EU countries of what a CCP is, it would not be enough to allow an institution that is recognised as a CCP in one country to act in other countries as a CCP in the definition of the respective country. This could be the case e.g. with accession countries. It could even be argued that the single passport for investment services firms had negative effects on CCPs. While in the past, CCPs had to accept only members that were subject to domestic regulation, they now have to accept firms as members that are subject to foreign regulation (home-country supervision). That is not supposed to be a problem for large institutions, but can be problematic for smaller ones. There will be an updating to ISD in the near future and one of the major changes is to provide the possibility for market participants to designate the settlement venue of their choice. Commission's purpose is to add level playing field, but the practical implementation can turn out to be difficult.

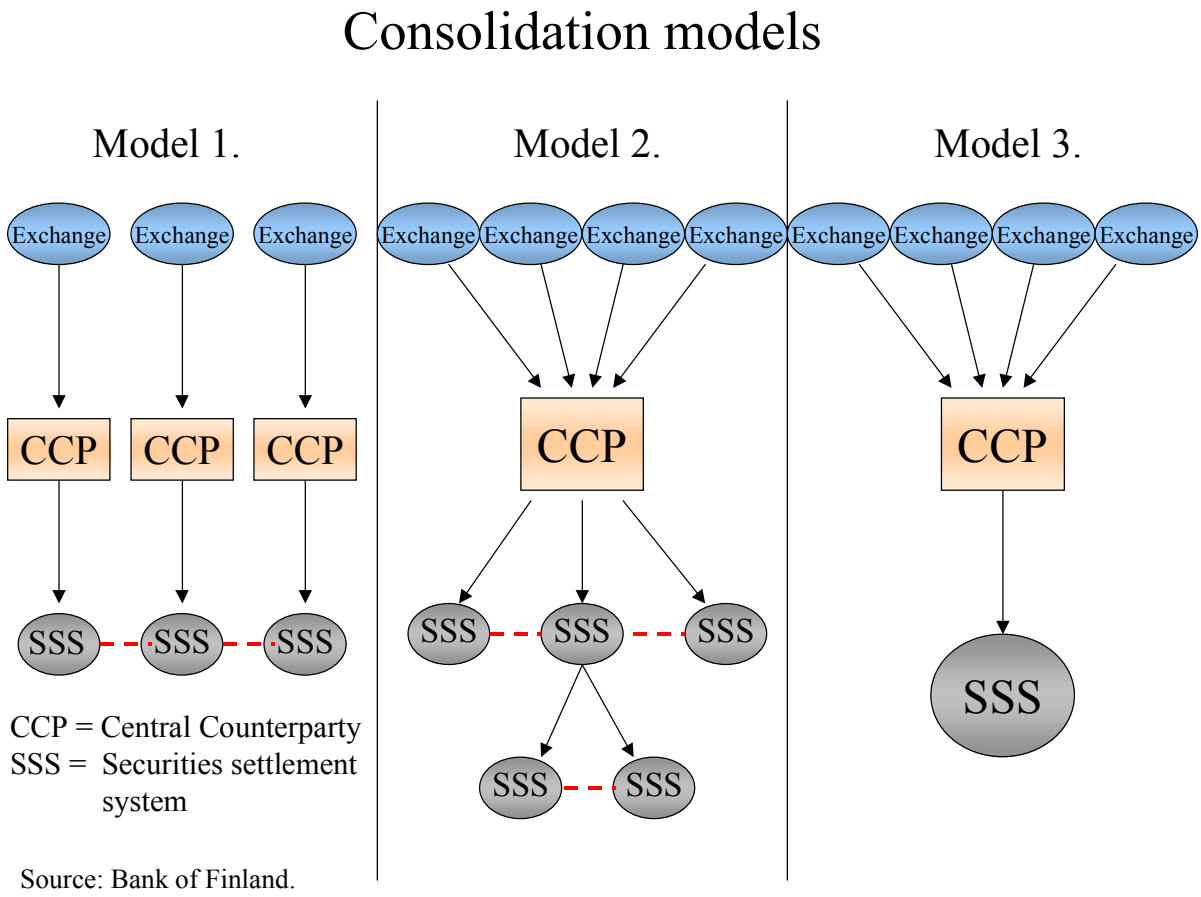
The problem of competition between CCPs and custodians/general clearing members in the area of cross-border clearing could also be addressed. Currently, it is much cheaper to use a custodian than for example a link between CCPs in order to clear a cross-border transaction. One main reason is the unequal regulation of custodians and CCPs in particular in the area of capital requirements.

Though market participants do not agree on the most efficient market structure to be achieved, consolidation among CCPs is an attractive option in many circumstances. A single CCP that spans several markets can act as a hub among several settlement institutions and depositories. From the viewpoint of the larger market participant, such a CCP can be a place where post-trade risk correlations can be recognised and where, correspondingly, capital requirements for risk management can be reduced. This effect can be especially important between derivative and cash securities markets. Operations are simplified when systems, communications and position management are standardised; this is more likely to be the case with a single CCP. And the costs for maintaining, enhancing and developing CCP technology can be spread across a larger base of activity.

The model of a 'single CCP' is also one of the examples proposed by Giovannini Group in its second report (2003). The group proposed three stylised models based on functional approach (figure 6). **The first model** assumes a limited degree of consolidation, with multiple central counterparties and settlement systems remaining in operation ('status quo'). **The second model** assumes that consolidation results in a single CCP but multiple SSS. **The third model** assumes that scale of economies and network externalities result in consolidation to a single CCP and a single SSS. Each of these models has been assessed on the basis of

cost effectiveness, competition, and systemic risks[62]. Disappointingly, the report concludes that each has its merits and faults, and fails to fall down in favour of any one side. The group argues that these models are only examples of different infrastructures and are not suitable as such for different groups of market participants.

Figure 6.



Against the benefits of a CCP, individual capital market participants have to weigh the costs of establishing and participating in a CCP – typically some capitalisation and finance costs, and fees associated with its services as well as the cost of the participants´ systems infrastructures. Where the marketplace is relatively small and no established CCP exists, the costs – and the risk – of setting one up as a separate entity may be significant and counterproductive. This could be the case also in some accession countries and emerging market countries. However, where issues of national sovereignty, local market practice, autonomy and local control weight against simple invitation to an established CCP to enter a local market, the question is whether it would be possible to devise modes of co-operation that achieve most of the benefits of extensions without compromising local interests and concerns. [63] In particular, different views are expressed as to when and where this possible pan-European CCP should be established.

[62] It is assumed that the users and providers of clearing and settlement services are operating in an already integrated, i.e. barrier-free environment.

[63] DTCC 2000.

The existence of a domestic infrastructure should not prevent the emergence of international infrastructures, such as the Continuous Linked Settlement Bank (CLS)[64] shows, in the field of securities settlement. International infrastructures are superimposed on domestic ones and are not essentially designed to replace them. However, from an overseer's point of view, it should propose a question if there exists a risk that counterparty can loose its risk consciousness operating with a single large international CCP?

5 Concluding remarks

Comparing to trading, post-trading is a closely related, but profoundly different world. Unlike trading, here competition is important, but not the main priority: efficiency and risk minimisation must rank higher. Attention should be paid to preventing infrastructure providers from competing by reducing risk management standards or the transparency of risk allocation. Systemic risk avoidance is the foremost task of post-trading system, and well-designed standards for systems and procedures, accepted by the relevant authorities, are paramount. Clearing and settlement benefit from scale economies that only one or a few centralised systems can offer. In general, users benefit from concentration and new technology – via lower costs and easier connectivity.

With regard to efficiency, the main issue is that existing arrangements are both too costly and insufficiently smooth and secure, relative to domestic arrangements. Full harmonisation of rules and the integration of institutions are complex issues, involving both public and private sectors: post-trading systems are closely intertwined with local legal systems, and involve issues of national interests.

Related to the surrounding post-trading infrastructure, it is evident that there exist still challenges for consolidation – and particularly for CCP consolidation. Competition is usually the principal driver for consolidation but true competition between central counterparties is difficult for the sake of different jurisdictions, pricing differences and questions related to national identities. Attempts to establish a Pan-European CCP have failed so far, although the idea has gained certain support.

Overall, the benefits of a CCP are becoming increasingly apparent in a globalised market with increasing cross-border activity. In a cross-border environment, through multilateral netting, the CCP reduces the number of settled trades down to one single transaction between the two settlement systems and the CCPs´ own account, thus sharply reducing the costs to firms of cross-border settlement. This, and the possibility of saving collateral through margin offset in correlated assets, seems to be one of the decisive arguments in favour of CCPs. CCPs can promote greater activity in markets through a more efficient use of capital and reduced total infrastructure costs. This is made possible by a more efficient distribution of risk through risk sharing, centralised monitoring, greater transparency and netting of settlement instructions. However, it should be kept in mind, that CCPs are not a cure-all: their introduction affects financial stability as a potential source of systemic risk, whereas CCPs and netting in general mitigate credit risk, consolidation of set-

[64] CLS Bank eliminates foreign exchange (FX) settlement risk through simultaneous global multi-currency settlement system.

tlement capabilities will involve new concentrations of operational risk, and in addition, it is not without costs to establish a CCP.[65]

Although, it is evident that a well-functioning CCP with proper risk management and governance is a part of modern post-trading infrastructure, there is still an open question what is an ideal number of infrastructure that should prevail in Europe. This paper has set out to give an objective picture of current risks and benefits related to CCP services in the integrating markets. Hopefully this paper provide basis for possible forthcoming risk-benefit –analysis in Finnish/Nordic-Baltic clearing and settlement infrastructure with a CCP-solution included.

[65] Giordano 2002.

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APPENDIX 1.

Central Counterparty Clearing House in Crisis

Caisse de Liquidation (Paris), 1974

Prices in the Paris White Sugar Market doubled between September and November 1974, but were then subject to a correction. This volatility was partly caused by the entrance into the market of speculative investors, who may not have been fully aware of the risks they were taking. Some clearing members put forward orders on behalf of their customers without obtaining their prior authorisation. Many participants were unable to meet the margin calls to meet this market volatility, and the losses of one sugar operator in particular, the Nataf Trading House, prompted the Ministry of Commerce to close the market.

The clearing house (Caisse Liquidation) exacerbated the situation in three ways:

- it did not adjust margin requirements, which were set on absolute amounts, to respond to the rapid rise in prices, even after being requested to do so by market participants in September;
- it was aware that one clearing member (Nataf) held a sufficiently large proportion of the sugar futures contracts in the market to have an effect on market prices, but failed to inform the exchange; and
- the allocation of losses was not transparent.

A regulation was applied, so that on the reopening of the market contracts would be settled at the average price of the last 20 days (which was considerably higher than the price at the suspension of trading). This was followed by considerable legal wrangling, which included a decision by a court of appeal to reverse this judgement, and the refusal of two of Nataf´s guarantors to cover the sums they were deemed to owe. The clearing house, which was liable to settle the outstanding contracts, became insolvent when it was clear that its shareholders were not indemnified. The sugar market did not reopen until June 1976, under new clearing rules.

Kuala Lumpur Commodity Clearing House, 1983

Massive defaults on the Kuala Lumpur Commodity Exchange Palm Oil contracts occurred following market concentration, a squeeze on prices and an accumulation of uncovered selling positions by a particular broker. As a result, six brokers defaulted on positions of $70 million and trading was suspended.

A task force, set up by the Malaysian government, issued a report that laid much of the blame for the crisis on management inaction in the clearing house: in particular there was a period of 12 days between the market squeeze and the broker default, during which margin was raised but disputed contract registrations were not speedily addressed and emergency powers were not invoked. Officials at the three-year-old Kuala Lumpur Commodity Clearing House lacked experience, and lack of co-ordination between the exchange, the clearing house and the Commodity Trading Council was highlighted.

The task force also focussed criticism on brokers who, they felt, should do more to assume their share of the risk monitoring – in particular, showing due cau-

tion in the acceptance of clients and not trading beyond their abilities. Higher minimum capital requirements were suggested as a means of improving the quality of brokers and that brokers should leave deposits with the exchange in relation to the volume rather than the risk of trades. In conclusion, though, the task force recommended that the central counterparty be re-established.

Hong Kong Futures Guarantee Corporation, 1987

During the stock market crash of 1987, both the stock and futures exchanges in Hong Kong were closed for four days. It was clear that the value of long positions in the Hang Seng Index future would fall dramatically when the futures exchange reopened, which prompted fears that participants would default on margin calls. Indeed, the fear that the scale of losses would exceed the total reserves of the guarantee fund prompted the government and private institutions to prepare a rescue package for the fund, much of which was required to meet defaulters´ positions.

The guarantee fund (HKFGC) was separated from the clearing house (ICCH(HK) - itself separate from the futures exchange). This meant that there was an asymmetry of information and risk: the clearing house was responsible for monitoring positions, but was not exposed to losses in the event of default, whereas the guarantee fund was exposed to losses but dependent on the clearing house for its risk monitoring. This meant not only that the guarantee fund was exposed if information was not effectively shared, but that traders, who were not exposed to the losses of the guarantee fund, had little incentive either to monitor the clearing house´s risk management or to follow prudent trading strategies. In practice, there had been failures of risk management: for instance, margin on the main Hang Seng Index future had not been raised in line with the 2000 per cent growth in turnover of the contract in the two years since it had been introduced.

Despite the fact that these failures in the management of the clearing house actually increased risks in the system during the crash, the report of the committee set up to investigate the response of Hong Kong´s financial system to the stock market crash of October 1987 recommended that a central counterparty should be re-established. The committee recommended that it should act as counterparty to every trade, and that part of its risk should be backed up by the fund made up of deposits from clearing members, and part laid off externally (via a guarantee from a banking syndicate or insurance).

The committee argued that the advantages of having 'a single body to monitor and control the risks in the system on the basis of daily information on the position of all the brokers in the market' and the operational benefits outweighed any possible disadvantages associated with the concentration of risk, as long as effective risk management can be assured. It described the prudent operation of central clearing houses as 'perhaps the single most important objective for market authorities and regulators'.

Source: Bank of England (1999).

APPENDIX 2.

CPSS-IOSCO Recommendations

Recommendation 4: Central Counterparties (CCPs)

The benefits and costs of a CCP should be evaluated. Where such a mechanism is introduced, the CCP should rigorously control the risks it assumes.

1. Has a CCP mechanism (or an indemnification arrangement) been introduced? If so, what types of securities and market participants are covered? When does the CCP interpose itself between its participants to assume the role of guarantor to each trade?
2. If no such mechanism has been introduced, have the benefits and costs of such a mechanism been evaluated? By whom? Has the assessment been documented? What was the conclusion?
3. Does the CCP impose financial and operational standards for participation?
4. How does the CCP manage its credit risk vis-à-vis participants? Does it require participants to collateralise their exposures? How often are requirements recomputed and collateral collected?
5. What are the financial resources of the CCP? How does the CCP assess the adequacy of the size and liquidity of its financial resources? Does it require participants to contribute to a clearing or guarantee fund? Does the CCP have legally enforceable interests in or claims on the assets in the fund? Does the CCP have transparent and enforceable loss allocation rules?
6. How does the CCP manage its liquidity risk? Does the CCP have in place agreements permitting it to borrow against collateral?
7. Has a participant ever defaulted? If so, how did the CCP handle the default? In the past year, has the CCP experienced, has the CCP experienced an operational failure that resulted in a delay in completing settlement?

Source: CPSS-IOSCO: Recommendations for securities settlement systems (Nov. 2001).

APPENDIX 3.

Description of selected CCPs.

Australian Stock Exchange Limited (ASX)

ASX provides integrated trading, clearing and settlement facilities for Australia's equities, warrants and equity options markets. It operates 2 clearing houses, one for cash market securities and another for equity derivatives. Both provide central counterparty guarantee facilities which are backed by Australia's National Guarantee Fund. ASX is a listed company with its ordinary shares publicly traded in Australia. More information on ASX is available on the web at www.asx.com.

The Brazilian Clearing and Depository Corporation (CBLC)

The Brazilian Clearing and Depository Corporation (CBLC), as the DNS clearing-house for the Brazilian securities markets (equities and debt instruments), provides a modern and efficient infrastructure for clearing, settlement, depository and risk management for cash, options and forward markets. Aligned with international best practices, CBLC acts as central counterparty and guarantor of settlements. More information on CBLC is available at www.cblc.com.br.

The Canadian Depository for Securities Limited (CDS)

The Canadian Depository for Securities Limited (CDS) is Canada's national securities clearing and depository service organization, established in 1970 to improve the efficiency of the financial sector through the provision of depository, clearing and related services in both domestic and international markets. CDS processes in excess of 57 million trades annually, holds nearly C$2 trillion on deposit and offers value-added information services to the broader securities industry in Canada. More information on CDS and its services is available at www.cds.ca.

Chicago Mercantile Exchange Inc. (CME)

Chicago Mercantile Exchange Inc. (www.cme.com) is an international marketplace that brings together buyers and sellers on its trading floors and GLOBEX®2 around-the-clock electronic trading system. CME offers futures contracts and options on futures primarily in four product areas: interest rates, stock indexes, foreign exchange and commodities. On Nov. 13, 2000, CME finalised its transformation into a for-profit, shareholder-owned corporation as it became the first U.S. financial exchange to demutualize by converting its membership interests into shares of common stock that can trade separately from exchange trading privileges. Through its wholly owned Clearing House, the exchange moves about $1.5 billion per day in settlement payments, manages $28.5 billion in collateral deposits and administers more than $1 billion of letters of credit.

Clearnet SA

Clearnet is the clearing house and central counterparty of Euronext, the first pan-European bourse resulting from the merger of the Amsterdam, Brussels and Paris exchanges. As such Clearnet is pioneering in Europe the merger of several central counterparties into one single jurisdiction and one single operating platform, Clearing 21®. Clearing 21® is the only up-to-date software available that clears derivative and cash markets. Clearnet clears OTC bond cash and repo and will expand its services to other regulated markets. More information is available on www.clearnetsa.com.[66]

The Depository Trust & Clearing Corporation (DTCC)

The Depository Trust & Clearing Corporation (DTCC) is the holding company for The Depository Trust Company (DTC) and National Securities Clearing Corpora-

[66] LCH – Clearnet merger; see: Section 4 Future prospects – From integration perspective. More information is available on www.lchclearnet.com.

tion (NSCC), which together provide the primary infrastructure for the clearance, settlement and custody of the vast majority of all equity, corporate debt, municipal bond, Unit Investment Trusts, mutual fund and insurance transactions in the United States. In 2000, NSCC processed nearly $105 trillion in equity and bond transactions, while DTC, the world's largest securities depository and a major clearinghouse for institutional post-trade processing and settlement, processed more than 230 million book-entry deliveries valued at more than $116 trillion.

The United States, which is often given as a model for the consolidation of central counterparty clearing houses in Europe, still has separate CCPs for different products. But there are also plans to foster consolidation across products[67].
For more information, see DTCC's web site at www.dtcc.com.

Eurex Clearing AG

The Eurex Clearing AG offers central counterparty services for instruments traded on the Eurex exchanges, Eurex Bonds and Eurex Repo as well as the Frankfurt Stock Exchange (Xetra and floor). More information is available on www.eurexchange.com.[68]

Hong Kong Exchanges and Clearing (HKEx)

Hong Kong Exchanges and Clearing (HKEx) wholly owns The Stock Exchange of Hong Kong Limited, Hong Kong Futures Exchange Limited and Hong Kong Securities Clearing Company Limited. It provides a comprehensive range of pre- and post-trade investment services and market information services to subscribers of information vendors. More information on HKEx is available on www.hkex.com.hk.

S.D. Indeval, Mexico

Since 1987, S.D. Indeval has been The Mexican Central Securities Depository providing custody, administration, clearing, settlement and book entry-transfer services for the Mexican financial industry. In a daily average, S.D. Indeval settles more than 80 billion dollars in transactions related with capital and debt markets which include equity, corporate bonds, debt instruments issued by Mexican Banks and Government Securities.

In addition, the Mexican Congress has authorised the legal figure of a Central Counterparty. In a first step, Indeval is in the process to develop a CCP for the Mexican Equity Market.

London Clearing House (LCH)

LCH acts as a central counterparty to trades executed by its members on the London International Financial Futures and Options Exchange (LIFFE), the London

[67] In the United States, there are several central counterparty clearing houses in operation, each of wich focuses on clearing on different products. The National Securities Clearing Corporation (NSCC) is the sole clearing house for all equity, corporate debt and municipal bond transactions. Other CCPs provide services for various kinds of options and futures. Central counterparty clearing in the United States has thus achieved full consolidation at the level of each product type, but there is little consolidation in clearing across different products. See also: ECB 2001.

[68] The Deutsche Börse started its CCP equity services in March 2003.

Metal Exchange (LME), the International Petroleum Exchange (IPE); in certain classes of over-the-counter (OTC) products, specifically interbank interest rate swaps, repos and cash bonds; in equities traded on the London Stock Exchange's SETS system, and, in early 2002, in equities traded on virt-x, the new pan-European exchange. LCH is owned by its members and derivatives exchanges, 75% and 25% respectively. Further information on LCH is available on its web site, www.lch.com[69].

The Options Clearing Corporation (OCC)

The Options Clearing Corporation (OCC), founded in 1973, is the largest clearing organization in the world for financial derivative instruments and was the first clearing house to receive a 'AAA' credit rating from Standard & Poor's Corporation. Operating under the jurisdiction of the Securities and Exchange Commission, OCC is jointly owned by The American Stock Exchange, Chicago Board Options Exchange, International Securities Exchange, Pacific Exchange and Philadelphia Stock Exchange. OCC is headquartered at 440 South LaSalle Street, Chicago, IL. More information is available through its web site at www.optionsclearing.com.

Singapore Exchange Limited (SGX)/The Central Depository (Pte) Limited

The Central Depository (Pte) Ltd. (CDP), a wholly-owned subsidiary of Singapore Exchange Limited (SGX), provides integrated clearing, settlement, depository and computerised book-entry services for securities traded on Singapore Exchange Securities Trading (SGX-ST). The CDP also has links with foreign clearing and depository organisations such as DTCC, Japan Securities Clearing Corporation, Clearstream Luxembourg and Shenzhen Securities Registration Company to facilitate settlement of cross-border trades. More information is available on www.sgx.com.

Tokyo Stock Exchange (TSE)

Tokyo Stock Exchange (TSE), while being a leading equities and derivatives exchange, not only in Asia but globally, also serves as a clearing organization with the CCP function for transactions executed at its market. In 2000, the TSE, as a clearing organization, processed approximately JPY 1,808 trillion for transactions in its equities and derivatives market. More information on TSE is available at www.tse.or.jp.

Source: Euronext (2002).

[69] LCH – Clearnet merger; see: Section 4 Future prospects – From integration perspective. More information is available on www.lchclearnet.com.