

TRENDS IN CLEARING OF EQUITY TRANSACTIONS BY A CENTRAL COUNTERPARTY

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INTRODUCTION AND SUMMARY

Central counterparties, CCPs, have attracted considerable attention in the aftermath of the financial crisis. One explanation is that CCPs contribute to reducing risk between market participants and to ensuring enhanced market transparency. Thus, a CCP positions itself between the parties to a securities transaction, assuming the risk for both the buyer and the seller from the transaction date until the transaction is finally executed. If either of the parties to the transaction defaults within this period, the CCP thus still has an obligation to the other party. However, this entails that risk is concentrated in the CCP, and therefore the CCP is subject to a number of regulatory requirements to ensure the completion of the transaction.

CCPs have been established in the equity markets of most European countries. In recent years, there has also been a tendency for several CCPs to be active in the same marketplace. While this promotes increased competition, it also creates interdependencies across European markets. This development has also extended to the Nordic equity markets in which free choice of CCPs is being introduced.

Danmarks Nationalbank regards increased competition among CCPs as positive. European legislation ensures that CCPs in the equity markets are subject to risk management requirements to reduce the risks resulting from increased market interconnectedness. It is important to regularly assess whether CCPs comply with the regulatory requirements so as to effectively reduce the risk of contagion.

CLEARING OF EQUITY TRANSACTIONS BY A CENTRAL COUNTERPARTY

Equity transactions can be carried out via trading venues operated by stock exchanges etc. or directly between counterparties, known as over-the-counter (OTC) transactions. In either case, two days typically pass from the transaction date until the transaction is settled, i.e. until the securities involved have been delivered from the seller to the buyer and the payment has been transferred. In normal circumstances, this does not cause any problems. But if, for instance, the seller defaults, the buyer may have to repurchase a security at a higher price. This risk is reduced by CCP clearing. A CCP positions itself between the buyer and the seller in an equity transaction, and in the period from the transaction date until the transaction is settled, the parties will have counterparty risk to the CCP only – not to each other. The process of an equity transaction, i.e. from the transaction is concluded until it is cleared and settled, is described in detail in Box 1.

Due to their central position in the financial infrastructure, CCPs are often regarded as systemically important. If a CCP is unable to complete the normal clearing of transactions, the participants' market access could be cut off for a period of time. Moreover, a CCP's default could cause contagion to the participants and onwards to the rest of the market. Therefore, CCPs are subject to a number of requirements to ensure the settlement of transactions.

Conclusion, clearing and settlement of equity transactions

Box 1

To **conclude** an equity transaction on a trading venue, a buyer for instance places an order on the venue, and a search for a seller is initiated. Once a match has been created, confirmation is sent to the buyer and the seller. If the transaction is subject to CCP clearing, the transaction is reported to the CCP the moment it is confirmed. In an OTC transaction concluded directly between the buyer and the seller, the parties report the transaction information through their systems, including whether the transaction will be CCP cleared.

Clearing is the calculation of claims and obligations pertaining to an agreed exchange of financial instruments, in the case of an equity transaction the exchange of equities for cash. A CCP clears equity transactions by acting as the counterparty to both sides of the transaction through a legal process known as novation. A characteristic of CCP clearing is that the participants' exposures are reduced through netting, cf. Chart 1. Netting takes place on an ongoing basis after the reporting of the transactions to the CCP and thus reduces the exposures between the CCP and its participants during the period until settlement.

Settlement is the time of exchange of securities for cash in a securities settlement system. Settlement is typically performed in net settlement cycles in which all claims and obligations are converted into a net claim or a net obligation for each participant, whereby the need for settlement liquidity is reduced. Viewed in isolation, this will not have any impact on CCP cleared transactions, since these transactions have already been netted by the CCP.

The period from a transaction has been concluded until it is finally settled is referred to as the **settlement period**. In 2014, the EU securities markets adopted a standardised two-day settlement period. This entails that a securities transaction must be settled on the second banking day after the transaction date. The background to this change is new European regulation that aims to harmonise the market, thereby strengthening cross-border trading in securities and enhancing competition between European central securities depositories (CSDs).¹

1. Cf. Regulation (EU) No 909/2014 of the European Parliament and of the Council of 23 July 2014 on improving securities settlement in the European Union and on central securities depositories and amending Directives 98/26/EC and 2014/65/EU and Regulation (EU) No 236/2012.

In the EU, CCPs are regulated by the EMIR regulation¹. Under EMIR, a CCP must be authorised to operate. To obtain such authorisation, which is granted by national competent authorities, the CCP must comply with a number of requirements for instance in relation to governance structures, collateral, financial resources, risk management, etc. Ongoing supervision to ensure that CCPs comply with the regulatory requirements is conducted by supervisory colleges, comprising representatives from both supervisory authorities and central banks. As CCPs tend to operate across borders, the supervisory colleges often have representatives from various countries.²

One benefit of CCPs is that the participants' mutual exposures are reduced through netting. As a CCP applies bilateral netting between the CCP and its clearing participants, each partici-

part's position will be reduced because only one amount or one volume of securities will be provided or received under a given ISIN code.³ The result of bilateral netting between the CCP and its participants is that the various parties' transactions are in fact netted multilaterally, cf. Chart 1. To the market as a whole, multilateral netting also means that the overall exposure – and thus risk – is reduced.

Since the autumn of 2009, transactions in Danish Large Caps on Nasdaq have been subject to mandatory CCP clearing, and in February 2015 Mid Caps were also included in this clearing.⁴ The Dutch CCP EuroCCP has been responsible for the clearing of equity transactions since 2009.⁵ In practice, all Large and Mid Cap equity transactions concluded on Nasdaq are immediately reported to EuroCCP, which subsequently acts as

1 Regulation (EU) No 648/2012 of the European Parliament and of the Council of 4 July 2012 on OTC derivatives, central counterparties and trade repositories.

2 For instance, Danmarks Nationalbank and the Danish Financial Supervisory Authority participate in a supervisory college for the Dutch CCP EuroCCP. This college is governed by the Dutch central bank. Danmarks Nationalbank participates as an observer, while the Danish Financial Supervisory Authority is a member.

3 International Securities Identification Number, ISIN, is an ISO standard for unique identification of securities.

4 Nasdaq is the primary securities exchange for Danish equities. Equities are divided into overall categories, such as Large Caps, currently comprising the 33 most frequently traded Danish equities, and Mid Caps, comprising the 29 next most frequently traded Danish equities.

5 The Dutch CCP European Multilateral Clearing Facility, EMCF, began clearing on Nasdaq in 2009. In January 2014, EMCF merged with UK EuroCCP Ltd. under the name of EuroCCP.

The netting effect

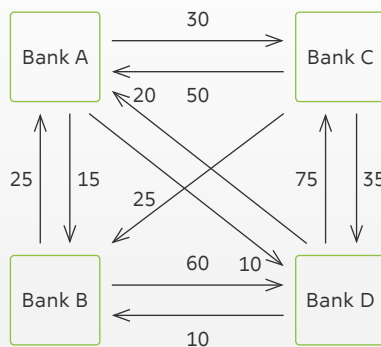
Chart 1

1) Gross positions between banks

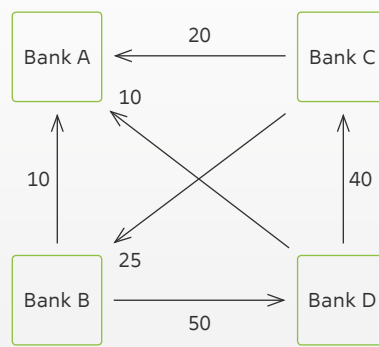
2) Bilateral netting between banks

3) Multilateral netting between banks and CCP

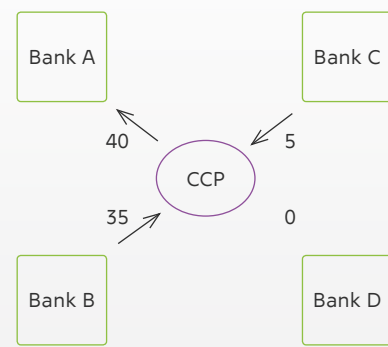
Total exposure: 355



Total exposure: 155



Total exposure: 80



Note: 1) shows the gross positions between the banks;
 2) here all gross positions are netted bilaterally, leaving just one mutual position between each of the banks;
 3) here CCP clearing has been introduced, entailing that the CCP positions itself between the buyer and the seller for all positions. With bilateral netting, positions are reduced to the effect that each bank has only one overall position against the CCP. Thus, positions are netted multilaterally.

Source: The chart is inspired by Figure 5 in De Nederlandsche Bank, *All the ins and outs of CCPs*, October 2013, but using own figures and calculations.

the counterparty to the transactions. This entails that EuroCCP acts as the counterparty to both the buyer and the seller immediately after a transaction has been concluded and until it is settled.⁶ If one of the parties fails to deliver, EuroCCP still has an obligation to the other party.

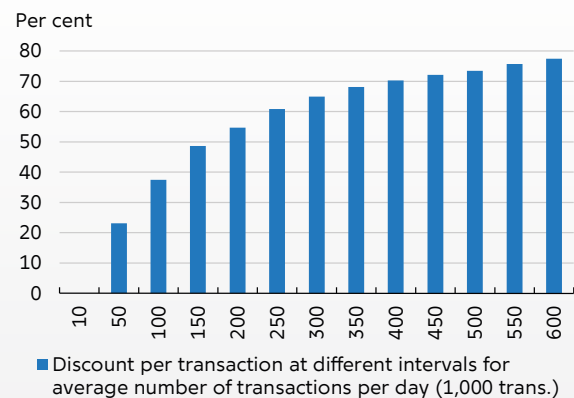
CCPs usually offer considerable quantity discounts to participants clearing a large number of daily transactions, cf. Chart 2. As a result, large banks and investment banks are often the only direct CCP participants. Other market participants enter into agreements with direct participants to carry out the clearing of transactions on their behalf. EuroCCP has eight Danish participants, two of which are General Clearing Participants and thus authorised to clear transactions on behalf of indirect participants. In 2015, Danish Large and Mid Caps worth an average of kr. 5.3 billion were cleared daily, cf. Chart 3.

Risk management

A CCP is subject to a number of requirements under EMIR, the purpose of which is to reduce the risk between the CCP and its participants. A

Quantity discount per CCP transaction

Chart 2

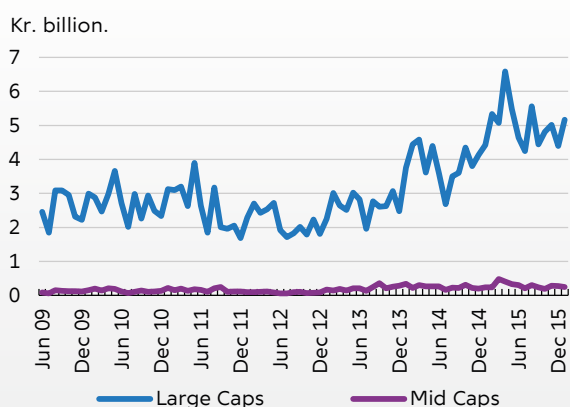


Note: The calculation of the percentage savings per transaction is based on the participant's average number of transactions per day. The discount is calculated as an average of the discount achievable in three of the largest CCPs in European equity markets.

Source: Websites of LCH Clearnet Ltd. ([link](#)), EuroCCP ([link](#)) and SIX x-clear ([link](#)), respectively, and own calculations.

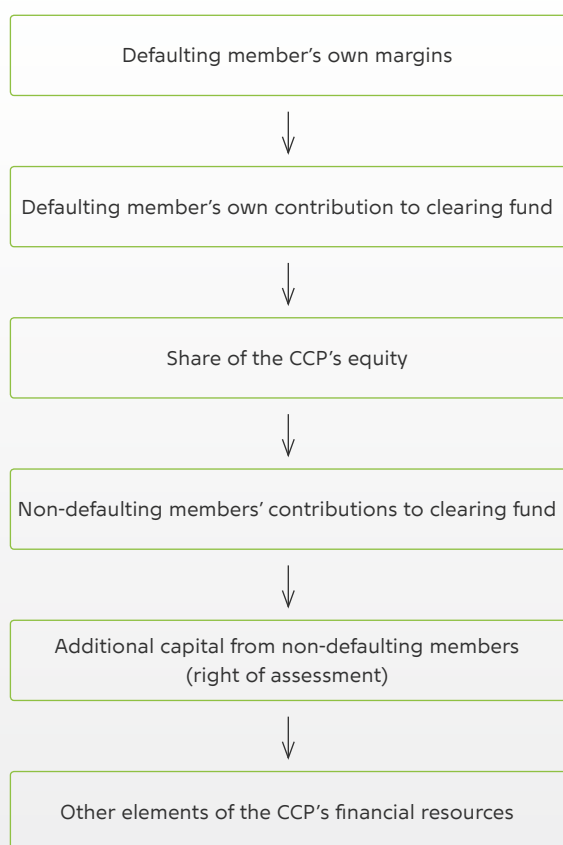
⁶ In a legal process known as novation.

Turnover in Danish Large and Mid Cap equities on Nasdaq, daily average Chart 3



Source: Monthly Reports - Total equity trading, Nasdaqomx.com ([link](#))

A CCP's default waterfall Chart 4



Note: The order of a CCP's default waterfall is defined in Article 45 of EMIR.

CCP thus uses a number of risk management tools designed to protect it from loss. Overall, risk management can be divided into three categories, cf. below.

Firstly, the CCP typically applies a number of overall admission criteria to the clearing participants, including that they are subject to financial supervision and comply with minimum capital and liquidity requirements. It is a regulatory requirement for a CCP's admission criteria to be clear and objective to allow fair and open access for participation in the CCP.

Secondly, the CCP handles its counterparty risks by imposing margin requirements on the participants, who post collateral to the CCP. The margin, primarily cash deposits and highly liquid bonds, is to cover the counterparty risk under normal market conditions⁷ and ensure that the CCP is able to maintain uninterrupted operations if a participant defaults. The counterparty risk is determined by the CCP compiling, on an intra-day basis, a total of all unsettled transactions at current market prices, cf. the EMIR requirements. The result shows the potential loss in case of participant default, and against this backdrop the CCP assesses whether the margin posted by the participants is sufficient or whether margin calls are required.

Thirdly, the CCP maintains financial resources to withstand potential losses. These resources comprise equity, deposits in a clearing fund and possibly also guarantees from the participants, loss allocation agreements, insurance schemes, etc. In case of participant default, the financial resources are used in a predetermined order, referred to in legislation as the CCP's default waterfall, cf. Chart 4. This order is as follows:

If a defaulting participant's own collateral/margin does not suffice, the loss will be covered by the defaulting participant's own contribution to the CCP's clearing fund. If this contribution is still not sufficient, a share of the CCP's equity will subsequently be used. Additional losses will be covered by the non-defaulting participants' contributions to the CCP's clearing fund. The CCP's total clearing fund must be sufficient to

⁷ This means that margins must be sufficient to cover losses that result from at least 99 per cent of the exposure movements over an appropriate time horizon, cf. Article 41 of EMIR.

cover the default of the largest participant.⁸ The CCP may also require the participants to contribute additional capital (right of assessment). If these measures together are not sufficient, the CCP must cover the loss with what remains of its financial resources, including its remaining equity.

DEVELOPMENT IN THE MARKETS FOR CENTRAL COUNTERPARTIES

In the early 2000s, the practice in most European countries was for securities trading to be conducted on national securities exchanges, often with an affiliated CCP clearing equity transactions in the national markets. This was not the case in Denmark, presumably because the benefits of establishing a CCP did not outweigh the costs. The securities settlement in VP⁹ already took place through multilateral payment netting, both on the securities and the payments side, and the counterparty risk was limited due to a relatively modest turnover.¹⁰

The implementation of the MiFID¹¹ changed the market for securities trading in Europe. The MiFID enabled securities trading on Multilateral Trading Facilities, MTFs, which was not possible earlier. As a result of the changes, new CCPs were established to carry out clearing on the new trading venues. As CCPs were the standard in most marketplaces, Nasdaq chose to introduce CCP clearing in the Nordic equity markets in 2009.

To strengthen competition, a Code of Conduct was signed by the European industry associations for stock exchanges, central securities depositories and central counterparties in 2006.¹²

In this Code of Conduct, the industry associations agreed to seek to promote *interoperability*, entailing for CCPs that two CCPs may mutually exchange information on transactions, thereby enabling netting across systems. Under MiFIR¹³ from 2014, CCPs are required to allow non-discriminatory access to system information to other CCPs. MiFIR enters into force in 2017 and will strengthen the possibilities of CCP interoperability.

The current status is that three CCPs have entered into interoperability agreements in the European equity market.¹⁴ These CCPs clear equity transactions in several of the same European marketplaces, while the clearing in other markets is still carried out by CCPs with a local monopoly, cf. Chart 5.

Benefits of interoperability

In interoperable clearing, two CCPs enter into an agreement to participate in clearing of the other party's transactions. In practice, they establish a technical link for intersystem communication. That way, each market participant is able to use its preferred CCP, while still benefiting from netting. If, for instance, the purchase and sale of equities is conducted on separate trading venues and cleared by different CCPs, the transactions may be netted if the two CCPs involved have entered into an interoperability agreement, cf. Chart 6. Hence interoperability reduces exposures – and thus risk – between participants across marketplaces.

Another benefit of interoperability is that the participants only need to participate in one CCP. This means that the participant needs only to adapt its system for internal settlement with this

8 A CCP must be able at least to withstand, under extreme but plausible market conditions, the default of the clearing participant to which it has the largest exposures or of the second and third largest clearing participants, if the sum of their exposures is larger, cf. Article 42(3) of EMIR.

9 VP comprises the Danish systems for securities settlement and safe-keeping. The systems are operated by VP Securities A/S.

10 Cf. Torben Nielsen and Peter Restelli-Nielsen, Analysis of the pros and cons of introducing a central counterparty in the Danish securities market, *Danmarks Nationalbank Working Paper*, November 2007.

11 Directive 2004/39/EC of the European Parliament and of the Council of 21 April 2004 on markets in financial instruments.

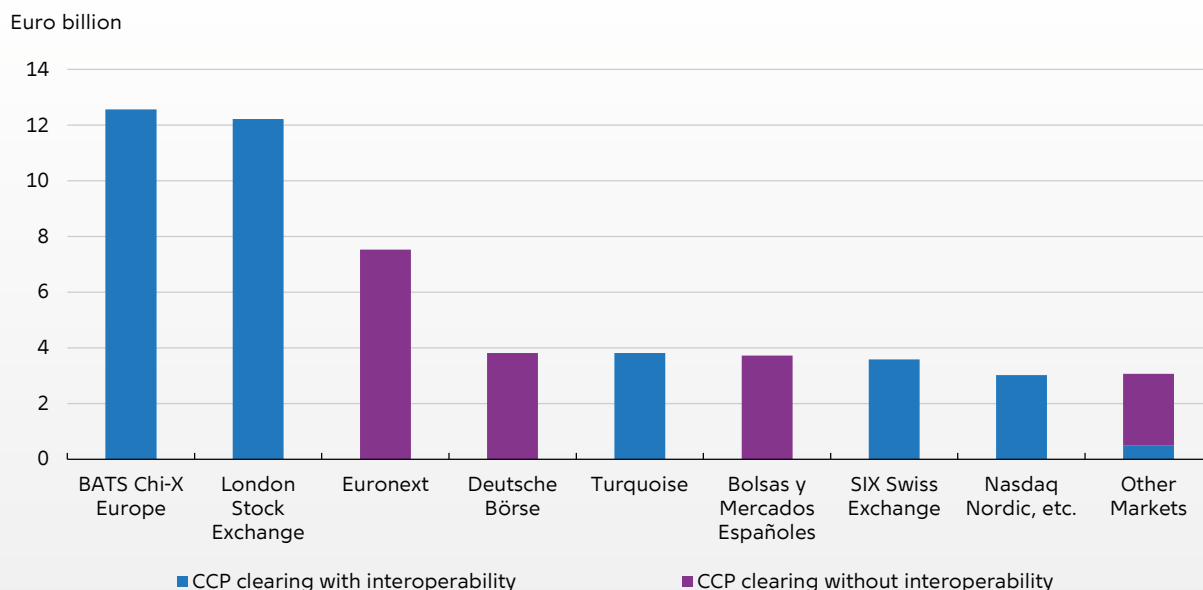
12 The Code of Conduct ([link](#)) was signed in October 2006 by Federation of European Securities Exchanges, European Association of Central Counterparty Clearing Houses and European Central Securities Depositories Association.

13 Regulation (EU) No 600/2014/EC of the European Parliament and of the Council of 15 April 2014 on markets in financial instruments.

14 These are the Dutch CCP EuroCCP, the UK CCP LCH Clearnet Ltd. and SIX x-clear, the latter comprising both the Swiss CCP SIX x-clear Ltd. and the Norwegian SIX x-clear Ltd. NB (Norwegian Branch).

Daily turnover in selected equity marketplaces with/without interoperable CCP clearing

Chart 5



Note: "Other markets" comprise other trading exchanges and venues that are members of the Federation of European Securities Exchanges, FESE, including Oslo Børs (stock exchange) with its interoperable CCPs.

Source: Data on turnover from the FESE ([link](#)) and CCP clearing data from the websites of trading exchanges and venues.

CCP and only post margin and contribute to the clearing fund of this CCP. This saves costs for the participant and reduces complexity.

Interoperability also helps to increase competition as several CCPs are able to clear transactions on the same marketplace without impairing the netting effect. Thus it is up to the CCPs to offer the most competitive terms to the participants within the regulatory framework for CCPs.¹⁵

Risks of interoperability

A number of risks are associated with interoperability. In a transaction cleared between two CCPs, there is counterparty risk between the participant and the CCP, but also between the two CCPs. Thus, a CCP's default could potentially cause contagion to the other CCP and onwards to its participants. The system interaction between the two CCPs also means that the operational risk increases, since a cross-CCP transaction cannot

be completed in case of communication errors between them.

To address the risk of interoperability, each CCP sets up an interoperability fund, constituting the inter-CCP margin for the transactions cleared between the CCPs. The inter-CCP margin covers the scenario of default by one of the linked CCPs. The contributions to the fund are made by the participants who are thus subject to higher margin requirements than in a non-interoperability situation. The drawbacks to the participants will probably be outweighed by the liquidity advantages of the increased netting effect, cf. above.

The calculation of inter-CCP margin requirements is highly complex as different CCPs typically use different models for calculating margin requirements. Therefore, CCPs are under a regulatory requirement to take measures to reduce the risks involved in the use of different models¹⁶. To prevent unnecessary systemic risk,

15 CCP interoperability arrangements are regulated by EMIR; in addition, five guidelines and recommendations for CCP interoperability have been issued, cf. European Securities and Markets Authority, ESMA, Guidelines and recommendations for establishing consistent, efficient and effective assessments of interoperability arrangements, June 2013 ([link](#)).

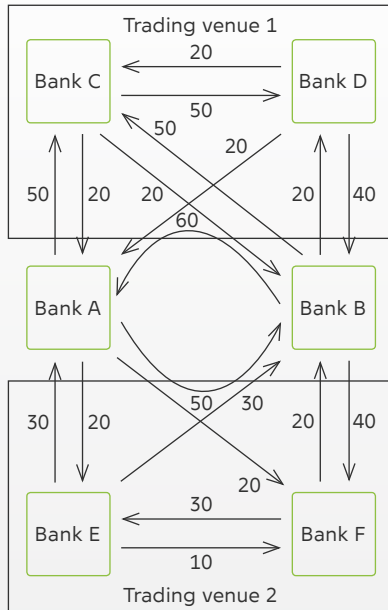
16 Cf. Article 52 of EMIR.

Netting effect with and without interoperability

Chart 6

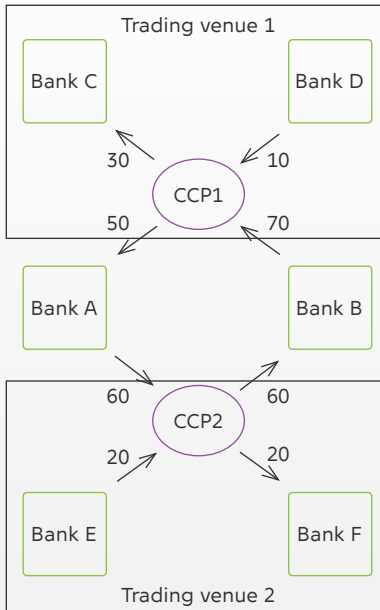
1) Gross positions (before CCP clearing) on the two trading venues

Total exposure: 600



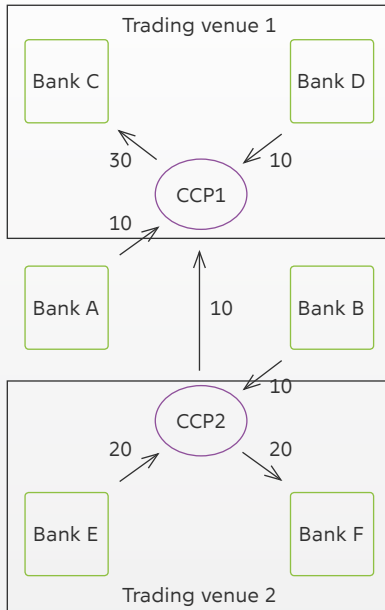
2) CCP clearing on the two trading venues without interoperability

Total exposure: 320



3) CCP clearing on the two trading venues with interoperability

Total exposure: 110



Note: The three charts are based on equity transactions on two separate trading venues. Banks A and B are large banks, trading on both venues, while banks C-F trade on only one of the venues. A CCP is clearing on each trading venue.

1) shows gross positions between the participants on the two venues;

2) shows CCP clearing without interoperability, positions are netted separately on the venues, banks A and B participate in both CCPs;

3) shows CCP clearing with interoperability, netted across venues, with bank A and B participating in CCP 1 and 2, respectively. This entails that bank A's outstanding transactions with participants in CCP 2 (-60) and bank B's outstanding transactions with participants in CCP 1 (-70) are netted, and the difference (10) is transferred from CCP 2 to CCP 1.

CCPs do not contribute to the clearing funds of each other.

CCP interoperability has attracted the attention of the European Systemic Risk Board, ESRB, which is responsible for macro-prudential supervision of the financial system in the EU¹⁷. The ESRB has analysed the systemic benefits and risks of CCP interoperability to financial stability, cf. Table 1.

The ESRB recommends that interoperability arrangements are continuously monitored closely by CCPs and regulators. The ESRB also stresses the need for maintaining robust management of the risks associated with interoperability and for risk management to be supported by sufficient financial resources in the CCPs.

Development in the Nordic region

In June 2015, Nasdaq announced its decision to introduce free choice of three CCPs in the Nordic equity markets, including the Danish market. Nasdaq thus follows suit with a number of other European marketplaces offering interoperable clearing. The decision was implemented in November 2015 when LCH Clearnet began to clear equities on Nasdaq. SIX x-clear is expected to begin clearing on Nasdaq later in 2016.

Initially, increased freedom of choice will not necessarily have any major significance for Danish participants. Firstly because the process of changing CCP is fairly extensive, since the systems for handling collateral and for portfolio management, etc., need to be adapted. Secondly, the

¹⁷ Danmarks Nationalbank is a member and contributes to the work of the ESRB via working groups and committees. The Danish Financial Supervisory Authority also participates in the ESRB.

Overall conclusions from the ESRB report on CCP interoperability arrangements

Table 1

Main benefits

- Reduced aggregate exposures
- Reduced aggregate collateral needs
- Reduced liquidity risk
- Reduced complexity for clearing members
- Substitutability

Main threats

- Introduces the risk of inter-CCP contagion owing to:
 - Inter-CCP exposures
 - Possible under-collateralisation of inter-CCP positions
 - Operational risk/complexity in risk management frameworks of CCPs

Source: European Systemic Risk Board, ESRB report to the European Commission on the systemic risk implications of CCP interoperability arrangements, January 2016 ([link](#)).

Danish participants seem to be satisfied with the services provided by EuroCCP. As a case in point, the settlement rates, measuring the percentage of equity transactions settled on time, are relatively high for EuroCCP in the Danish market.¹⁸ Settlement rates are an important parameter for CCP clearing effectiveness, and along with CCP prices and operational stability these rates are important factors in the competition.

With the expansion, some international participants will have easier access to the Danish equity market. Danish equity transactions may be conducted on MTFs such as London-based BATS Chi-X and Turquoise where the three CCPs mentioned above (EuroCCP, LCH Clearnet and SIX x-clear) also offer CCP clearing. Thus, international participants using one of the two “new” CCPs in the Danish market will be able to trade in Danish equities without participating in EuroCCP or having to enter into an agreement with a General Clearing Participant on indirect participation.

Danmarks Nationalbank finds that increased competition between CCP and easier access for international investors to trade in Danish equities are positive for the Danish equity market. However, this development entails increased interconnectedness between the Danish market and other European equity marketplaces offering interoperable CCP clearing. European legislation ensures that CCPs in the equity markets are subject to the necessary risk management requirements to reduce the risks associated with increased interconnectedness. It is important to regularly assess whether the regulatory requirements are complied with so as to effectively reduce the risk of contagion among CCPs and thus to a wider circle of market participants.

¹⁸ Cf. Danmarks Nationalbank, *Oversight of the Financial Infrastructure in Denmark*, 2015, April.