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Jan Pieter Krahnert and Lorian Pelizzon

“Predatory” Margins and the Regulation and Supervision of Central Counterparty Clearing Houses (CCPs)

White Paper No. 40

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“Predatory” Margins and the Regulation and Supervision of Central Counterparty Clearing Houses (CCPs)¹

by

Jan P. Krahnen² and Loriana Pelizzon³

9 September 2016

Abstract

This note discusses the basic economics of central clearing for derivatives and the need for a proper regulation, supervision and resolution of central counterparty clearing houses (CCPs). New regulation in the U.S. and in Europe renders the involvement of a central counterparty mandatory for standardized OTC derivatives’ trading and sets higher capital and collateral requirements for non--centrally cleared derivatives.

From a macrofinance perspective, CCPs provide a trade-off between reduced contagion risk in the financial industry and the creation of a significant systemic risk. However, so far, regulation and supervision of CCPs is very fragmented, limited and ignores two important aspects: the risk of consolidation of CCPs on the one side and the competition among CCPs on the other side. i) As the economies of scale of CCP operations in risk and cost reduction can be large, they provide an argument in favor of consolidation, leading at the extreme to a monopoly CCP that poses the ultimate default risk – a systemic risk for the entire financial sector. As a systemic risk event requires a government bailout, there is a public policy issue here. ii) As long as no monopoly CCP exists, there is competition for market share among existing CCPs. Such competition may undermine the stability of the entire financial system because it induces “predatory margining”: a reduction of margin requirements to increase market share.

The policy lesson from our consideration emphasizes the importance of a single authority supervising all competing CCPs as well as of a specific regulation and resolution framework for CCPs. Our general recommendations can be applied to the current situation in Europe, and the proposed merger between Deutsche Börse and London Stock Exchange.

¹ This paper is based on an introductory statement delivered to the 1st Forum for Financial Stability held at Deutsche Bundesbank on July 7, 2016. The forum was entitled “The new architecture of OTC derivatives markets – a blueprint for other financial markets?” We are grateful to Claudia Buch for suggesting the topic to us and for extremely helpful comments from forum participants and colleagues, in particular Darrell Duffie, Alexandra Engel, Peter Gomber, Satchit Sagade, Erik Theissen. All remaining errors in fact and judgement remain ours, however.

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Der vorliegende Text diskutiert die ökonomischen Grundlagen des zentralen Clearings (Abrechnung) von Derivaten. Begründet werden die Anforderungen an eine sinnvolle Regulierung sowie an Aufsicht und Abwicklung von Clearinghäusern, die als zentrale Gegenparteien fungieren (CCPs). Neue Regulierungsvorschriften in den USA und in Europa seit der Finanzkrise verlangen die Einbeziehung einer zentralen Gegenpartei in den Handel von standardisierten OTC-Derivaten. Zugleich schreiben sie höheres Mindesteigenkapital und die Stellung von Sicherheiten für nicht zentral geclearte Derivate vor.

CCPs vermindern auf eindrucksvolle Weise das Ansteckungsrisiko, das ein großer Derivatemarkt erzeugt. Zugleich erzeugen sie aber auch mit einer kleinen Restwahrscheinlichkeit das Risiko eines Totalausfalls des gesamten Finanzsektors. Während die Bestrebungen zu einer europaweiten einheitlichen Regulierung fortgeschritten sind, ist die Aufsicht fragmentiert; die zahlreichen CCPs sind nationalen Aufsichtsbehörden unterworfen.

Aus dieser fragmentierten Aufsichtslandschaft erwachsen aber spezifische Risiken, denen nur durch eine Konsolidierung der Aufsicht auf gesamteuropäischer Ebene sinnvoll begegnet werden kann. Die spezifischen Risiken entstehen aus dem Wettbewerb zwischen CCPs um Marktanteile, weil er die Gefahr von unzureichenden Sicherheitsanforderungen mit sich bringt und eine fragmentierte Aufsicht diese Gefahrenquelle für die Systemstabilität nicht erkennen kann – und u.U. nicht erkennen will. Bei diesen negativen Wettbewerbseffekten handelt es sich um „predatory margining“.

Als Lehre für den Gesetzgeber folgt aus unserer Analyse die Forderung nach einer einheitlichen Aufsichtsbehörde für alle CCPs - zumindest für alle in Europa aktiven CCPs. Unsere Empfehlungen sind von Relevanz auch für die aktuelle Situation in Europa sowie für den geplanten Zusammenschluss von Deutscher Börse und London Stock Exchange.

1. Introduction

This paper discusses the benefits and risks emanating from an increased reliance on central counterparty clearing houses (CCPs) in financial markets and implications on CCP regulation and supervision. Specifically, it addresses an important policy issue which has been neglected in the recent regulatory reforms in the U.S. and Europe. We argue that the rise of CCPs in OTC derivative markets, itself a highly welcome development, poses a systemic risk problem which requires an adjustment of the existing regulatory and supervisory framework.

We are not the first to discuss that, and how, CCPs may create systemic risk (see Bernanke, 2011, Yellen, 2013, Culp, 2010, Stulz, 2010, Singh, 2010, Duffie/Zhu, 2011, Heller/Vause, 2012, Pirrong, 2011 and 2013, Cont/Kokholm, 2014, Duffie et al., 2015, Duffie, 2016, France/Kahn, 2015).

However, this paper strives to stress the importance of centralizing regulation and particularly supervision at the supra-national level in order to avoid a potential race to the bottom in collateral standards and a commensurate rise of systemic risk.

Central clearing of OTC derivatives has been mandatory for some asset classes since 2012 in the U.S. (Dodd-Frank Act) and since 2014 in Europe (EMIR). Today, i.e. after a relatively short period of time, an estimated 50% of all interest rate and credit derivatives are cleared via a CCP according to a recent FSB study (Domanski et. al., 2015). The notional values of cleared contracts are huge, approaching USD 100 trillion for interest rate swaps alone. In the coming years, these numbers are expected to grow even further when the coverage of the regulation will be gradually extended to additional user groups.

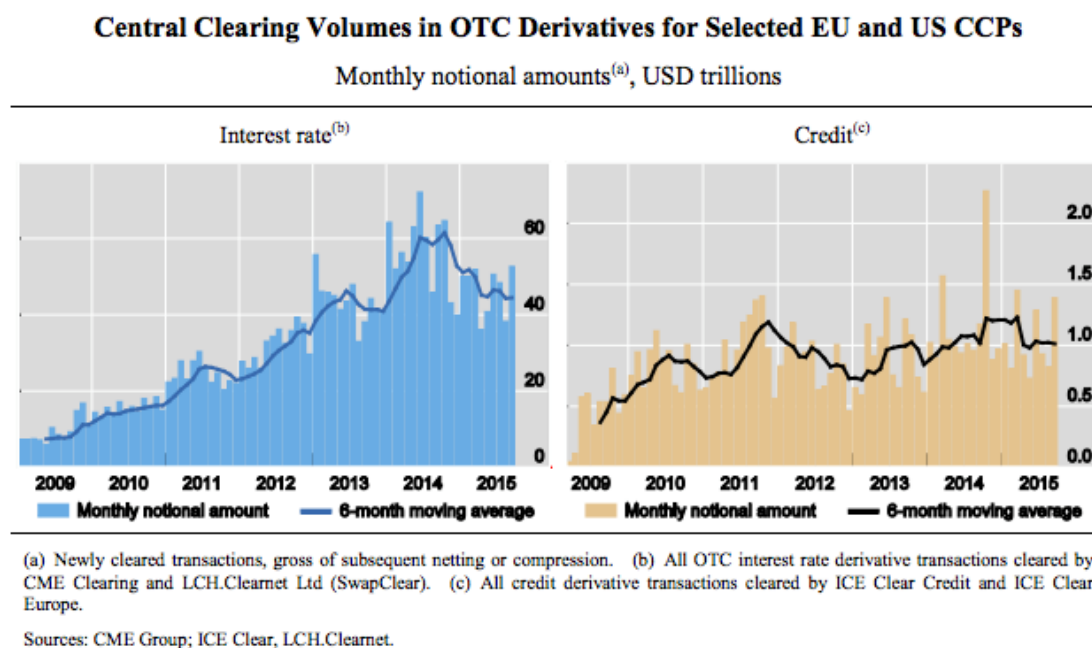


Fig. 1: Growth of central clearing volumes in OTC derivatives (Source: FSB 2015, *OTC Derivatives Markets reform, 10th Progress Report on Implementation*, 4 November 2015, p. 20).

The regulatory focus on CCPs was signed off at the 2009 Pittsburgh G-20 summit, the second gathering of heads of state after the outbreak of the financial crisis in 2007. The closing document of the G-20 summit proposes a transfer of derivatives transactions from intransparent OTC markets to supervised exchanges, relying on the CCP model that has been successfully applied to futures markets for a long time. A CCP requirement for standardized derivatives contracts was first introduced in the U.S. as part of the Dodd Frank Act in 2010, and later also in the EU, as part of the EMIR regulatory project in 2014. Both regulations envisage multi-year implementation periods.

In this paper, we discuss first the economic role of CCPs and the issues regarding financial stability. Second, we consider the CCP industry and its market structure, and the bearing of CCP competition on financial stability. Based on these considerations, we derive several policy conclusions regarding the future design of supervision, regulation and resolution of CCPs.

2. The economics of risk transformation through CCPs and financial stability

We develop the economic analysis of risk transformation through the operation of a CCP in 3 steps, starting at the level of the individual CCP and then moving on to the market level with several competing CCPs by investigating: (2.1) the benefits of risk aggregation, (2.2) the importance of adequate margining for financial stability and the compromising role of CCP competition, and finally, (2.3), the importance of regulation and centralized supervision for systemic risk containment.

2.1 Risk aggregation benefits (“multilateral netting”) and the robust-yet-fragile property

Derivative transactions are intertemporal by nature and thus require some sort of credit relationship between the counterparties. For example, investor A enters into an interest rate swap with investor B in order to hedge his/her exposure from a Libor-based debt contract by exchanging it against a nominally fixed schedule. Both parties to the trade are committing to deliver a particular schedule over an agreed time horizon. If B defaults on the swap, investor A will suddenly be unhedged, facing the payoff request from his/her original Libor contract. Therefore, a counterparty credit default is an important risk inherent to any derivative contract.

Markets have developed standard methods to deal with this risk, mostly by requiring each party to post some collateral. In organized markets, such as futures markets, the technique of defining mutual collateral requirements has been combined with the role of the exchange as the single counterparty for both contracting partners. That way, the exchange (the clearing house) will be located in the middle of each individual trade, becoming the CCP to all customers. The centrally cleared OTC markets are quite similar to the futures markets. The main difference is that contracts are initially traded bilaterally and then novated to a CCP, such that there is not a centralization of the price, i.e. the same contract can be traded at the same time with different prices.

The assessment of each participant’s creditworthiness can be achieved at the transactional level. Bilateral negotiations between a CCP and each trading partner are required in order to determine an appropriate amount of collateral for each counterparty and for every instrument. The CCP will request collateral postings from its customers based on the value-at-risk-methodology⁴. These requests will be adjusted continuously, usually once a day, such that the aspired safety level of 99% should be kept up throughout the life of the contract.

⁴ The X% value-at-risk (VaR) of an exposure is the loss from that exposure over a certain period of time (e.g. one month) that will not be exceeded with probability X. For example, the 99% VaR of a derivatives portfolio may be estimated at 10,000 euros. In this case, the ex-ante likelihood of suffering a loss from the portfolio in excess of 10,000 euros is 100 basis points. Note that the VaR metric does not speak about expected loss given it exceeds 10,000 euros. The VaR estimates are based on the time series of past (historical) portfolio value realizations.

If a customer has more than one derivative exposure, for example in different instruments, or with different maturities, or at different market places, the sum of the counterparty risk involved in each transaction may be reduced through diversification (or hedging if exposures are of different sign). As a consequence, bringing two different exposures (e.g. to different counterparties) of the same client on one CCP gives room for a reduction of the required collateral. Unless the two exposures are perfectly positively correlated, the X% VaR of the combined position is lower in absolute value than the sum of the X% VaR requirement of the same exposures treated separately. This advantage of multilateral netting is the driving force behind the natural monopoly characteristic of CCP operations.

That said, it is also conceivable – at least in theory – that the decreasing average risk of multilateral netting can be replicated relying solely on bilateral contracting without a CCP. In this case, the VaR calculation has to take into consideration all other exposures the counterparty has entered into. Thus, the advantage of multilateral netting without a central counterparty requires full transparency about everybody's mutual exposures; since this is a rather unrealistic assumption, we have labeled this case as 'theoretical'.

Leaving the theoretical case aside, the CCP is an efficient way to reap the benefits of multilateral netting even in absence of full transparency. The CCP becomes a kind of relationship intermediary, allowing to focus on net risk exposure, and commensurably building a desired level of safety on a smaller amount of collateral (see Duffie/Zhu, 2011).

The collateral-efficiency of CCPs encourages market participants to migrate from non-centrally cleared to centrally cleared transactions. The regulators encourage the move towards CCPs (and therefore centrally cleared transactions) by requesting minimum levels of collateral and/or capital for non-centrally cleared OTC transactions.

Thus, a well-managed CCP renders derivatives markets safer by eliminating counterparty risk – at least most of the time. The use of the VaR methodology defines collateral levels for all counterparties of the CCP in a novation process. The choice of the VaR confidence level allows to lower a CCP's own default risk to any desired level.

The process of dynamic margining keeps the default risk of each exposure at the desired level at any point in time. Nevertheless, the CCP's default risk will not vanish completely unless collateral for the underlying individual exposures is very high. The loss distribution for a typical CCP resembles (but is not necessarily equal to) a two-point distribution. With very high probability, say 99.9%, the realized loss is zero and with a very small probability the loss is extremely large. This latter extreme-loss event

represents the case when shortfalls from the entire portfolio of exposures managed by the CCP exceed the available collateral, including possible safety cushions the CCP may have set up.

By all unlikeliness, this would be an extreme systemic risk event, resulting in all major financial institutions in the relevant market covered by the CCP having trouble fulfilling their financial obligations. The larger the CCP, the more severe will be the respective systemic risk event. Despite a waterfall of safety layers in the CCPs' liability structure, ranging from initial margin, variation margin, credit enhancement (default fund, variation gains haircuts) all the way down to CCP equity, it is likely that such an event will trigger a complete collapse of the financial system due to a run on its banks and other runnable institutions. Government bailout will be inevitable in this case. Haldane (2009) has characterized such a (financial) system aptly as *robust-yet-fragile*: robust in that it serves as a risk absorber in most of the cases while suddenly it may become a risk-spreader where fragility prevails (for an analysis of the properties of a robust-yet-fragile system see Acemoglu/Ozdaglar/Tahbaz-Salehi, 2015).

2.2 Margining, competition, and financial stability

As was argued in the previous subsection, a CCP exhibits decreasing average risk to scale and thus exhibits the properties of a natural monopoly. In principle, these scale benefits can be reached either through complete transparency concerning all concurrent exposures between customers and CCPs, or through the merger of CCPs, eventually leading to a single, monopolistic CCP. In both cases, the less-than-perfect correlation of individual exposure risks decreases aggregate, system-wise risk and allows to lower the cost of default risk protection. As a result, margin requirements for a given set of exposures can be reduced, once the overall network of exposures is taken into consideration.

In a recent working paper by the U.S. Office of Finance Research (OFR), Glasserman/Moallemi/Yuan 2016 show that the stability of a financial system with multiple CCPs critically depends on margin requirements at each CCP properly reflecting the fact that clients (dealers) hold additional exposures with other CCPs. Margins need to internalize the risk externality arising from multiple relations of clients with CCPs across products. The reason is that to capture liquidity costs at default, margin requirements need to increase superlinearly in position size. The externality could theoretically be internalized with full transparency about all concurrent exposures of clients, as is shown in Acharya/Bisin (2014), or through a CoMargin algorithm as suggested by Lopez/Harris (2015) that allows to internalize the externality of having several CCPs; a similar proposal can be found in Menkveld (2016).

However, the most natural way to internalize this externality is to have a single CCP. In fact, it is likely to expect that competition among CCPs would end up in an equilibrium with only few (or maybe just one) CCPs with very low margin requirements. The reasoning behind this conclusion is very simple. With more than one CCP operating in a particular market, which is servicing the same customers (with different products) or the same products (with different customers), there is competition for market share. The competition is fueled by the natural monopoly property of the CCP business, which promises decreasing average default risk if more trades are combined at one exchange.

In one of the rare empirical studies on CCP performance, Abruzzo and Park (2015) find that margin differences between CME and ICE, the two largest CCPs in the U.S., explain subsequent margin changes; the authors interpret this as evidence for the competition sensitivity of observed margins.

However, if competitive pressure leads to an undercutting in margin levels and if asset values are correlated, the CCPs may end up having insufficient collateral. In particular, they will implicitly lower the VaR level. This brings us to a second consequence of merger activity, besides the economies of scale just mentioned, namely the emergence of competitive underpricing which we call “predatory margining” (in line with the industrial organization literature on oligopolistic goods markets). While the first motive for integration, economies of scale realization, leads unambiguously to efficiency gains, the second motive, rent realization, does not. It is, however, fundamental for identifying the right design and regulation of the OTC derivatives market. The current literature focuses primarily on the first consolidation motive, economies of scale. For example the natural monopoly character of CCPs is discussed in Duffie/Zhu (2011). Lewandowska (JMCB 2015) compares different clearing models in a numerical exercise, effectively analyzing their natural monopoly properties. She finds that netting efficiency critically depends on bundling all asset classes at the same CCP. In particular, there should be no clearing exemption for certain asset classes, e.g. forex derivatives, nor for certain market participants, e.g. dealers.

On the second motive for market consolidation, winning market share to increase profitability through recouping a monopoly rent later, there is less academic literature to rely on. In short, from the perspective of an individual CCP, margin undercutting may prove to be a profitable strategy if it remains temporary and serves the purpose of winning over market share from a competitor. Due to decreasing average cost (or rather risk), an increase in business volume effectively lowers margin requirements. At the level of the individual firm, the industrial organization literature teaches us that predatory margining may be used to expand market share at the expense of competing CCPs. The resulting lower earnings will be compensated by potentially higher margins in the future, once current competitors are driven out of business.

At the level of the market as a whole, however, predatory margining implies concurrent suboptimal levels of collateral, thereby increasing the risk of a CCP default. Moreover, lowering margin requirements may be the strategy pursued by all competing CCPs simultaneously. This imposes an external effect on the systemic risk level in the market (which will increase). This externality is difficult to observe, and it is unpriced.

Thus unfettered competition among CCPs may lead to a “bad” equilibrium in which the likelihood of a systemic risk event is rising.

2.3 The importance of regulation and centralized supervision for systemic risk containment

Supervision of CCPs is currently organized in a decentralized setting. While the European Securities and Markets Authority (ESMA), the regulator in charge of market supervisory standards, defines the general supervisory principles and rules, the actual supervisory job of CCPs is done by the relevant national institutions, accompanied by international colleges. A CCP in Germany, for example, is under the control of the banking supervisor at the Federal Financial Supervisory Authority (BaFin)⁵. Given that most large clients have exposures with several CCPs in more than one country at the same time, the information about counterparty risk is necessarily incomplete. This alone renders supervision of CCPs by national agencies inefficient.

A second limitation of national supervision, in the case of CCP, follows from the influence of competition in the CCP industry.

Regulatory standards are set uniformly across the EU through EMIR and the applicable regulatory technical standards set by ESMA⁶. Standard setting bodies at the supra-national level (for example the Financial Stability Board, FSB) have discussed the systemic risk problems relating to CCPs for quite some time (see FSB 2016), and have therefore included some very large CCPs in the group of systemically important financial institutions, deserving special supervisory attention. But is this enough?

We think not. An effective implementation of any desired regulatory standard requires consolidated supervision at the CCP level in order to internalize any indirect margining effect caused by the existence of concurrent exposures between any one counterparty with different CCPs. An additional argument in favor of a unified supervisory responsibility emerges from capture potential that follows from a more regional or national approach to supervision. Therefore, a proper regulation, comprising comprehensive oversight of margin processes, is relevant for financial stability.

⁵ This is because the CCP in Germany is a credit institution by definition.

⁶ <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32012R0648&from=DE>

European regulators have turned their attention to recovery and resolution policy recently. Steven Maijoor, the Chair of ESMA, has described in a speech on 24 June 2016 how CCPs are supposed to prepare for a possible major default shock. The relevant regulation EMIR has defined a so-called “cover-2” requirement, which demands enough safety cushion in a CCP’s financing structure to withstand the default of its two most important clearing members. The FSB is also advocating stringent rules for CCP resolution (see FSB 2016).

Moreover, a first EU-wide stress test covering major CCPs was carried out recently (see ESMA 2016, Report on the EU-wide CCP stress test 2015), again presupposing the default of two major clearing members. These tests were assuming “extreme but plausible” market conditions. This is certainly not a completely outlandish scenario, underscoring the relative softness of the stress test. E.g., the correlation among exposures was generally set at zero, a very benign assumption. In his speech, Maijoor concedes that no adequate resolution tool is available today. The European Commission is preparing a proposal for resolution for the design of such a tool, which should be presented by the end of 2016.

For a set of modest default states, when losses from a major fallout are significant but not too large, a structured recovery and resolution framework is of great importance, see BIS-IOASCO (2014) on basic concepts of infrastructure recovery, and FSB (2015) for details on effectiveness of resolution regimes. An effective framework for recovery and resolution will also set proper incentives for CCP owners and management to hold sufficient cushions of equity, and for clients to monitor the soundness of a CCP’s margining policy.

Without prejudice to the outcome of these preparations, we argue from the *robust-yet-fragile* nature of CCP loss distribution that a simple copy-and-paste of the EU recovery and resolution procedures in banking, emphasizing the concept of bail-in and total loss absorbing capital, will most likely be insufficient for CCPs. The reason is that a bail-in tool, as introduced in the EU banking regulation recently, is restricted to loss events of rather limited size. Assuming a two-point (binomial) loss distribution, according to which losses are either zero or very large, where the former has a very high probability, the CCP will not have sufficient capital for the rare but disastrous loss event.

In this case, when extreme loss states are materializing, a sophisticated bail-in methodology with pre-defined layers of subordinate debt and equity will unfortunately be “for the birds”. The only feasible remedy in a CCP loss event will then require a government backup, and/or a central bank life-line. Incidentally, under similarly extreme conditions concerning a tail risk event, a government bailout is also the instrument of choice in today’s banking regulation. There, too, a true systemic risk

event will suspend the legal force of the Bank Recovery and Resolution Directive (BRRD, EU 2014/59), giving room for a full-fledged government intervention.

3. Reality check: Is CCP competition a likely threat to financial stability?

If we look at the market structure of the CCP industry, we find that most CCP services are organized as subsidiaries to exchanges. For example, LCH.Clearnet belongs to London Stock Exchange, Clearstream to Eurex which itself is a part of Deutsche Börse Group. Some other CCPs are mutually owned by major dealers, like DTCC (Depository Trust & Clearing Corporation)⁷ in the U.S.

Given the recent regulation of derivatives markets in the U.S. (Dodd Frank Act) and Europe (EMIR) and the subsequent transfer of OTC derivative business to CCPs, clearing operations are now expected to become increasingly important for the bottom line of exchanges.

A recent statistic compiled by the FSB sees a strong tendency of clearing houses to be owned by stock exchanges (right panel). However, the number of major clients of CCPs, its members, is roughly constant, averaging less than 100 counterparties, mostly banks and dealer-brokers.

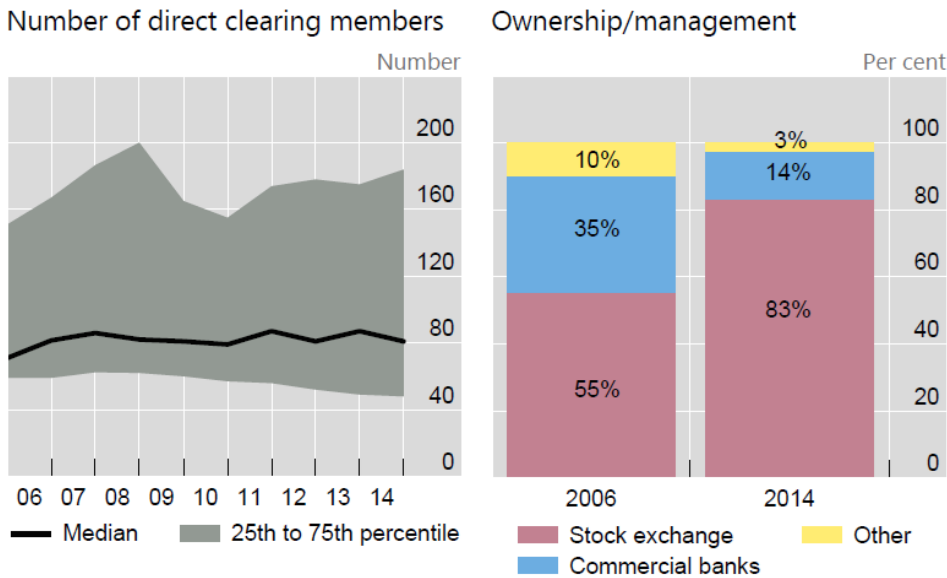


Fig. 2: Evolution of CCP industry (Source: FSB, Domanski et al., 2015)

Given the high level of competition among trading platforms, including internalizers and crossing networks, CCPs are expected to remain a (or the) core activity of major exchanges’ business model. In fact, competition between CCPs is escalating. First, the European Commission has advocated market access in clearing and settlement for years. The European Commission has taken a strong

⁷ DTCC is the largest CCP for credit derivatives clearing in the U.S. It is also active in Europe (EuroCCP), and it holds an important stake at LCH.Clearnet.

stance against so-called vertical silos, like Deutsche Börse, combining trading, clearing and settlement services in a single corporation with a single bottom line. Only recently, ESMA has issued an open access requirement, giving Eurex customers the option to clear via other clearer such as LSE's LCH.Clearnet⁸.

Currently, there are 32 CCPs active in the European Union, of which 16 are authorized CCPs located in the EU, and 16 are recognized („passported“) third-country CCPs (see ESMA 2016, Report on Risks and Vulnerabilities).

While hard evidence for an increase in competition is not available, several arguments point in that direction. The large number of active CCPs renders competitive pressure likely, given the natural monopoly character of the business model. Moreover, CCPs from the U.S. market, like DTCC and ICE, are now entering the deregulated European market. Steven Maijoor in his June 24, 2016 speech has emphasized the signs of increased competition in the CCP industry in Europe.

As was argued above, a rise in competition may lead to insufficient margining (or predatory pricing) in these markets. Incumbent CCPs may feel compelled to soften their collateral standards to defend their position against new entrants, just as entrants may use undermargining to gain some market share. It will be critical how CCP supervisors respond to such developments. We are, however, pessimistic about their role in fending off undermargining problems. Firstly, it may be difficult to identify undermargining with sufficient precision, as margin requirements are based on simulations that may be sensitive to assumptions and data selection. Secondly, even if undermargining can be identified unequivocally, the supervisor may implicitly partner with the supervised entity in order to protect the CCP's superior business model and also to protect the agency's own role.

Taken together, these arguments suggest that competitive undercutting of CCP margins may go unchallenged in an internationally open access CCP market with national supervision. Such a scenario opens the perspective to a race to the bottom, in which an ever decreasing margining policy increases the systemic risk emerging from the operation of one or several CCPs – which leads eventually to a government bailout of the CCP when the systemic event finally happens.

⁸ Reuters has commented as follows: “The European Securities and Markets Authority (ESMA) regulator said open access to exchange-traded derivatives does not create undue risks to market stability and should not be temporarily excluded. It marks a victory for the LSE and its clearing house LCH.Clearnet, along with ICAP and Nasdaq, who wrote to the ESMA in March last year asking it to back open access for exchange-traded derivatives.” (<http://uk.reuters.com/article/uk-eu-derivatives-regulations-idUKKCNOX11QC>)

4. Summary and conclusions

We summarize our analysis of the CCP industry and its role for financial stability in six lessons:

1. Under current regulatory conditions, the growing role of CCPs in derivatives markets greatly improves the stability of the financial system by imposing collateral requirements (margins) on a large fraction of bilateral derivative transactions, thereby reducing contagion risk among market participants (banks in particular).
2. In line with its robust-but-fragile property, a CCP triggers a systemic risk event with small but positive probability. In these extreme loss events, the banking system will be severely affected, and multiple bank defaults will be looming.
3. In case of a systemic CCP default, a government rescue operation (bailout) is not only unavoidable, it is also efficient as there will be not enough capital available at the CCP level to counter the severity of the loss experience.
4. CCP loss events of a more modest size, i.e. smaller than extreme systemic events, may be dealt with adequately by a suitable recovery and resolution framework.
5. The market structure of CCP services may itself affect systemic risk. In particular, if there is competition for market share between different CCPs, rather than a monopoly CCP, and transparency about individual exposures is incomplete, society faces the risk of undermargining. Firstly, due to a lack of transparency, CCP-specific margin estimates do not reflect the increased risk from exposures vis-à-vis multiple CCPs. Secondly, owing to economies to scale, unfettered competition will invite undermargining by aggressive CCPs.
6. Lessons 1-5 provide guidance for the efficient design of CCP regulation and supervision. Firstly, the supervisory practice (and their standards) should be the same for all CCPs, irrespective of their location, in order to avoid a race to the bottom of regulatory standards. Secondly, and consistent with the first argument, supervisory standards should be uniformly applied without regard to local champions. The latter is particularly relevant if CCPs are operating at the national level and relevant supervisory agencies are national rather than supranational authorities.
7. Consequently, regulation and supervision should be centralized in one agency covering the entire “relevant market”, which is defined as including all (national) economies in which CCP counterparties are domiciled. This definition of relevant market ties in with the set of countries that would ultimately face the bailout bill should a systemic risk event ever happen.

These lessons can be applied to the regulatory status quo in Europe, suggesting two policy conclusions:

Need for a single supervisory agency

A potential race to the bottom could be avoided if supervisors coordinate among themselves, fixing margining requirements at a uniform level, and abstracting from any competitive considerations. Since such a behavior is difficult to achieve in a college of independent supervisors, for reasons of political economy, one possible way out is to establish a unified regulatory and supervisory agency *in charge of all* competing CCPs. The objective of the single CCP supervisor would be to preserve a minimum VaR of the entire financial system, encompassing all CCPs in a single market model. Given the current institutional set-up in Europe, the single supervisor for the CCPs could be either ESMA, who now serves as the single regulator, the Single Supervisory Mechanism for banks (SSM) or a new institution that could be established from scratch.

In light of the important role of systemic risk in understanding the potential costs and benefits of CCPs, we argue in favor of the SSM as the single CCP supervisor. The reasoning is straightforward: A sound estimation of margining standards, as it is required for the supervisor to monitor safety standards in derivatives markets, requires comprehensive information about the major counterparties of the CCPs; these major counterparties are predominantly commercial and investment banks as well as broker-dealer institutions. The SSM has already deep knowledge about all risks of these institutions. Thus, no double data collection efforts would be required to set up the single CCP supervisor.

Conversely, we advise strongly against a role of national supervisors for CCP supervision. The European CCP market today is still strongly structured along national market lines. Therefore, if the supervisory mandate would remain with national supervisory agencies, there is a risk of regulatory capture. This risk is elevated by the fact that much of the cost of lax supervision comes in the form of an externality: an increased probability of a systemic risk event, borne by all countries in the relevant market.

Bail-in rules and TLAC requirements for CCPs are of limited importance

Provided that a single supervisor along with the existing single regulator is established, the issue of recovery and resolution emerges. Of course, the same issue emerges when there are multiple supervisors, or a college of supervisors, like today. The question is: Do CCPs allow for a resolution along the BRRD lines, i.e. building on bail-inable debt?

The current debate in Brussels focuses on establishing several layers of bail-inable capital, ranging from equity to senior debt. Its setup resembles the minimum total loss-absorbing capacity (TLAC) model now preferred in banking regulation in Europe⁹. For CCPs, the waterfall starts with the layers of variation margin reserves held by individual customers, then bails in initial margins, followed by accumulated loss reserves of the CCP. After those, haircutting the margins of all other customers is called for, followed by the CCP's own equity, and potentially other bail-inable debt held by the CCP.

While the list of bail-inable layers of loss absorbing capital seems impressive, it will not make the CCP immune against a default. The reason is that correlated shocks to assets of many or all CCP customers may lead to a downward spiral of collateral values and, ultimately, of customers' own capital that will render the haircutting of other clients' margin reserves illusive.

The current EU proposal requires bailing in these layers of capital before outside rescue funds, provided by a government or a central bank, can be injected. This is a good thing, as it ensures proper incentives at the level of the individual CCP, and it is also in line with the treatment of other financial institutions under BRRD.

However, the bail-in of a CCP under market stress has not yet been tested. Historically, there are only a few CCP defaults on record. These are U.S. Options Clearing Corporation in 1973, Paris 1974, New York Mercantile Exchange, Inc. in 1976, Commodities Exchange Inc. in 1985, Hong Kong's futures clearinghouse in 1987 (requiring a government bailout), and U.S. Board of Trade Clearing Corporation in 1992 (see Jones/Pérignon, 2008, Kroszner, 2000 and 2006)

Our major concern with a TLAC-compliant strategy is that it will not work well for a CCP. The main reason is that a CCP, unlike a bank, is almost by construction too big and too interconnected to fail. Its robust-yet-fragile nature, producing a two-point (bimodal) loss distribution, is hard to reconcile with the on-balance-sheet loss absorption implied by a bail-in procedure. We rather expect to see a self-enforcing loss contagion process, once margin haircutting sets in at a broader level. In such a situation, a destabilizing effect on the entire financial system will only be averted with explicit government and/or central bank guarantees. It is worth remembering that the systemic importance of a CCP, and thus the potential financial implication of a default, rises with its market share.

⁹ European Parliament, DG for Internal Policies 2016, „Loss absorbing capacity in the Banking Union: TLAC implementation and MREL review“, a briefing of the European Parliament, gives an overview over the debate. The text can be found under: [http://www.europarl.europa.eu/RegData/etudes/BRIE/2016/574408/IPOL_BRI\(2016\)574408_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/BRIE/2016/574408/IPOL_BRI(2016)574408_EN.pdf). See also Krahnen/Moretti 2015.

The larger the CCP, the more efficient its multilateral netting facilities, the more important is the credibility of a bailout guarantee by the domestic governments. In fact, the guarantee has to be issued by those states that are home to the clients of the CCP, not necessarily the home of the CCP itself¹⁰. An explicit guarantee will stabilize the CCP ex-ante, but it may also induce moral hazard and adverse selection risks. The consolidated supervisor, overseeing all CCPs operating in Europe (including the UK), would have to rule out predatory margining, and other sources of systemic externalities.

¹⁰ This last point is of relevance in the current debate about the location of a merger between LSE and Deutsche Börse. The argument in this policy note suggests that the consolidated CCP (or both CCPs if LCH.Clearnet and Eurex.Clearing remain separate businesses) run by the merged entity should be domiciled within the borders of the European Union, preferably the Eurozone, with a single EU-wide supervisory agency being in charge of monitoring margining policy and practice.

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