



The Future of Clearing

REPORT EXCERPT

This report, co-authored by the World Federation of Exchanges and Oliver Wyman, provides an overview of the post-crisis developments that have shaped the current clearing landscape. The paper draws on existing studies and quantitative assessments performed by industry bodies, as well as a proprietary survey completed by 20 respondents from across the WFE CCP member base.

The report looks at the relevant policy and regulatory frameworks that were introduced with a specific focus on the reforms aimed at encouraging greater use of central clearing, and the impacts of these on CCPs, and other market participants. It also considers how the nature of clearing services has evolved against this backdrop.

The report concludes with an assessment of the opportunities for the industry, policy recommendations to build the CCP of the future and a recommended framework for the market structure that supports that CCP of the future.

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1 EXECUTIVE SUMMARY

While the fundamental role of a CCP as a neutral and independent risk manager has not changed, the benefits associated with counterparty risk management and transparency have become ever more central to financial market stability and operations. Post-crisis regulations have recognised and sought to build on the stabilising role that CCPs played during the Crisis and the systemic benefits that CCPs have long provided.

Commitments to increase transparency and promote stability of financial markets, made and reiterated at 2009 and 2011 G20 summits, were carried forward by International standard setting bodies (FSB, IOSCO, CPMI and BCBS), and subsequently implemented by regional and national regulators, with the introduction of a raft of policies, regulations, standards, and frameworks aimed at promoting the use of central clearing and enhancing the resilience of CCPs.

There is consensus that strong progress has been made in meeting G20 objectives with a significant shift to central clearing of OTC derivatives and ongoing investment by CCPs in their risk management and core processes while bolstering financial resources.

However, there is still work to be done for supervisors, CCPs and clearing members alike, to maintain a robust financial markets ecosystem that delivers on its core ambitions. For supervisors this means finalising the central clearing agenda and fully implementing the clearing obligations, addressing the range of factors that may impede the use of clearing services. These include minimising cost barriers to clearing, e.g. those that result from the interplay of CCP and banking regulations, such as the approach to the leverage ratio. Supervisors also need to focus on ensuring implementation of agreed principles and avoiding unnecessary market fragmentation.

For CCPs, the focus remains on core risk management capabilities (credit, liquidity, operational risks and default management), and exploring ways in which to further enhance the accessibility of clearing.

This activity will occur against a backdrop of an evolving market structure influenced by a range of dynamic regulatory, technological, and systemic developments.

Solving identified challenges and delivering on opportunities will require engagement across a broad set of stakeholders and supervisors. The specific future focus areas for CCPs will vary depending on their levels of risk maturity, the products they clear, and the regulatory framework within which they operate (amongst other factors).

As the regulatory focus gradually shifts from implementation of post-crisis regulation towards enabling growth and market development, it will be critical to avoid negative impacts on the finely calibrated incentive structures in place across the central clearing ecosystem; it should be assessed whether, on balance, the regulatory objectives are appropriately met and properly implemented. We suggest that an ideal outcome is one which:

- I. Promotes financial stability and integrity and ensures that the lessons from the crisis have been learnt and understood.
- II. Recognises that sustainable economic growth relies on financial stability.
- III. Ensures CCPs' central role as neutral and independent risk managers via a faithful and full implementation of the G20 central clearing agenda.
- IV. Safeguards the CCP incentive structures on the basis of risk management standards.
- V. Results in cross-jurisdictional and regulatory dialogue and coordination mechanisms to tackle "ecosystem level" challenges and implementation of agreed standards.
- VI. Supports continued collaboration between CCPs and their members / end-clients to deliver innovations and solve ad-hoc and structural challenges.
- VII. Produces enhanced understanding of the interconnectedness of the clearing system and associated implications (incl. risk assessments, R&RP).

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HOW WE GOT TO WHERE WE ARE

In September 2009, at the G20 meeting in Pittsburgh, global leaders noted that *“major failures of regulation and supervision, plus reckless and irresponsible risk taking by banks and other financial institutions, created dangerous financial fragilities that contributed significantly to the current crisis.”* In response, the G20 committed to strengthening the international financial regulatory system through enhanced bank capital requirements, reform of the over-the-counter (OTC) derivatives market and addressing issues related to systemically important financial institutions.

In relation to OTC derivatives specifically, leaders agreed that:

- All standardised OTC derivative contracts should be traded on exchanges or electronic trading platforms, where appropriate (the trading mandate), and cleared through central counterparties (CCPs) by end-2012 (the clearing mandate/obligation);
- OTC derivative contracts should be reported to trade repositories; and
- Non-centrally cleared contracts should be subject to higher capital requirements.

At the 2011 G20 summit, leaders reiterated their commitment to the reform of the OTC derivatives market and proposed additional measures, including the introduction of margin requirements for non-centrally cleared derivatives.

The stated objectives of these measures were to:

1. Improve transparency in the derivatives markets;
2. Mitigate systemic risk; and
3. Protect against market abuse.

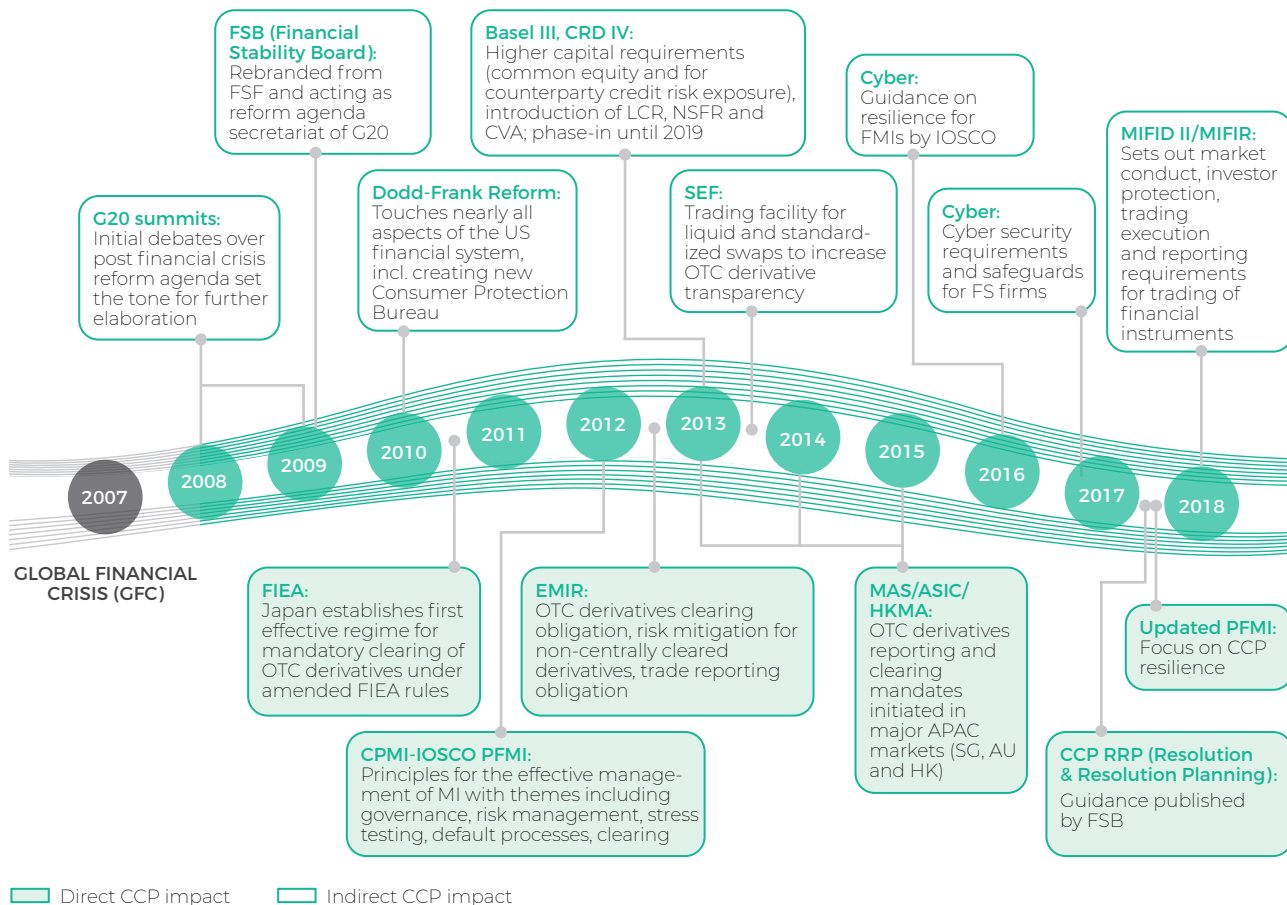
As a result of the crisis, CCPs were thrust onto centre stage. However, they far pre-date the crisis¹ and were providing effective risk management services across multiple (predominantly, though not entirely exchange-traded²) asset classes since well before the crisis. In fact, it was the performance of CCPs through the crisis and the inherent features of CCPs in managing counterparty credit risk and enhancing transparency (see Box on page 15-16 for more detail), that drove the regulatory enthusiasm for greater central clearing of OTC derivatives.

In response to the G20 objectives and mandates, international standard setting bodies (such as the Financial Stability Board (FSB), the International Organisation of Securities Committees (IOSCO), the Committee on Payments and Market Infrastructures (CPMI) and the Basel Committee on Banking Supervision (BCBS)), followed by regional and national regulators around the world, introduced a raft of policies, regulations, standards, and frameworks. These included several measures aimed at further enhancing the resilience of CCPs, in recognition of their more central role.

1 The first clearing organisation in the US was established in 1883 to clear Chicago Board of Trade contracts.

2 LCH's SwapClear offering was operational from 1999.

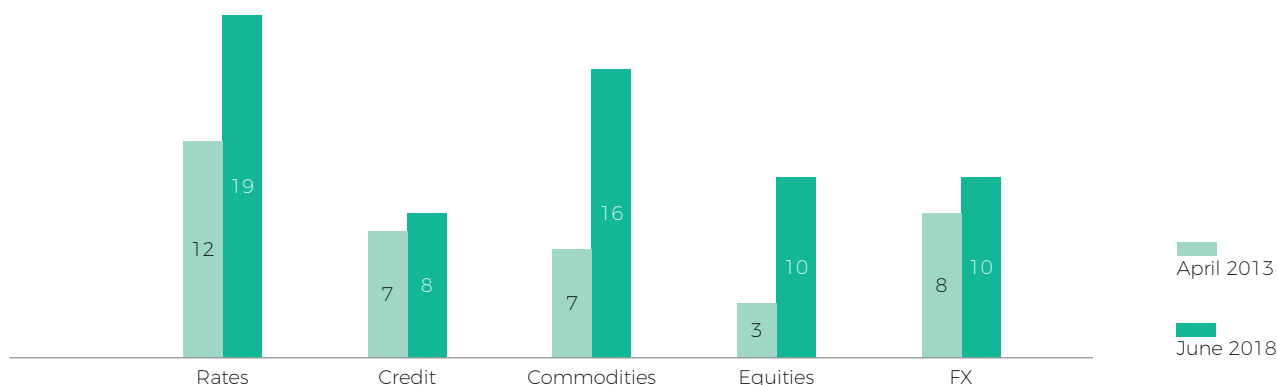
Figure 1: Overview of some of the post-crisis regulatory reforms impacting CCPs and their stakeholders



Among the most significant of the post-crisis reforms and guidance for CCPs are:

- The CPMI-IOSCO Principles for Financial Market Infrastructures (PFMI, 2012), and the Resilience of CCPs: Further Guidance on the PFMI (2017) aimed at ensuring sound governance and risk management practices at CCPs;
- The CPMI-IOSCO Guidance on the Recovery of Financial Market Infrastructures (2014, revised 2017) aimed at ensuring the development of effective recovery plans;
- The FSB Guidance on CCP Resolution and Resolution Planning (2017), focused on promoting the existence of robust recovery and resolution regimes at CCPs; and
- The CPMI-IOSCO Framework for Supervisory Stress Testing of Central Counterparties (2018).

Figure 2: Growth in OTC CCPs by asset class (2013 – 2018)³



Source: BIS derivatives statistics 2018, Oliver Wyman, WFE.

These guidelines (and the national legislation giving effect to them) interact with reforms in the banking sector, such as the revised BCBS Basel Capital Framework and the Margin Requirements for Non-centrally Cleared Derivatives (2013), and the BCBS Capital Requirements for Bank Exposures to Central Counterparties (2014) to shape the post-crisis landscape. We discuss this in more detail in Chapter 2.

Market structure developments

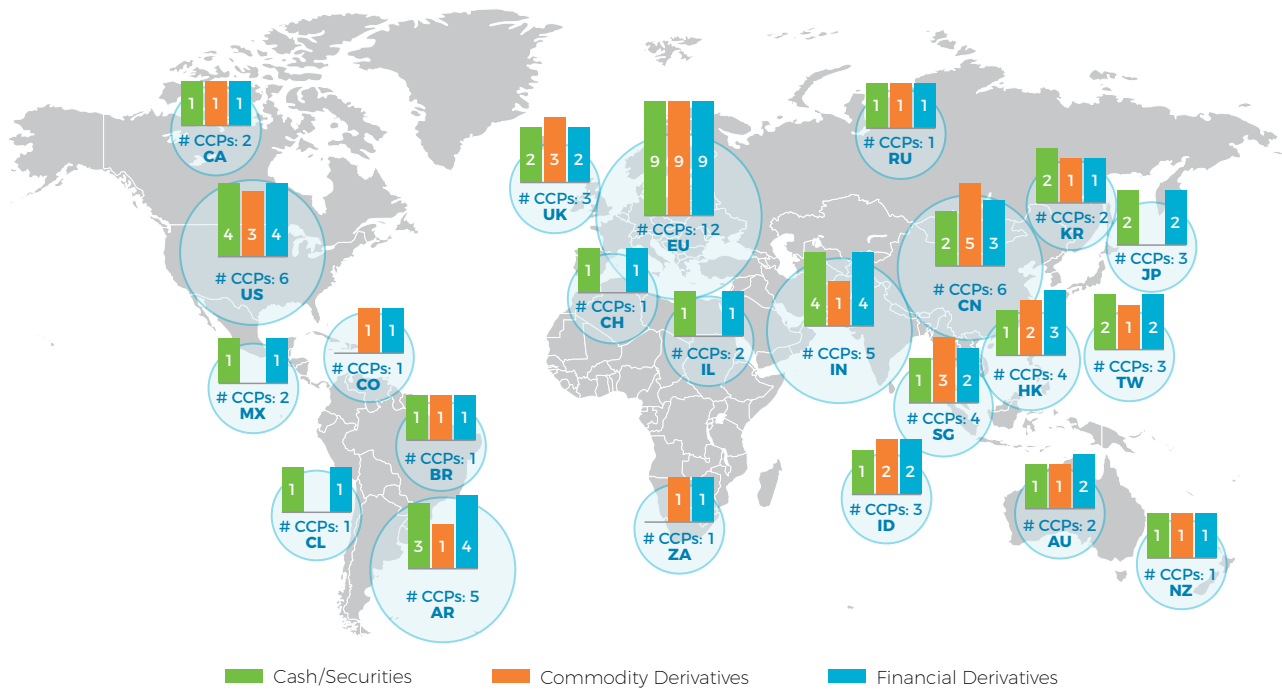
The regulatory developments set out above sketch the backdrop against which the CCP landscape is evolving and have both driven the changes at CCPs and driven expectations in relation to CCPs. Some of market structure changes relating to CCPs are set out below:

- Many CCPs have expanded the range, particularly of OTC products, available for clearing through their infrastructure, with a commensurate increase in the number of clearinghouses providing OTC clearing services across all asset classes (see Figure 2)³. Based on FSB data, 31 CCPs (some of which are part of the same group) were providing clearing services for one or more OTC derivatives products as at June 2018.
- CCPs have also expanded the scope of their operations, both in terms of geography and in terms of products available for clearing. The 31 CCPs mentioned above provide OTC clearing services in 14 jurisdictions, with several CCPs operating in more than one jurisdiction. The number of jurisdictions in which a single CCP is authorised to provide clearing for classes of OTC derivatives ranges from one to nine.⁴ When one includes CCPs clearing cash and exchange-traded derivatives products, there are a total of 74 CCPs globally, spread across developed and developing capital markets.

³ Based on data from the FSB's OTC Derivatives Market Reforms: Fifth and Thirteenth Progress Reports on Implementation, available here: <http://www.fsb.org/publications/progress-reports/> Note, these are not discrete numbers of CCPs but rather the number of CCPs offering clearing services for a particular asset class. A single CCP may offer clearing in more than one asset class. Similarly, CCPs may be authorised to provide clearing services for some or all asset classes in a number of jurisdictions.

⁴ Not all CCPs are authorised to clear all products in all the jurisdictions in which they operate. The data includes CCPs where CCP authorisation was pending as at date of publication.

Figure 3: Overview of global CCP coverage across key asset classes⁵



Number of CCPs with asset class coverage per jurisdiction; excl. cross-jurisdictional services. Excl. MY, PH and TH with 1 CCP each; Total of 74 CCPs based on FSB / CPMI / WFE sample.

Source: CPMI Statistics on payment, clearing and settlement systems in the CPMI countries 2018, FSB OTC Derivatives Market Reforms – 13th Progress Report, WFE, Oliver Wyman analysis.

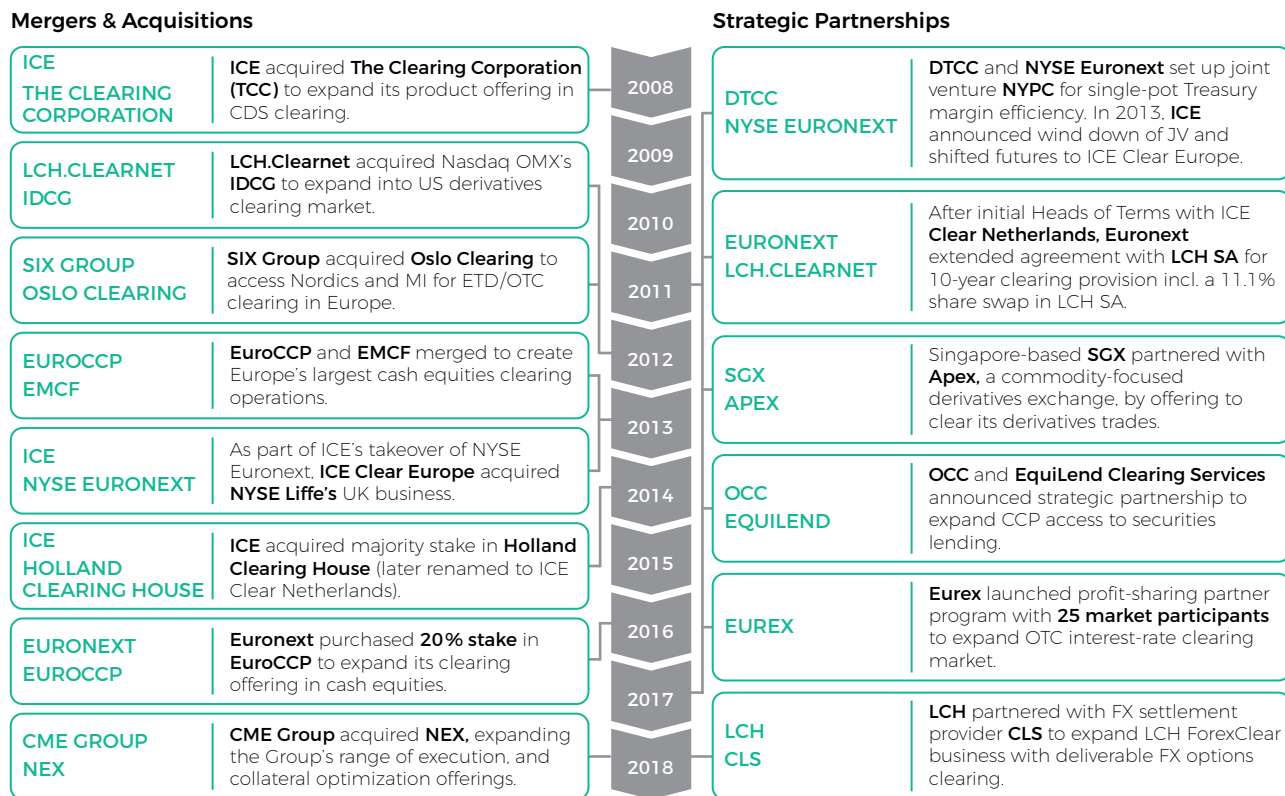
- Within this group of CCPs, 23% provide clearing across all three asset classes (cash, commodity derivatives and financial derivatives) while 31% are dedicated to providing clearing for only one asset class. The products cleared range from cash equities, to exchange-traded stock, commodity and currency futures and options, to OTC interest rate swaps and forward rate agreements.

While some of this product and regional expansion occurred organically, some of it was enabled through a series of mergers and acquisitions, and strategic partnerships (set out in the figure on the next page).

The ownership and operational structure of the CCPs referred to above vary widely. Many form part of a group structure that includes exchanges, and potentially other market infrastructures. There may be more than one CCP within a group, and the ownership structure may be different for different CCPs within the same group. CCPs that form part of a group structure may be a wholly-owned subsidiary within the group, or may be partly owned, with part-ownership by financial intermediaries or users of the platform (e.g. LCH and HKEX’s OTC Clear offering).

⁵ CCPs are counted by reference to discrete legal entities. This does not reflect the provision of cross-border clearing services. If these were included, the “number” of CCPs in a jurisdiction would be even higher.

Figure 4: Illustration of post-crisis M&A activity and strategic partnerships in the CCP market



CCPs also vary in terms of the origin of the products they clear. Some provide clearing services (at least for exchange-traded instruments) mainly for the products traded on the associated exchange. Examples in this category include JSE Clear, Eurex Clearing and B3. Others may be part of a group structure that includes an exchange but in addition to clearing products traded on their markets, also provide clearing services for other exchanges and execution platforms. Examples here include SIX x-Clear and LCH. CCPs may also be standalone structures, not associated with an exchange, that provide clearing across markets and products, for example EuroCCP, DTCC and OCC.

Despite differences in ownership or operational structure, and products cleared, the primary focus for all CCPs is ensuring effective risk management in accordance with the central tenets of the PFMI (as implemented in the relevant jurisdiction).

CCP CORE FUNCTIONS AND ROLE IN PROMOTING SYSTEMIC STABILITY

Ensuring greater use of CCPs is a core focus of the post-crisis agenda. CCPs serve to reduce systemic risk and thereby enhance the resilience of the financial system. They do this in a number of ways:

- By becoming the buyer to every seller and the seller to every buyer, CCPs replace a complex web of bilateral relationships with a more streamlined set of relationships. This process enables multilateral netting of exposures thereby reducing the total exposure of the entire network and more efficient collateralisation of exposures.
- Through ensuring effective collateralisation of exposures by establishing clear processes for calculation and collection of initial margin.
- By performing daily variation margin/settlement calculations between counterparties to limit exposure to market risk.
- By establishing a mutualised default fund that not only incentivises appropriate risk management on the part of users of the system, but provides certainty as to the process that will be followed in the event of a counterparty default (the so-called default waterfall – see Figure 6).
- By providing transparency of the centrally-cleared market (to supervisors and market users), providing greater insight to the functioning of the CCPs, its available resources, the set of exposures between counterparties and the associated interconnectedness.

Unlike banks, CCPs do not introduce risk in the system, but rather act as independent risk managers to ensure contractual continuity and performance.

Figure 5: Illustration of bilateral vs. centrally cleared transaction structure and characteristics

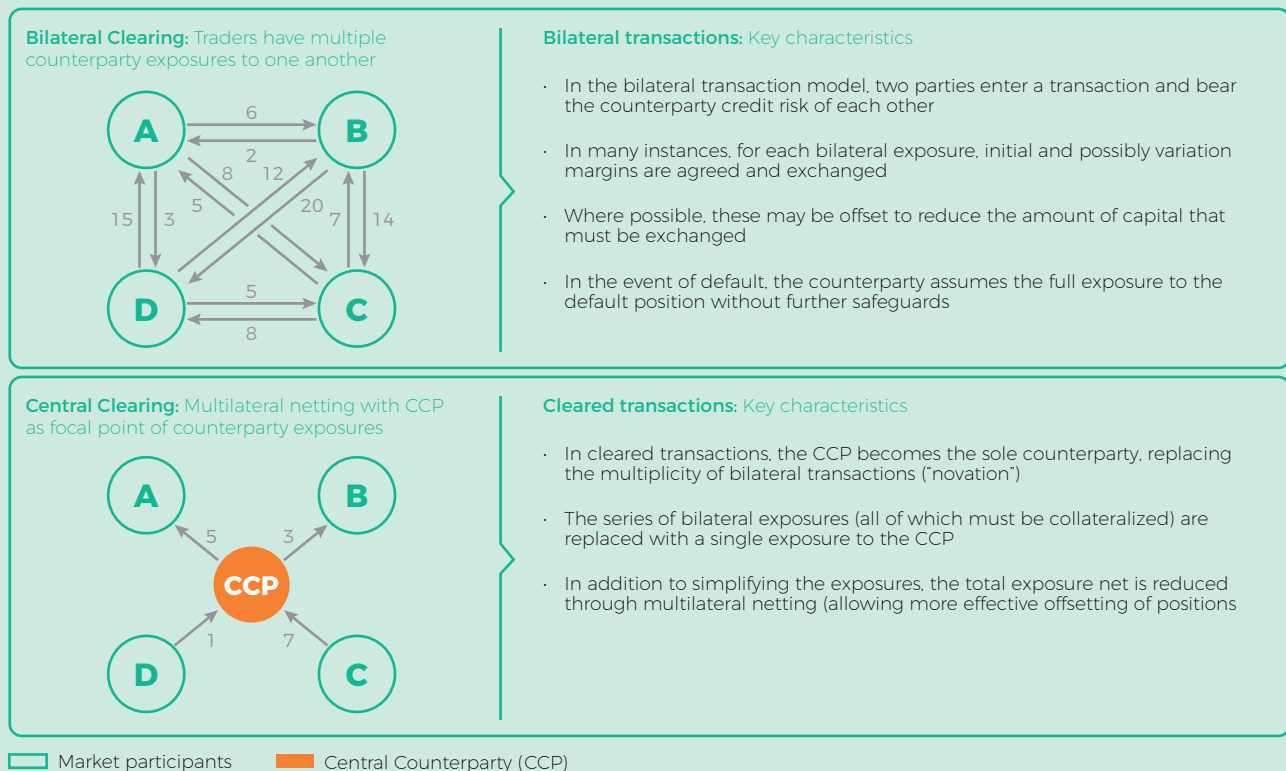
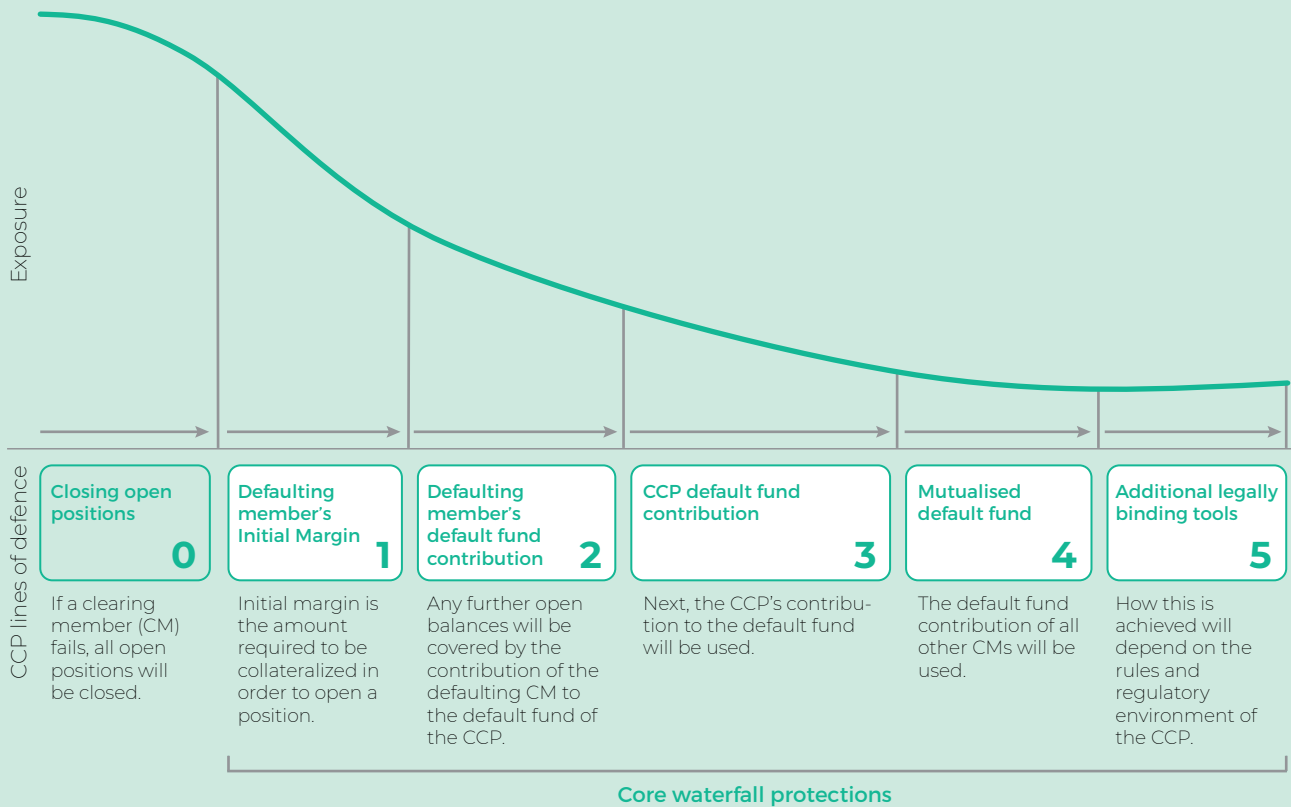


Figure 6: Illustrative view of a typical CCP default 'waterfall'



The ability of CCPs to perform this function effectively is predicated upon the CCP having effective risk management and governance criteria in place including strict eligibility criteria for entities admitted as clearing members.

“The centralised, rules-based management of a clearing member’s default by a CCP, combined with the incentives created by mutualisation enhance the system’s resilience and continuity during a stress and brings greater certainty to the default management process for market participants.”

Sir John Cunliffe, Bank of England, June 2018

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TAKING STOCK: WHAT HAS BEEN ACHIEVED SO FAR?

Policymakers, standard-setting bodies, regulators and industry participants (including WFE member CCPs) agree that overall, a significant amount of progress has been made both in implementing the G20 reforms and achieving the reform objectives. In its November 2018 report to the G20, the FSB concluded:

- The new regulatory framework was largely in place;
- The financial system was more resilient; and
- OTC derivatives markets were simpler and more transparent.

The greater resilience of the financial system is attributed to reforms that have resulted in a banking system that is “better capitalised, less leveraged and more liquid” while the improvements in the OTC derivatives markets are ascribed (at least partially) to the greater use of central clearing and collateralisation of transactions.

In relation to OTC clearing specifically, there have been sizeable increases in OTC clearing activity, particularly interest rate and credit derivatives. For example, clearing levels for interest rate swaps have increased from an estimated 24% to over 60% by end 2017, while clearing of credit derivatives grew from 5% to 45% over the same period.⁶ At the same time, CCPs (whether they clear OTC derivatives or not) have invested significantly in enhancing their governance and risk management processes to meet the objectives of the PFMI,⁷ and begun reporting regularly against key disclosure metrics (in line with the CPMI-IOSCO Public Quantitative Disclosure Standards for CCPs), enabling greater insight into CCPs. The expansion in the number of CCPs offering clearing services across jurisdictions and the expansion of the product set available for clearing, has also enhanced access to clearing.

However, despite this progress, there is also recognition that the reforms are not yet fully and consistently implemented, that in some instances the interaction of the reforms may run counter to the objectives and that the reforms are introducing changes to market structure which need to be evaluated and understood.⁸

1. AREAS OF INCOMPLETE/INCONSISTENT IMPLEMENTATION

Despite the overall growth in central clearing there is a high degree of variation in the use of central clearing across G20 jurisdictions and asset classes. In general, OTC clearing rates are higher in jurisdictions where a clearing obligation has been implemented;⁹ for instruments subject to such clearing obligation; and/or where bilateral margin rules for non-centrally cleared derivatives have been introduced.

In its 2018 progress report on OTC derivatives reform implementation, the FSB notes that only six (of 24) jurisdictions have implemented final capital requirements for bank exposures to CCPs and eight jurisdictions had yet to implement margin requirements for non-centrally cleared derivatives. Meanwhile six jurisdictions were still in the process of implementing regulations determining when central clearing was required. In jurisdictions where central clearing obligations are in place, regulators have in some instances delayed the rollout of the clearing obligation, granted temporary exemptions to certain categories of clients or raised thresholds.

6 Based on data from the November 2018 report on “Incentives to centrally clear over-the-counter (OTC) derivatives – A post-implementation evaluation of the effects of the G20 financial regulatory reforms – final report”. These numbers will vary within the asset classes and across jurisdictions.

7 See the August 2016 CPMI-IOSCO “Implementation monitoring of PFMI: Level 3 assessment – Report on the financial risk management and recovery practices of 10 derivatives CCPs”

8 Note the FSB’s statement in its 2019 Work Programme that “implementation of the reforms is not complete and remains uneven”.

9 As at June 2018, 11 jurisdictions had a clearing obligation in place, with a further two expected to implement such by end 2018.

The regulatory approach to implementation has also created concerns about possible market fragmentation. This is attributed to a range of factors, including differences in timing of implementation of reform measures (as set out above), inconsistent approaches to implementation of reforms, insufficient regulatory deference to differences in implementation of the relevant standards and need by regulators to exercise broad oversight of their markets. A set of truly global standards that are consistently interpreted, communicated and implemented by domestic regulators (to the extent that this is feasible) remains a work in progress.

Finally, while progress has been made in the implementation of the PFMI and associated standards (as at July 2018, only three jurisdictions had not yet self-attested to the full implementation of the PFMI as they related to CCPs)¹⁰ the May 2018 CPMI-IOSCO Level 3 implementation assessment found that some CCPs still have work to do in the areas of risk management and recovery planning.

2. INTERACTION OF REFORMS POTENTIALLY UNDERMINING REFORM OBJECTIVES

The design of some of the bank capital requirements negatively impacts on the use of central clearing, disproportionately increases the costs of clearing for certain types of clients and further increases the concentration of clearing activities in a few large clearing members.

Perhaps most problematic is the treatment of client margin in the leverage ratio calculation. As currently framed, the leverage ratio does not recognise the exposure-reducing impact of appropriately segregated client collateral. This increases the cost of providing client clearing services. As the FSB notes in its November 2018 assessment of incentives to clear in the OTC derivatives market (the DAT report) “the leverage ratio can constrain the client clearing business, and so affect the willingness of individual firms to provide access to centrally cleared OTC derivatives markets.”¹¹ The WFE membership has echoed the concerns of policymakers in noting that over the last decade the number of client clearing service providers has largely remained flat or declined, both relative to the growth of the cleared market and even in absolute terms in many markets.¹²

¹⁰See the July 2018 Implementation monitoring of PFMI: Fifth update to Level 1 assessment report (<https://www.bis.org/cpmi/publ/d179.pdf>)

¹¹See also work by the Bank of England (<https://www.bankofengland.co.uk/working-paper/2018/the-impact-of-the-leverage-ratio-on-client-clearing>) and the CFTC (https://www.cftc.gov/sites/default/files/About/Economic%20Analysis/oce_leverage_and_options.pdf)

¹²See the WFE response to Basel Committee on Banking Supervision’s discussion paper on leverage ratio treatment of client cleared derivatives, January 2019

Figure 7: Overview of impacts on cost to trade under Bilateral and Cleared derivatives transactions¹³

OTC Collateral and capital economics

	Bilateral model without IM ¹	Bilateral model with IM ¹	Central clearing model
Bilateral exposure	✓	✓	✗
Variation margin	✓	✓	✓
Initial margin	✗	✓	✓
CCP exposure	✗	✗	✓
Default fund	✗	✗	✓
RWA capital cost	High	Low	Low
LR capital cost	High	High	Medium
Funding cost	Low	High	Medium
CVA	High	Medium	No

The leverage ratio challenge

- Under Basel III/CRD IV rules, initial margin used for centrally cleared transactions **may not be used to offset the exposure** and capital required by the Leverage Ratio (LR)
- Higher capital cost implied by the LR framework thus provide **disincentives for clearing business** and (partially) undermine the clearing economics
- National regulators have taken diverging stances; both **EU and US policymakers recognize exposure-reducing effect** of client initial margin
- In late 2018, the BCBS initiated **consultations on potential amendments** of the LR framework

“The inability to recognize [...] initial margin in the leverage ratio inappropriately increases the capital cost of client clearing, thereby **undermining one of the key tenets of financial reform** following the crisis which is to utilize the **safeguards of central clearing**.” (Letter to BCBS, GHOS and FSB by leading clearing market participants, 2016)

“Following the introduction of the LR [...], UK clearing member banks **reduced on average their client cleared transactions by around 5%** and operated with around 4-5 fewer clients as compared to non-UK [...] members.” (BoE, 2018)

1. Initial Margin

Source: Bank of England, Oliver Wyman desk research and analysis.

This also has the effect of concentrating clearing activity in several large clearing members (or at least contributing to such concentration). Between 2012 and 2017, growth in centrally cleared transactions has been disproportionately higher than growth in the number of member firms: since 2012, the top 10 CCPs (based on CPMI sample, 2018) increased their total transaction value by ~17%, while the total number of clearing members rose by just ~1%¹⁴. The DAT report notes that over 80% of total client margin for cleared interest rate swaps in the United States, the United Kingdom and Japan is held in five clearing members, all bank-affiliated.

“Given the G20 reform mandate, I have concerns about the systemic risk implications of the current FCM concentration levels, the effect of the SLR on bank-owned FCMs, as well as the portability of a failing clearing member’s book of business to other clearing members in times of stress.”

Rostin Benham, CFTC Commissioner, October 2018

¹³See also a recent (15 February 2019) CFTC letter in which the authors state: “The Failure to Acknowledge the Risk-Reducing Impact of Client Initial Margin in the Calculation of the Supplementary Leverage Ratio Has Reduced the Availability of Clearing Services in Contravention of G20 Mandates.” Available here: <https://www.cftc.gov/sites/default/files/2019-02/SA-CCRCCommentLetter021519.pdf>

¹⁴Of these Top10 CCPs, 8 experienced growth in total transaction value, while only 5 experienced growth in number of Clearing Members

3. UNDERSTANDING THE IMPACT OF REFORMS ON THE CLEARING ECOSYSTEM

The overall impact of the post-crisis reforms on the financial system as a whole is an area of ongoing review. Much of the focus to-date has been on assessing the impact on regulated entities (banks, CCPs) and their performance. More recently there has been an attempt to understand how the reforms interact and what the sources of interconnection are in the system.

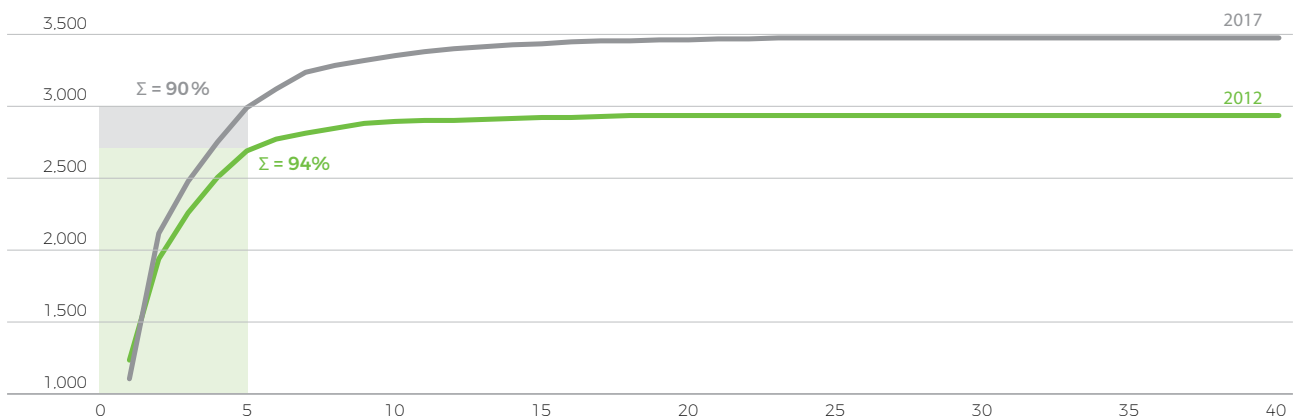
As at 2017, the largest five CCPs by cleared OTC transaction value accounted for ~90% of the total value of transactions of CCPs sampled (based on CPMI sample of 43 CCPs, 2018). While the extent of OTC activity concentrated in CCPs is higher than it has been historically, the concentration of activity is not new (and in fact, somewhat lower than it was in 2012, with the five largest CCPs accounting for 94% of activity by transaction value). Nor is it particularly surprising as the multilateral netting benefits of clearing are amplified as more activity is concentrated in the same entity.

In addition to concentration within CCPs, exposures to CCPs are concentrated among a reasonably small number of highly interconnected entities. The largest 11 clearing members (out of 306, as measured by prefunded financial resources contributions to the CCP) are connected to between 16 and 25 CCPs¹⁵. Entities that provide clearing services also provide other services to CCPs such as custodial, intraday liquidity, settlement and investment services.

Figure 8: Concentration of global OTC clearing activities (by value) across leading CCPs

Cumulative global OTC clearing transaction value 2017, ranked from largest to smallest CCP¹

In \$ BN/rank order



1. Based on CPMI sample of 42 CCPs.

Source: CPMI Statistics on payment, clearing and settlement systems in the CPMI countries (Red Book) 2018; Oliver Wyman analysis.

¹⁵Based on data from the November 2018 report on "Incentives to centrally clear over-the-counter (OTC) derivatives - A post-implementation evaluation of the effects of the G20 financial regulatory reforms - final report".

Again, the recent FSB analysis shows that the largest clearing members (or entities in the same group as the clearing member) provide several additional services to CCPs, with the largest clearing members providing between three and six other services (beyond clearing services) to CCPs.

As the standard setters note in their interconnectedness analysis, the data measures levels of interconnectedness, not risk per se. OTC derivatives markets have always been characterised by levels of concentration and interconnectedness. The advantage of the current situation is that by shifting more activity to the cleared environment, these interconnections are more transparent, and better understood and CCPs, as neutral risk managers, are able to act as firewalls against the transmission of risk.

NEXT STEPS

Most immediately it is incumbent upon global standard-setting bodies to work with regulators to finalise implementation of the outstanding G20 reform initiatives; to address identified barriers to clearing and outstanding challenges to incentives to clear; and to encourage cross-jurisdictional harmonisation of standards/regulations (where appropriate). On this latter point, standard setting bodies and regulators should be conscious of the need to balance the objectives of achieving consistent adherence to global standards with appropriate deference to national and product-specific requirements. Additionally, while noting and supporting ongoing discussions about how best to achieve supervisory cooperation and acknowledging regulators' legitimate interests in managing systemic risk and ensuring proper oversight of their markets, the effect should not be to unduly fragment a global market. Finally, it is important for global regulatory and standard-setting bodies to evaluate risks holistically, and ensure that reforms in one part of the system do not undermine broader systemic stability objectives.

“Let us refocus on the original mission, keeping in mind three key points. First, clearinghouses were determined to be a potential solution, not a contributing factor, to the financial crisis. Second, both the EU and the US have implemented the fundamental G20 standards and, third, both sides have mutually recognised that their requirements are equivalent or comparable.”

Dawn Stump, CFTC, 25 January 2019

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LOOKING AHEAD – WHERE TO FOCUS OVER THE NEXT 5–10 YEARS?

While progress has been made, there is still work to do as the clearing landscape and market structure continue to evolve and mature. In particular, there is a need to consolidate the strides taken towards achieving the G20 agenda while also recognising that waves of post-crisis regulation and market evolution have introduced new considerations for the clearing ecosystem and its participants.

In this section we explore likely priorities for the future. These are derived from current and emerging regulatory, risk management, technology, and market structure influences shaping this landscape (detailed below), all interacting with the characteristics of the clearing ecosystem discussed earlier in this paper.

INFLUENCES:

1. NEXT WAVE OF REGULATORY FOCUS:

- Evolution of dialogue around incentives to clear, building on the DAT study (including to cover the exchange-traded derivatives market) and set within the context of the phase-in of bilateral margining requirements
- Continued focus on default management practices of CCPs and exploring opportunities for further development of best practice
- Increasingly targeted industry debates and standard-setting on specific topics or capabilities (e.g. cyber resilience, recovery & resolution planning, supervisory stress testing)

2. SHIFTING RISK ENVIRONMENT:

- Evolving nature and high profile global incidences of operational threats, including cyber / information security
- Ongoing investment in credit, market & liquidity risk management as tools and mitigations adjusted as necessary in response to changing market and member behaviours
- Risk implications of an increasingly collateralised capital markets ecosystem, placing greater emphasis on collateral availability, handling and efficiencies
- Increased availability of information and information sharing allowing for more complex discussions on stress testing, recovery & resolution planning, interconnectedness

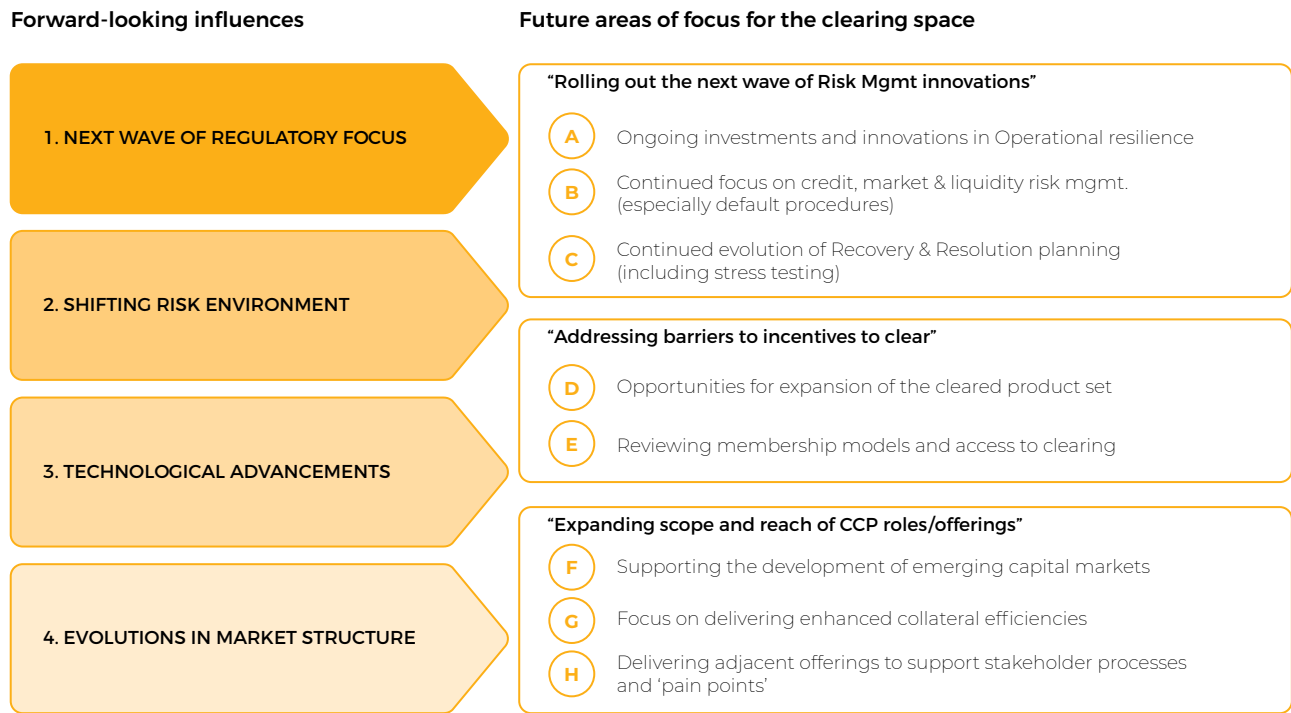
3. TECHNOLOGICAL ADVANCEMENTS:

- Rapid expansion of crypto-currencies and distributed ledger technology creating new opportunities and considerations
- Some early stage adopters deploying blockchain solutions though market impact (if any) not yet clear
- Uncertainty over future-state post-trade ecosystem as technologies develop – including the digitisation of clearing services, deployment of cloud-based services and use of AI in areas such as risk management

4. EVOLUTIONS IN MARKET STRUCTURE:

- Potential for continued concentration of clearing members particularly if issues such as leverage ratio relief are not addressed), with implications for broader access to clearing
- Following an active period of post-crisis M&A in the CCP space, selected pockets of further consolidation in areas where sub-scale CCPs exist or regional business models could provide efficiencies and improved access to clearing

Figure 9: Summary of future areas of focus for the stakeholders in the clearing ecosystem



This gives rise to several areas where CCPs and associated stakeholders may focus their energies over the coming years to ensure continued development, safeguarding and efficiency of markets. Not all of these will be equally relevant for all CCPs and associated stakeholders, given differences in levels of risk maturity, cleared product set, and jurisdictional considerations, and they should therefore be understood in this light.

These focus areas can be grouped into 3 broad categories, namely:

- "Rolling out the next wave of risk management innovations"
- "Addressing barriers to incentives to clear"
- "Expanding scope and reach of CCP roles/offerings"

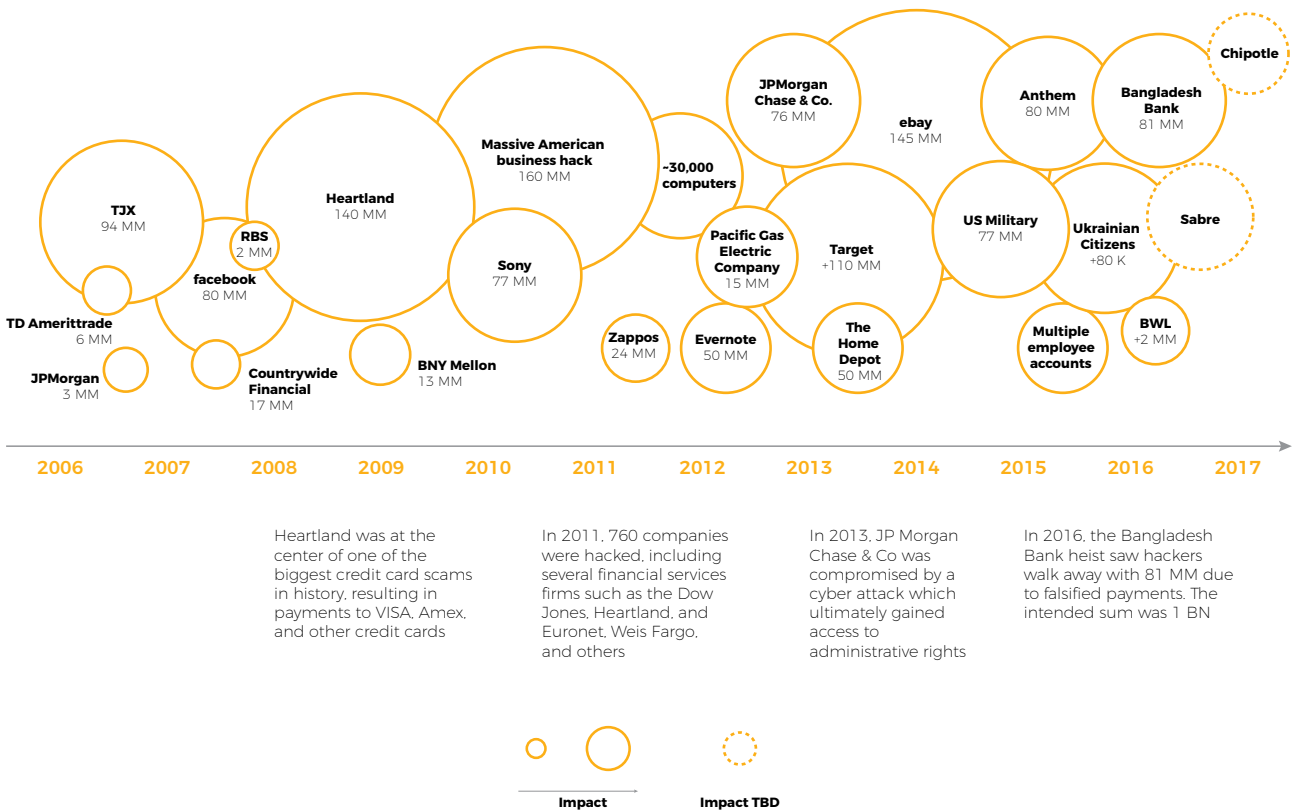
“ROLLING OUT THE NEXT WAVE OF RISK MANAGEMENT INNOVATIONS”

Recognising that the risks that CCPs manage are not static, but evolving, core risk management capabilities will remain a key area of future focus for CCPs. Emerging technologies, interconnectedness of financial markets stakeholders and continued regulatory scrutiny will need to be carefully understood and associated risks mitigated on an ongoing basis. We therefore expect management of operational risk (including cyber resilience), credit, liquidity and market risks as well as recovery & resolution planning to remain high on the agenda for CCPs across the globe.

A. ONGOING INVESTMENT AND INNOVATION IN OPERATIONAL RESILIENCE

Operational resilience is critical to ensuring the effective functioning of CCPs. Within this realm, cyber remains an ever-present and evolving threat, with continued high-profile incidents observed inside and outside of financial services.

Figure 10: Illustration of the growing prevalence of cyber-attacks over the past decade



Consequently, ensuring CCP resilience and alertness to cyber-attacks will remain an important focus area for regulators (CPMI IOSCO 2016 guidance on cyber resilience for FMIs) and a core focus for CCPs. WFE member survey respondents consistently rated cyber-attacks on CCPs, exchanges and clearing members as both high impact and high likelihood risk events, highlighting the importance CCPs assign to effectively managing this risk.

“Today we are seeing individuals and criminal groups developing tools and exploiting vulnerabilities on an industrial scale. And with the speed of data processing and interconnectedness of systems, attacks travel fast...in a digital world, as a regulator we care about resilience.”

Robin Jones, Financial Conduct Authority, January 2018

A major cyber-attack on a CCP, exchange or clearing member could threaten the core functions of a CCP, disrupt exchange and settlement functions, and potentially place privileged information on client positions at risk in the event of a data leak. CCPs have therefore invested heavily in enhancing capabilities and processes for mitigating the risk and impact of cyber-attacks – including use of ‘Red’ and ‘Blue’ team constructs to simulate attacker behaviours, enhanced reporting around penetration testing results and operational performance, creating dedicated Chief Information Security Officer roles and wargaming ‘live’ responses to an attack scenario. Given that the nature of this risk continues to change as available technologies, tools and strategies used to penetrate institutions are developed, we expect these risk management practices will be subject to ongoing review and enhancements.

While CCPs’ policies and procedures for treatment of default losses are well-established, policies on treatment of non-default losses remains a work in progress for some institutions. Recent CPMI-IOSCO recovery guidance proposes loss allocation arrangements for some non-default risks (e.g. custody and investment losses) suggesting that loss allocation for non-default losses should be proportional to the level of responsibility and/or benefits extracted from a service of each stakeholder. However a consistent policy position is yet to be agreed.

We expect CCPs will continue to explore how best to mitigate non-default losses and to work with stakeholders to arrive at a policy outcome that supports the overall integrity of the system.

B. CONTINUED FOCUS ON EFFECTIVE CREDIT & MARKET RISK MANAGEMENT (ESPECIALLY DEFAULT PROCEDURES)

Management of credit, market and liquidity risks sits at the heart of the purpose of a CCP, and will always remain high on the agenda for CCPs. It is therefore unsurprising that survey respondents identified this as the primary focus area for CCPs. Risk management is not static and as markets, members and other stakeholders evolve, so CCPs will need to evolve in their approach to management of these risks.

Progress in levels of trade reporting and consolidation of trade data (e.g. in Trade Information Warehouses), and the marked increase in use of CCPs for OTC derivatives means there is much greater transparency on exposures and positions at the point of a default than has historically been the case. However, a recent clearing member default event (CCP member default event in Q3 2018 following failure to make margin call, and subsequent initiation of close-out processes) means continued scrutiny from supervisors and market participants, and associated emphasis from the CCP community on ensuring the continued resilience and robustness of central clearing.

We therefore expect ongoing discussion about, and focus on, risk management practices (especially with respect to margin models and default procedures). Supervisory bodies will also play a key role in ensuring that best practises and standards relating to risk management and default management are appropriately harmonised (where it makes sense to do so) and tested on an ongoing basis.

In relation to default management specifically, supervisory bodies and operators of CCPs¹⁶ have already identified possible future focus areas:

Harmonisation of default management standards and processes

- Aligning default management conventions and terminology to foster global consistency and transparency (e.g. standard auction types, bidding conventions)
- Clarity on auction processes for defaulting clearing members (e.g. sequencing, timing and communications), establishing common principles instead of “one-size-fits-all” prescription
- Developing “auction playbooks”, with clear participation rules and guidelines for all market participants

¹⁶E.g. CCP Risk Management Subcommittee of the Market Risk Advisory Committee of the CFTC, and the Default Risk Management Working Group, group of eight central counterparty clearinghouse (CCP) operators, representing over 15 CCPs

Heightened collaboration during a default between regulators, CCPs, clearing members and clients

- Broad participation across member and non-member firms in default auctions to increase private sector capital commitment and improve overall auction results
- Coordinated default management committees across CCPs to optimally leverage skills and expertise of clearing member traders in hedging risks, structuring and liquidating defaulting member's portfolio and positions
- Effective customer porting mechanisms for client positions between defaulted and non-defaulted CCP members to avoid disruptions to market stability and liquidity

Enhanced ex ante (pre-default) cross-border communication and information sharing

- Enabling communication channels to promote cross-border collaboration and seamless information sharing (including regular updates on customer position movements, etc.)
- Creation of global clearing directories involving key risk management personnel at CCPs, members and clients

Regular testing / fire drills to ensure default management robustness

- Definition (and execution) of joint stress-testing routines ("fire drills") across CCPs, members (and clients) to ensure operational, legal and technological readiness for default shocks – especially relating to CCPs with high product portfolio overlap

C. ONGOING INVESTMENT IN RECOVERY & RESOLUTION PLANNING (INCLUDING SUPERVISORY STRESS TESTING)

CCPs' and supervisors' stress testing frameworks continue to evolve, with a focus on ensuring (or in some instances, continuing to ensure) complex scenarios such as contagion risk or idiosyncratic risks, are fully captured. CCPs and supervisors alike should continue investigating if further hypothetical scenarios in stress testing and risk management frameworks could capture risks which might not be reflected in historical data alone. In Europe, ESMA's 2015 stress testing exercise was an important start for European CCPs, while in the US, the CFTC has conducted two sets of systemic stress testing exercises for CCPs (with the second test focusing specifically on funding liquidity). As market regulators either introduce stress testing in their markets or seek to expand the existing stress testing exercises, there may be opportunities to:

- Expand stress tests to cover additional risk types and counterparty relationships and combine into an integrated "severe, but plausible" scenario; and
- Potentially include an operational part into the exercise (industry-wide "fire-drill") given the importance of liquidity and default management for CCPs.

CCP recovery and resolution planning exercises will likely follow an iterative process, with ongoing review and assessment to ensure the establishment of an appropriate framework. The recent FSB discussion paper on this topic¹⁷ introduces a range of possible areas for the industry to address, such as:

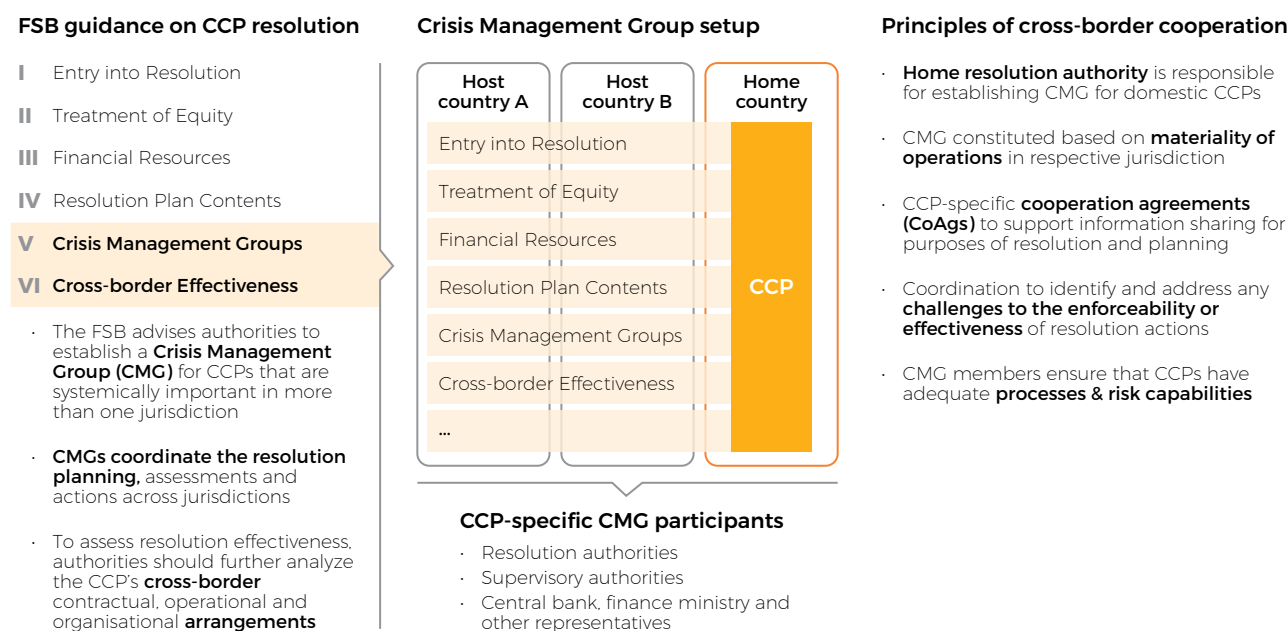
- **Increased cross-border cooperation** and use of cross-jurisdictional crisis management groups
- Reinforcing the **preferability of recovery over resolution** in formalized plans and strategies
- Assessing financial resources to support resolution and considerations for the **treatment of CCP equity** in resolution plans

As the FSB notes, any discussion of these issues must consider the specific characteristics of the CCP being assessed (e.g., products cleared and risk management practices) and the regulatory framework under which the CCP operates.

Stakeholder cooperation has become a major theme in discussions on CCP resolution, with a focus on cross-border considerations and coordination of resolution plans across impacted entities/jurisdictions. As outlined in the figure below, the FSB has also suggested the establishment of CCP-specific cooperation agreements (CoAgs) – where they do not already exist - to promote information sharing for purposes of resolution and planning. In addition, CCPs that are systemically important in multiple jurisdictions could establish Crisis Management Groups (CMGs) to further assess and manage resolution challenges around cross-border contractual, operational and organisational considerations. Importantly, this must be structured so as to recognise the primacy of the home regulator.

¹⁷"Financial resources to support CCP resolution and the treatment of CCP equity in resolution" – Financial Stability Board (November 2018)

Figure 11: FSB guidance and key considerations on cross-border resolution and crisis management



Source: FSB Guidance on Central Counterparty Resolution and Resolution Planning (2017). Oliver Wyman.

Looking ahead, there will be a need for careful coordination between CCPs, clearing members and their supervisors as recovery & resolution planning evolves and approaches are refined to better reflect nuances such as cross-border cooperation and participant interconnectedness. Additionally, recovery & resolution planning approaches will have to remain cognisant of the need to appropriately align incentives to support CCP recovery where feasible, with the objective of promoting systemic stability.

“ADDRESSING BARRIERS TO INCENTIVES TO CLEAR”

In line with the clearing obligation set out in the G20 agenda, CCPs will likely continue to expand the range of products made available for clearing, as well as identifying ways to facilitate stakeholder access to clearing services (incl. implications of costs associated with access to these clearing services).

D. OPPORTUNITIES FOR FURTHER EXPANSION IN THE CLEARED PRODUCT SET

The largest growth in clearing of OTC products has been in interest rate and credit asset classes, with 76% of interest rate derivatives now centrally-cleared compared to just 24% in 2009.¹⁸ The situation is similar for CDS, where the combination of mandatory clearing for Index and the introduction of single-name cleared products has led to over 65% cleared volumes in 2018.

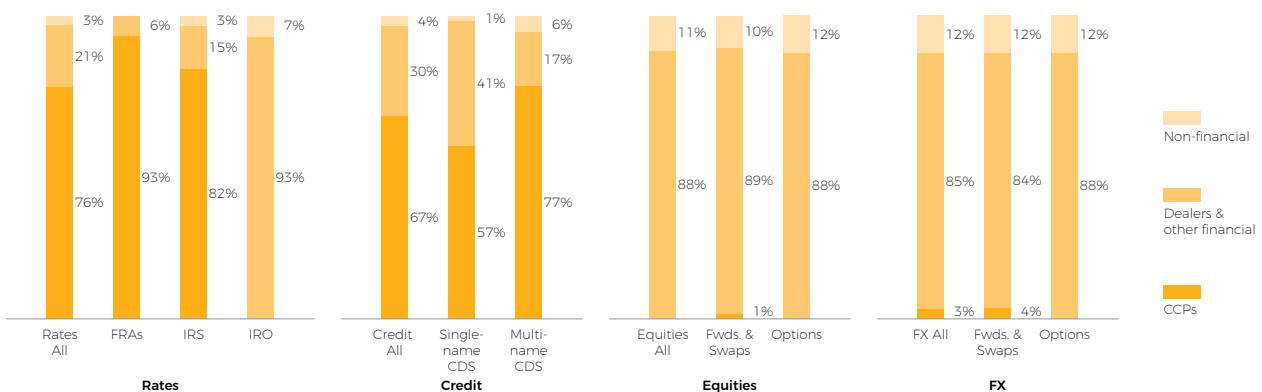
Conversely, OTC FX and equity derivatives clearing (which are not subject to a clearing mandate) remains at relatively low levels, despite recent developments in clearing of some FX products (e.g. NDF Options).

New product development efforts at CCPs, coupled with the full implementation of regulatory incentives to clear (e.g. clearing obligations for specific products and the added cost to trade bilaterally due to phase-in of margin requirements), increased netting benefits associated with greater use of clearing, and recognition of the risk management benefits of use of central clearing offerings, should see continued expansion of the proportion of cleared derivative products. The proportion of activity that is cleared will depend on the extent of standardisation that is possible, with certain exotic, illiquid or highly bespoke OTC products remaining outside the cleared world.

In addition to extending the range of OTC products that are available for clearing, CCPs are also extending their offerings across repo and securities lending markets. While still dwarfed by the triparty market, central clearing of repo and securities lending transactions has become more attractive for both market participants and supervisors as an effective means of reducing inefficiencies, risks and costs associated with these transactions. In line with this ambition, several leading repo CCPs have recently moved to expand their offering to new client segments such as money market funds, pension funds and other institutional investors.

Figure 12: Cleared vs. Uncleared split of OTC derivatives transactions (2018)

OTC derivatives transactions by counterparty type
In % of outstanding notional by assets class, 2018 H2



Source: BIS derivatives statistics, Oliver Wyman.

¹⁸Note: levels of clearing vary significantly across jurisdictions.

E. REVIEWING MEMBERSHIP MODELS AND ACCESS TO CLEARING

The nature of CCP memberships varies significantly by type of CCP, jurisdiction and asset classes cleared, resulting in a large variety in the number, average size and complexity of clearing members across CCPs. As shown in the figure below, the number of member firms at CCPs varies from over 1,000 members to less than 10 members at the other end of the spectrum.

Many CCPs operate a General or Direct Clearing Membership (GCM / DCM) model¹⁹. These clearing members are liable to the CCP for all Variation Margin, Initial Margin, Default / Guarantee Fund contributions associated with the positions they clear, and may be required to participate in default processes, such as auctions. If they are part of a banking group, they must also account for any capital charges associated with this business line. Given these requirements, clearing membership at these CCPs is often dominated by a small number of large banking entity members.

The nature of the CCP risk management structure, means CCP membership criteria (incl. capital requirements, governance requirements, creditworthiness and financial resources) are important to safeguarding the CCP itself and ensuring robust mutualisation of risk. As noted, the nature of the criteria will vary depending on a range of factors, including the asset class being cleared. However, the criteria for GCMs/DCMs of particularly OTC derivatives, coupled with high capital costs and leverage ratio requirements for clearing member banking entities, have raised concerns over access to clearing, and the potential concentration of clearing services within a few clearing members, all acting as a potential impediment to the achievement of the G20 agenda.

Figure 13: Distribution of CCPs by number of Clearing members (2017)

CCPs ranked by highest to lowest number of members firms
CPMI sample of 42 CCPs



Source: CPMI Statistics on payment, clearing and settlement system in the CPMI 2018; Oliver Wyman analysis.

¹⁹Direct Clearing Membership: A clearing member that deals directly with the central counterparty (CCP) and often as an intermediary between indirect clearing members and the CCP. These models are not unique to OTC derivatives clearing venues.

CCPs are exploring how to address this, including looking at ways in which to extend clearing services to buy-side clients directly in certain markets. For example, a European CCP has launched a service that allows qualifying buy-side institutions direct access to certain CCP clearing services. We expect CCPs will continue to examine the possibility of expanding clearing services to clients directly, while ensuring that the ultimate objectives of market stability are not undermined.

“EXPANDING SCOPE AND REACH OF CCP ROLES / OFFERINGS”

CCPs and other stakeholders are assessing where there are opportunities to leverage their infrastructure to support the development of capital markets and risk management globally. In addition, given the central positioning of CCPs within the post-trade landscape, we expect to see CCPs continuing to explore the delivery of additional offerings for the market and their members.

F. SUPPORTING THE DEVELOPMENT OF EMERGING CAPITAL MARKETS

In line with historical CCP consolidation efforts (e.g. EuroCCP/EMCF tie up, European Bank for Reconstruction and Development (EBRD) Eastern European CCP project), we expect stakeholders to continue to explore where consolidation between existing CCP infrastructures and other clearing venues could deliver a) economies of scale in a similar space, b) strategic expansion opportunities (e.g. asset-class, geographical), c) margin efficiencies for the existing member base.

For example, the establishment of regional (rather than domestic) CCP offerings enables the provision of clearing services to trading counterparties in jurisdictions where there is not a domestic clearing venue, and where the creation of such may not be economically viable. While a range of challenges (including political) would need to be addressed in the design and build of any regional CCP model, we expect further regional initiatives will be explored in the coming years, building on learnings from existing efforts such as the Central and Eastern European project spearheaded by the EBRD²⁰.

²⁰Regional Central Counterparty: A solution for Central and Eastern Europe” – EBRD, 2015

Figure 14: Illustrative rationale and practical considerations for a regional CCP model



Source: Oliver Wyman.

CCPs may play an important role in the development of emerging capital markets, providing risk mitigation for trading counterparties and promoting greater involvement of international investor/trading communities. However, in some instances, introducing a fully-fledged CCP model from the outset, may have the effect of stifling the development of the market. Consequently, some markets are relying on other models, enabled through the CSD and/or the exchange as an interim measure, to support the growth of the market as it evolves

Figure 15: Selected case studies of CSDs playing a risk mitigation role

MARKET	CSD PLAYER	EXEMPLARY CLEARING / RISK MITIGATION ROLES PERFORMED BY CSDS
Saudi Arabia	Tadawul	<ul style="list-style-type: none"> • Tadawul's CSD branch performs deposit, transfer and settlement services • Requires prefunding of all securities / cash accounts prior to trading, while CSD blocks the securities, thus providing a credit risk safeguard • Launch of CCP in 2019 to stabilize and promote new derivatives markets
Ukraine	National Depository of Ukraine (NDU)	<ul style="list-style-type: none"> • Ukraine's post-trade infrastructure is highly underdeveloped, with two CSDs (SC and NDU) providing 'clearing', settlement and depository roles • 100% cash-prefunding and pre-depositing required; simple yet highly inefficient risk mitigation; added risk from payments via commercial banks • Recent push for post-trade infrastructure upgrade with robust risk management (incl. CCP) by National Bank of Ukraine and regulators
Kenya	CDSC	<ul style="list-style-type: none"> • CDSC provides quasi-clearing, settlement and depository services for listed and unlisted securities in Kenyan markets • Established guarantee fund to ensure financial integrity and stability for securities settlement, financed through contributions from CSD members, penalties, CDSC revenue share, and other sources

- Emerging market **CSDs** often perform vital **risk mitigation roles** and enable (cash) **market integrity**
- **CCPs** with opportunity to further **advance development and efficiency** of emerging derivatives markets

Source: CPMI Payment, Clearing and Settlement Red Books, corporate websites, Oliver Wyman.

G. FOCUS ON DELIVERING ENHANCED COLLATERAL EFFICIENCIES

Post-crisis regulations (incl. clearing obligations and requirements for individual client segregation of margin), have brought collateral availability and efficiency further into focus for clearing stakeholders. As well as collateral availability and the associated funding cost, the capital treatment of collateral posted to clearing houses adds additional cost for participants (see Section 2).

Outside of collateral required for CCP-cleared trades, the introduction of initial margin for bilateral trades poses additional challenges for derivatives markets, not least a significant increase in collateral demand across clearing members and trading counterparties.

Challenges for the industry are manifold in terms of development of new infrastructure and capabilities, as well as driving a fundamental shift to management of liquidity risk (and collateral availability), rather than on-balance sheet counterparty credit risk.

CCPs are therefore focused on ways in which to enhance collateral efficiencies. Some CCPs overseeing a large spectrum of eligible collateral, with facilities for substitution or recycling of posted assets and access to central-bank accounts are looking at how to reduce funding requirements and costs associated with cleared trades for their participants. Additionally, CCP entities within larger market infrastructure groups (including CSD entities) are exploring where additional collateral management offerings can deliver efficiencies and mitigate liquidity challenges for members and their clients.

Examples of areas in which CCPs are delivering collateral-related services include:

- A. **Collateral access and availability:** collateral pooling for bilateral and CCP trades, reusability of collateral, collateral eligibility services.
- B. **Security and transparency:** margin segregation services (incl. flexible segregation), interfaces for reporting and monitoring of exposures and collateral allocation.
- C. **Collateral allocation and distribution:** collateral management systems (CMS), automated collateral allocation and optimization, integration with settlement services.
- D. **Margining efficiencies:** cross-region and cross-product margining capabilities, screening of portfolios to identify offsetting potential (and deliver associated funding efficiencies).

H. DELIVERING ADJACENT SERVICES TO SUPPORT STAKEHOLDER PROCESSES AND ‘PAIN POINTS’

Beyond collateral offerings, we expect CCPs will continue to explore where their unique positioning within the post-trade ecosystem (including visibility on exposures and linkages to execution and settlement venues) enables them to deliver adjacent services for their members and end clients. These additional offerings could assist clearing members and clients by providing value-add services or addressing key areas of cost or complexity relating to their trading activities today. Figure 16, below, sets out some potential areas for expanded CCP services (in some cases areas where incumbents have recently developed an offering).

Figure 16: Illustrative set of adjacent offerings a CCP could consider

TRADE DATA SERVICES	BILLATERAL OTC SOLUTIONS	APROPRIETARY DATA & ANALYTICS SERVICES	TECHNOLOGY SOLUTIONS / APPS
<ul style="list-style-type: none"> Delivering “golden source” trade records for a particular asset class or product set Aggregation of trade data across multiple sources Potential use of distributed ledger technology to generate immutable record 	<ul style="list-style-type: none"> Standardisation and facilitation services for uncleared bilateral trades Core service offerings incl. <ul style="list-style-type: none"> E2E trade procesing and lifecycle management Standardised risk factor calculations for margining 	<ul style="list-style-type: none"> Data & analytics services based on leveraged inhouse data / information Provision of regulatory and R&RP insights / expertise Development of tools for enhanced margining and netting efficiency 	<ul style="list-style-type: none"> Adoption of distributed ledger technologies such as blockchain to enable e.g. <ul style="list-style-type: none"> Single trade record Processing efficiency Platforms / applications for enhanced workflow and connectivity (client-facing)
Access to trade data record	Standard margin calculation	Price verification	Distributed ledger solutions
3rd party provider facilitation	SIMM parameterisatlon	Regulatory reporting & RRP	Proprietary applications
(Post)trade intermediation	Valuation & dispute resolution	Risk optimisation services	Connectivity & middle ware
...
EXAMPLE PRODUCTS/ SERVICES			

Source: Oliver Wyman.

DELIVERING ON THESE PRIORITY AREAS

Delivering market-wide solutions that provide the identified opportunities will require an ecosystem approach, premised on “Coordination, Harmonization and Enhancement”²¹ while recognising the nuances implied by different jurisdictions and types of CCP (e.g. Cash Equity vs OTC Derivatives CCP).

A key theme across the focus areas identified in this paper is the interconnectedness of post-trade stakeholders (and their supervisors), and the need for dialogue and cooperation across these participants in the search for improved outcomes for the clearing space. In many cases, a broad set of stakeholders will need to be involved with (or will be impacted by) delivery of solutions and progress in these areas.

Finally, as noted at the start of this chapter, not all focus areas will be equally applicable to all CCPs, or implementable in the near-term. While all CCPS are and will remain focused on ensuring effective risk management, the nature of this focus will vary. For some CCPs the priority will be ensuring full alignment with the PFMI. Others, while continuing to ensure robust risk management processes, will work with regulators to introduce or expand recovery and resolution planning measures and associated stress testing exercises. Moving beyond risk management, more advanced, multi-product CCPs may explore ways to further expand the cleared product set, enhance the accessibility of clearing, and improve collateral efficiencies. The move into adjacent services is likely to be a medium or longer-term focus area, with most relevance for larger, more diversified CCPs. Large, well-established CCPS in emerging markets are most likely over the medium to long-term to explore opportunities to support the development of emerging financial markets.

²¹ CCP Risk Management Subcommittee of the Market Risk Advisory Committee of the CFTC [2015] speaking specifically about default management

5 CONCLUSION

The years since the financial crisis have been characterised as encompassing “the most wide-ranging set of reforms ever in the history of financial regulation”.²² These reforms have targeted a range of intermediaries and sought to achieve a broad array of objectives. For many national financial market regulators, the agenda defined by the G20, and given substance by the FSB, CPMI, BCBS and IOSCO has defined their own focus and indeed work-plan over the last ten years, with a commensurate impact on regulated entities.

²²Mr Ravi Menon, Managing Director of the Monetary Authority of Singapore, at the Symposium on Asian Banking and Finance, Federal Reserve Bank of San Francisco, San Francisco, 25 June 2018.

As the regulatory approach gradually shifts from the implementation of the post-crisis regulatory agenda towards promoting growth, it will be critical to avoid undermining the finely calibrated incentive structures in the central clearing universe. This will entail identifying the impacts and interactions of the various regulatory reforms and assessing whether, on balance, the objectives are appropriately met. This is the time for regulators and regulated entities to ensure outstanding areas of reform are properly implemented.

Assessing the efficacy of the various reforms requires – to a certain extent – the emergence of a new post-crisis stable state. The FSB 2019 focus on finalising outstanding reforms and monitoring and evaluating the impact of reforms and the ongoing monitoring work of CPMI-IOSCO is therefore appropriate.

Meanwhile, the clearing space will continue to evolve along the lines identified in this report. We suggest that an ideal outcome is one which:

- I. Promotes financial stability and integrity and ensures that the lessons from the crisis have been learnt and understood.
- II. Recognises that sustainable economic growth relies on financial stability.
- III. Ensures CCPs' central role as neutral and independent risk managers via a faithful and full implementation of the G20 central clearing agenda.
- IV. Safeguards the CCP incentive structures on the basis of risk management standards.
- V. Results in cross-jurisdictional and regulatory dialogue and coordination mechanisms to tackle “ecosystem level” challenges and implementation of agreed standards.
- VI. Supports continued collaboration between CCPs and their members / end-clients to deliver innovations and solve ad-hoc and structural challenges.
- VII. Produces enhanced understanding of the interconnectedness of the clearing system and associated implications (incl. risk assessments, R&RP).

APPENDIX – INDEX
OF GLOBAL CCPS

#	ENTITY	PARENT ENTITY	LOCATION	ASSET COVERAGE		
				CA	CO	FD
EUROPE						
1	LCH SA	LCH Group Holdings Ltd (LSEG as majority owner)	France			
2	ECC	EEE AG	Germany			
3	Eurex Clearing	Eurex	Germany			
4	ATHEXClear	ATHEX	Greece			
5	CCG	Borsa Italiana	Italy			
6	ICE Clear Netherl.	ICE	Netherlands			
7	EuroCCP N.V.	Various parties	Netherlands			
8	KDPW CCP	KDPW	Poland			
9	OMI Clear	OMI Clear	Portugal			
10	BME Clearing	BME	Spain			
11	Nasdaq Clearing	Nasdaq OMX	Sweden			
12	SIX x-clear AG	SIX Swiss Exchange	Switzerland			
13	Takasbank	Borsa Istanbul (majority)	Turkey			
14	ICE Clear Europe	ICE	UK			
15	LCH Ltd.	LCH Group Holdings Ltd (LSEG as majority owner)	UK			
16	LME Clear Ltd.	LME Ltd.	UK			
NORTH AMERICA						
17	CME Inc	CME Group	United States			
18	ICE Clear Credit	ICE	United States			
19	LCH.Clearnet LLC	LCH Group Holdings Ltd (LSEG as majority owner)	United States			
20	OCC	OCC	United States			
21	FICC	DTCC	United States			
22	NSCC	DTCC	United States			
23	CDCC	TMX Group	Canada			
24	NGX	TMX Group	Canada			
LATIN AMERICA						
25	ByMA	Matba Byma Rofex MAV MAE	Argentina			
26	MAE	Matba Byma Rofex MAV MAE	Argentina			
27	MaTBA	Matba Byma Rofex MAV MAE	Argentina			
28	MAV	Matba Byma Rofex MAV MAE	Argentina			
29	Argentina Clearing	Matba Byma Rofex MAV MAE	Argentina			
30	B3	B3 S.A	Brazil			
31	CCLV Contr. Central	Bolsa de Comercio Santiago	Chile			
32	CRCC Colombia SA	Bolsa de Valores de Colombia	Colombia			
33	Asigna	BMV Group	Mexico			
34	CCV	BMV Group	Mexico			
CHINA						
35	SHCH	Various stakeholders	China			
36	CSDC	Shanghai and Shenzhen SE	China			
37	CFFEX	Various exchanges	China			
38	DCE	Dalian Commodity Exchange	China			
39	SHFE	Shanghai Futures Exchange	China			
40	ZCE	ZCE	China			

#	ENTITY	PARENT ENTITY	LOCATION	ASSET COVERAGE		
				CA	CO	FD
ASIA PACIFIC (EX. CN)						
41	OTC Clearing HK Ltd	HKEX	Hong Kong			
42	HKSCC	HKEX	Hong Kong			
43	HKCC	HKEX	Hong Kong			
44	SEOCH	HKEX	Hong Kong			
45	JSCC	JPX, Others	Japan			
46	JDCC	JASDEC	Japan			
47	TFX	CBs, Others	Japan			
48	KRX	KRX	Korea			
49	KSD	CBx, Others	Korea			
50	Taipei Exchange	Taipei Exchange	Taiwan			
51	TAIFEX	Taiwan Futures Exchange	Taiwan			
52	TWSE	Taiwan Stock Exchange	Taiwan			
53	ASX Clear	ASX Clear	Australia			
54	ASX Clear (Futures)	ASX Clear	Australia			
55	ICH	Gov. of Republic of Indonesia	Indonesia			
56	KBI	Gov. of Republic of Indonesia	Indonesia			
57	KPEI	Indonesia Stock Exchange	Indonesia			
58	CCIL	Commercial banks, other	India			
59	ICCL	BSE	India			
60	MCX-SXCCL	MSE	India			
61	NSCCL	National Stock Exchange of India Limited	India			
62	MCX	Multi Comm. Exc. of India Ltd.	India			
63	BMDC	Bursa Malaysia	Malaysia			
64	NZX Clearing	NZX Limited	New Zealand			
65	SCCP	Philippine Stock Exchange	Philippines			
66	SGX DC	SGX	Singapore			
67	Asia Pacific Clear	APEX	Singapore			
68	ICE Clear Singapore	ICE	Singapore			
69	CDP	SGX	Singapore			
70	TCH	SET	Thailand			
REST OF WORLD						
71	TSE CH Ltd.	TASE	Israel			
72	MAOF CH Ltd.	TASE	Israel			
73	NCC	Moscow Exchange	Russia			
74	JSE Clear (Pty) Ltd	JSE	South Africa			

CA = Cash / Securities
CO = Commodity derivatives
FD = Financial derivatives.

Source: CPMI Statistics on payment, clearing and settlement systems in the CPMI countries 2018, FSB OTC Derivatives Market Reforms - 13th Progress Report, WFE, Oliver Wyman analysis.

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