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Contents

Foreword

Articles

CONTENTS

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Foreword

This 17th issue of the Banque de France's *Financial Stability Review* is dedicated to assessing and putting into perspective the reforms undertaken following the Pittsburgh summit in 2009, where the G20 leaders committed to changing the rules for over-the-counter (OTC) derivatives markets, with a view to bringing them more in line with those of organised markets and thereby strengthening their security and transparency.

As in past years, the Banque de France has invited distinguished academics, heads of leading players on OTC derivatives markets and of their infrastructures as well as those in charge of institutions responsible for their regulation to express their point of view on the reforms carried out to reach the targets set by the G20. Their contributions show that commitments made have been met but they also show that the reforms must be continued in order to establish a comprehensive, adequately calibrated and consistent regulatory framework.

As regards security, the G20 committed to ensuring that sufficiently standardised derivatives should be subject to mandatory clearing through a central counterparty (CCP) by the end of 2012. Thanks to the efforts undertaken at the international level and in each jurisdiction, at the end of 2012, clearing services were developed for all OTC derivatives and we estimate that between 40% and 50% of interest rate derivatives are currently cleared through a CCP.

Central clearing both reduces the main risks associated with OTC derivatives and improves transparency. In particular, it increases market liquidity and largely eliminates counterparty risk.

The second focus of the G20 reform is enhanced transparency,[1] via the registration of all transactions with trade repositories (TRs) and the implementation of a unique international identification scheme (legal entity identifier – LEI).[2] These central TRs standardise all transaction data and provide authorities with a consolidated overview of derivatives trading, thereby facilitating the calculation of overall exposures and allowing a better understanding of the interdependence between financial players.[3]

The commitments taken by the G20 at Pittsburgh have been set out in a regulatory framework that is currently being finalised:[4] at the international level, in April 2012 the CPSS (Committee on Payment and Settlement Systems) and the IOSCO (International Organization of Securities Commissions) published the "Principles for Financial Market Infrastructures" that update, strengthen and broaden the former standards[5] applicable in the different jurisdictions, and notably in the United States with the Dodd-Frank Act and in the European Union with EMIR (European Market Infrastructures Regulation).[6]

Nevertheless, this is insufficient and the efforts made should now be pursued with a view to obtaining a comprehensive, consistent and adequately calibrated framework.

- The framework must be comprehensive.

This first includes the regulation of risk arising on OTC derivatives that will remain uncleared. We must ensure, using appropriate regulatory incentives, that all products that can be standardised have been standardised. For the others, appropriate risk management must be promoted in particular through the implementation of stricter margin requirements than those for standardised products. Consultative documents have been published on the framework that should be imposed on market participants trading in non-cleared products. A consultation and an impact study have been conducted; but efforts are still needed to achieve balanced proposals that combine mitigation of systemic risk, incentives for central clearing as well as the preservation of liquidity and activity of market participants necessary for the smooth functioning of the economy.

1 *See Acharya, Bodson, Ross and Buenaventura, in this publication.*
2 *See Jenkinson and Leonova, in this publication.*
3 *See Brunnermeier, Clerc and Scheicher, Coudert and Gex, in this publication.*
4 *See Carney, Kono, Barnier, in this publication.*
5 *See Russo, in this publication.*
6 *Regulation No. 648/2012 of 4 July 2012 on OTC derivatives, central counterparties and central trade repositories.*

This also includes the current work relating to the principles that will have to be applied in the event of recovery and/or liquidation of market infrastructures. In this respect, it is important that financial market infrastructures, i.e. CCPs and central securities depositories, be subject to recovery and resolution principles in each of the countries concerned.[7] Indeed, they concentrate a very high level of risk (in particular CCPs), and their potential failure must be organised in order to avoid market turmoil. In this respect, recovery and resolution measures for market infrastructures must be tailored to meet their specific nature, especially with regard to credit institutions.

Lastly, this includes extending the field of transparency. In addition to enhancing the transparency of OTC derivatives themselves, opinions currently also appear to be converging on the need for greater transparency for secured and unsecured interbank lending, which are the underlying benchmark for the most common class of OTC instrument, interest rate derivatives.[8] This naturally stems from the need for transparency of the OTC derivatives market. But there is also a need for greater transparency given the growing size of the secured loan market, resulting from current counterparty risk management and the new liquidity regulatory requirements. As a matter of fact, the light regulatory framework of reference rates poses a risk for stability of the financial system. Lastly, monetary policy considerations also call for such an enhancement. Indeed, monetary policy requires detailed knowledge of the participants and organisation of the money market, as well as an understanding of the real conditions under which transactions take place. The current debate surrounding the lack of reliability of the benchmark indices (Libor, Euribor, Eonia, Eurepo, etc.) highlights central bankers' permanent need for information.

- The framework must be adequately calibrated.

The development and concomitant implementation of the different regulations (e.g., the regulation of risks arising on OTC derivatives, Basel III liquidity requirements relating to the implementation of the liquidity coverage ratio, or capital requirements associated with these exposures) require a perfect coordination, in particular to assess overall the appropriateness and interactions of these regulations.[9] Indeed, capital requirements act as a form of protection that, although functioning differently from margin calls on derivatives, must nevertheless be taken into account in the overall assessment of the protection of an institution. Furthermore, links with Basel III liquidity requirements must also be carefully reviewed since it is necessary to align total requirements to hold margin and liquid assets with the available supply for these same assets and their distribution in the market.

Moreover, the final framework must not give rise to direct or indirect costs that do not reflect the risks incurred for market participants and the public. Since margin calls lead to higher costs, margin requirements that differ too greatly from current practices could significantly disrupt global liquidity and undermine the functioning of the markets. It is necessary to bear in mind the fact that many regulatory reforms are very often based on requirements of very high quality collateral, whose supply is not inexhaustible.[10] In addition, reforms that are poorly calibrated in terms of collateral could come up against a sub-optimal allocation between market participants. Market initiatives are starting to address this concern.[11] Nevertheless, the increased operational complexity brought about by the optimisation of collateral management is not without risk. These considerations must also be taken into account.

- The whole framework must be consistent.

First, there must be consistency between the different parts of the initiative to regulate OTC derivatives, by ensuring the incentive framework is fully appropriate. The relationship between risk regulation requirements concerning on the one hand cleared products and on the other those relating to products that will remain uncleared must be adjusted. In this respect, it is vital that CCPs be sufficiently protected by their risk

7 *See Tucker, in this publication.*
8 *See Gensler, in this publication.*
9 *See Ingves, in this publication.*
10 *See Singh, Houben and Slingenberg, in this publication.*
11 *See Autheman, in this publication.*

management framework (margin calls and default funds), given that they now concentrate more risks. It is of paramount importance to correctly calibrate clearing costs because, failing this, we may create incentives to bypass the central clearing requirement. Similarly, requirements relating to uncleared derivatives, which aim among other things to encourage CCP clearing, must not be less stringent that those applied to cleared products, which are more liquid and should entail less systemic risk. This correct calibration of the reforms is fundamental to the overall effectiveness of these regulations.[12]

Geographical consistency must also be ensured. The crisis and the significance of international players have shown that there are no boundaries to the spread of risk. It is vital that the different regulators coordinate to ensure that reforms are consistent across jurisdictions.[13] Any differences will leave the door wide open to regulatory arbitrage. At present, the Financial Stability Board is actively working to improve the coordination of regulations. This involves encouraging national regulators to specify the cross-border application of the different regulations. Any concrete disagreements, inconsistencies or breaches should give rise to discussions between regulatory authorities with a view to finding solutions to overcome these difficulties.

Moreover, geographical coherence also implies consistency in the localisation of infrastructures with respect to the currencies traded. Infrastructures processing foreign currency-denominated instruments with a systemic dimension for the issuers of these currencies must be located in the relevant area.[14] The establishment of rules imposing a greater use of financial market infrastructures, in order to enhance their security, and notably the implementation of the mandatory central clearing of standardised OTC derivatives, concentrates the financial risks among these players.[15] It is therefore even more essential than before that they be perfectly robust and that they have an excellent risk profile. This means, above all, that they must be able at all times to manage their liquidity risk in all of the currencies that they trade. To do this, they must have committed credit facilities with highly-rated commercial banks. Furthermore, access to the credit operations of the central bank issuing the currency traded is the only way to ensure that they can always meet their liquidity needs, including in the event of extreme but plausible financial market stress. Such access to the credit operations of the central bank is only conceivable if the latter has oversight authority over the infrastructure, with direct and permanent powers so that it can compel it to take the necessary measures to guarantee its security and its efficiency, prevent moral hazard and ensure that the measures taken do not undermine the central bank's monetary policy framework.

Lastly, consistency has to do with requirements applicable to the different types of players. A player that has to comply with numerous regulatory requirements, in particular in terms of capital, should not be considered the same way as an unregulated player. Properly understanding the relationships between the different types of counterparties could help us to better regulate the shadow banking system and stop transactions from moving from the regulated sphere to the unregulated one. It should also allow financial innovation, which remains a key factor for economic growth, to continue to develop in regulated spheres, and benefit from appropriate risk regulation.[16]

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Governor of the Banque de France

12 *See Oudéa, O'Connor in this publication.*
13 *See Dallara in this publication.*
14 *See Lane, Dion and Slive, in this publication.*
15 *See Aigrain, Biais, Heider and Hoerova, in this publication.*
16 *See Persaud, in this publication.*

Regulatory progress

Completing the G20 reform agenda for strengthening over-the-counter derivatives markets

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Significant progress has been made in developing and implementing the agreed G20 reforms mandating that all transactions in over-the counter (OTC) derivatives be reported to trade repositories and that all standardised contracts be cleared through central counterparties and traded on exchanges or electronic trading platforms, where appropriate. There has also been solid progress in developing the necessary international policies and principles for these infrastructures, including the CPSS-IOSCO "Principles for Financial Market Infrastructures". In addition, work on establishing the four safeguards for global central clearing is well advanced.

Indeed, many jurisdictions have made the required decisions regarding their approach to central clearing. A recent Financial Stability Board (FSB) progress report found that the necessary market infrastructure is in place for all asset classes of OTC derivatives, but usage of this infrastructure has been slow to expand because of regulatory uncertainties. For example, many FSB jurisdictions have not yet finalised their legislation and rules regarding OTC derivatives. As well, cross-border issues with respect to conflicts, inconsistencies, overlaps and gaps in these rules need to be addressed and resolved. In particular, more work is needed on capital and margin requirements, the definition of standardised, access to data in trade repositories, and compatible formats for data aggregation.

While much progress was made in advance of the agreed G20 deadline of end-2012, work has continued into 2013. Despite the extended time frame for full implementation, FSB members remain committed to fulfilling the G20's vision for efficient and resilient OTC derivatives markets.

1| The importance of continuous markets

During the recent financial crisis, over-the-counter (OTC) derivatives markets were a path for contagion rather than a source of strength. When Lehman Brothers failed in September 2008, the opaqueness and interconnectedness of derivatives exposures to Lehman amplified uncertainty about risk exposure. More generally, market participants were concerned about not only their direct exposure, but also their counterparties' exposures to Lehman.[1] Combined with poor overall risk management in some areas, this uncertainty resulted in a dramatic reduction in liquidity and allowed stress to spill over into other parts of the financial system. The problem was particularly acute in the market for credit default swaps (CDSs), where each market participant managed its own counterparty credit risk. Other derivatives markets that were backed by strong financial infrastructure such as central counterparties (CCPs) or exchanges, on the other hand, performed much better throughout the crisis.[2] This experience provides important lessons for the reform agenda.

Continuously open financial derivatives markets improve the resilience of the financial system by allowing market participants to effectively manage risks during both normal times and times of stress. The financial crisis demonstrated that when poor transparency, misaligned incentives and inadequate liquidity hinder continuously open financial markets, the default of a major market participant can cause serious market disruption that spreads rapidly through the financial system. In contrast, where markets are resilient, the impacts of such failures can be better managed. Creating continuous financial derivatives markets is therefore an important complement to other financial reforms aimed at reducing "too big to fail".

In response to the financial crisis, the G20 initiated a series of reforms designed to strengthen the regulation and oversight of the financial system and tasked the Financial Stability Board (FSB) with coordinating the reforms and assessing their implementation. An important part of these reforms is a commitment to enhance the regulation of OTC derivatives markets so as to improve transparency, mitigate systemic risk and protect against market abuse. To further these ends, the G20 decided at the September 2009 Pittsburgh leaders Summit that:

"All standardised OTC derivative contracts should be traded on exchanges or electronic trading platforms, where appropriate, and cleared through central counterparties by end-2012 at the latest. OTC derivative contracts should be reported to trade repositories. Non-centrally cleared contracts should be subject to higher capital requirements."[3]

In November 2011, the G20 further directed that internationally consistent minimum standards be developed for the margining of non-centrally cleared OTC derivatives.

These commitments for reforming OTC derivatives markets work together to achieve the overarching goals of the G20 to increase transparency, mitigate systemic risk and protect against market abuse:

- Reporting transaction details to trade data repositories (TRs) improves transparency both for the official sector and for market participants. This supports the management of systemic risk by allowing the official sector to monitor and react to the aggregate build-up of risk and permitting market participants to better understand and price risk.

- Standardisation contributes to market transparency and liquidity. Sufficient standardisation, both in terms of contractual details and operational processes, is necessary for OTC derivatives transactions to be centrally cleared and traded on exchanges or electronic trading platforms.

- In turn, clearing through CCPs reduces systemic risk by improving counterparty risk management, reducing interconnectedness and enhancing the netting of financial exposures. This reduces the probability that the default of a market participant will destabilise other participants.

- Exchanges and electronic trading platforms also improve transparency and help to reduce market abuse by standardising trading rules and processes and bringing them into the open.

1 *The role of OTC derivatives in the financial crisis is discussed in Noyer (2010).*
2 *The role of financial market infrastructures in managing the Lehman default is described in Russo (2010) and Norman (2011).*
3 *These commitments were reaffirmed at the Toronto Summit in 2010 and the summits in Cannes (2011) and Los Cabos (2012).*

• Higher capital and margin requirements reduce systemic risk by creating a buffer that can absorb losses and by creating incentives to properly manage risk. Incentives provided by capital and margin requirements for non-standardised derivatives will motivate increased use of standardised products and discourage spurious customisation.

Chart 1 provides an overview of how the different OTC derivatives reform areas for central clearing, reporting to TRs, trading on organised platforms and capital and margining contribute to the G20's goals for enhancing OTC derivatives markets.

These critical reforms will transform a large, complex and globally-integrated OTC derivatives market.[4] They require extensive changes to international policies and standards, to domestic legislation and regulation, and ultimately to the practices of market participants. Because OTC derivatives transactions frequently take place across borders, it is essential that these changes be coordinated on an international basis to create a robust and consistent framework. It is also important that the costs of these reforms are contained in order to allow OTC derivatives to continue to serve their important role as a tool to manage risks in the wider economy. This will only be possible with extensive cross-border cooperation to maximise the effectiveness of the reforms and minimise compliance costs.

Chart 1
The G20's goals for OTC derivatives reforms

		OTC derivatives reforms			
		Clearing	Reporting	Platform trading	Capital/ margining
G20's underlying goals	Improving transparency		■	■	
	Mitigating systemic risk	■			■
	Protecting against market abuse		■	■	

2| Achievements to date

Since the G20 leaders made their original commitments in Pittsburgh, a great deal has been accomplished towards achieving the ultimate goal of reforming and strengthening OTC derivatives markets:

• International policies and standards to guide sound implementation of the G20 commitments are largely in place. This has required extensive coordination among the members of international standard setting bodies and international financial institutions.[5]

– To steer reforms in **trade reporting**, the Committee on Payment and Settlement Systems (CPSS) and the International Organization of Securities Commissions (IOSCO) published guidelines on the data that should be collected, stored and disseminated by TRs. CPSS-IOSCO are proposing guidelines for authorities' access to TR data.

– The OTC Derivatives Supervisors Group (ODSG) has been working closely with industry to define and increase **standardised OTC derivatives products and processes** in line with an agreed roadmap set in March 2011.[6]

– IOSCO has published guidelines on products suitable for **central clearing**. CPSS with IOSCO provided strengthened international standards for systemically important CCPs and TRs under their "Principles for Financial Market Infrastructures" (PFMIs), along with a methodology to help authorities assess observance of these standards.

– Joint work has been undertaken by the Basel Committee on Banking Supervision (BCBS), Committee on Global Financial System (CGFS), CPSS, and IOSCO to develop proposed international standards on **margin requirements** for non-centrally cleared derivatives transactions. The BCBS has also set out **capital requirements** for counterparty

4 *The Bank for International Settlements (BIS) reported in June 2012 that the notional amount outstanding of OTC derivatives contracts, across seventy-two major dealers in thirteen countries, was USD 639 trillion.*
5 *This group includes: the FSB, as well as the BIS, the Basel Committee on Banking Supervision (BCBS), the Committee on the Global Financial System (CGFS), the CPSS, the IOSCO and the International Monetary Fund (IMF).*
6 *The ODSG is comprised of the domestic and international supervisors of major OTC derivatives market participants. The ODSG works with market participants to plan, monitor, and coordinate industry progress against a series of "commitment letters" to deliver structural improvements to the OTC derivatives market across asset classes in the interest of financial stability.*

credit risk exposures for non-centrally cleared derivatives transactions, under the Basel III capital framework, as well as interim rules for trade and default fund exposures to CCPs.

– To help authorities develop rules for **trading** standardised OTC derivatives transactions **on exchanges or organised trading platforms**, IOSCO set out a framework for determining which financial products could be eligible and outlined the types of trading platforms available for executing these transactions. IOSCO has also provided high-level standards for the regulation of derivatives market intermediaries.

– Standard setters are now turning their attention to monitoring national implementation in order to ensure consistent adherence to their requirements and guidelines.

• National legislative and regulatory frameworks have been strengthened in a number of jurisdictions, notably those with the largest OTC derivatives markets. Implementing rules are well-advanced across FSB jurisdictions in terms of capital, transaction reporting and clearing requirements.

• Work to establish the four safeguards for global central clearing is well advanced.[7] These safeguards will enable a safe and efficient environment for clearing OTC derivatives through global CCPs. Indeed, all FSB jurisdictions had declared their approach to central clearing by the fall of 2012.[8] National authorities are verifying the membership terms of CCPs to ensure they provide fair and open access,[9] and are cooperating within and across jurisdictions to establish effective oversight arrangements for global CCPs. Recovery and resolution regimes for CCPs are being developed in line with the CPSS-IOSCO (PFMIs). Authorities are also monitoring the implementation by global CCPs of appropriate liquidity arrangements.

• The necessary market infrastructure is in place for all OTC derivatives asset classes, with the ability to expand capacity as needed. CCPs are available to service some products in all major derivatives asset classes (commodity, credit, equity, foreign exchange and interest rate derivatives), as are TRs and organised platform trading infrastructure. As noted in the FSB's fall 2012 implementation progress report, the development of market infrastructure is not an impediment to further progress in meeting the G20 commitments, although expansion of services and participation does require substantial lead time.

While market practices have already begun to change in anticipation of final requirements and restrictions, the full extent of necessary changes cannot be determined because national legislation and regulation has not yet been completed in any FSB member country. As such the expansion of infrastructure use, in terms of the proportion of transactions reported to TRs and centrally cleared, has slowed. Full implementation of OTC derivatives reforms across all participants, markets, and jurisdictions will likely take a few more years to complete. Despite the extended period for full implementation, FSB member jurisdictions remain committed to fulfilling the G20's vision for efficient and resilient OTC derivatives markets.

3| Remaining areas of work

The task of making lasting reforms across diverse OTC derivatives products, markets and participants, which are constantly evolving, has proven challenging. At this juncture, there are several important areas of work left for FSB members to complete.

First, regulatory uncertainty in terms of the application of rules within as well as across jurisdictions is impeding further progress on reform implementation. As detailed in the latest FSB progress report on implementation, there are a number of areas for which national rule-making has not yet been completed. This is partly due to incomplete progress at the international level. While the challenges

7 *The four safeguards are (i) fair and open access by market participants to CCPs, based on transparent and objective criteria; (ii) cooperative oversight arrangements between all relevant authorities, both domestically and internationally, that result in robust and consistent regulation and oversight of global CCPs; (iii) recovery and resolution regimes that ensure the core functions of CCPs are maintained during times of crises and that consider the interests of all jurisdictions where the CCP is systemically important; (iv) appropriate liquidity arrangements for CCPs in the currencies they clear.*

8 *Each jurisdiction was asked by the FSB Chair to indicate: whether their approach to central clearing would be based on the use of domestic clearing infrastructure or infrastructure located in other jurisdictions (or some combination); whether mandatory clearing requirements would be imposed or whether authorities would rely on economic incentives. See:* http://www.financialstabilityboard.org/publications/r_121105a.pdf.

9 *Lane (T.), Dion (J.-P.) and Slive (J.): Access to central counterparties: why it matters and how it is changing, in this issue of the Financial Stability Review.*

faced by authorities in determining appropriate requirements are recognised, specifying them as quickly as possible is essential for providing needed guidance to market participants and helping them to advance their own preparations for change.

At the same time, providing greater clarity on national requirements is important for identifying and resolving potential cross-border regulatory issues. Conflicts, inconsistencies, overlaps and gaps in requirements across jurisdictions are already emerging.[10] If not addressed, these could result in undesired, adverse consequences such as regulatory arbitrage and market fragmentation, which could reduce the safety and efficiency of global financial markets. Regulators are taking steps to resolve these extensive and highly complex issues.[11]

Second, continued efforts are required by authorities and by market participants in terms of standardisation. From a regulatory perspective, further clarity and consensus are needed for determining which derivative products are sufficiently standardised to be captured under rules for clearing and platform trading (in addition to making those requirements consistent across different jurisdictions.) This is challenging because market characteristics, such as liquidity and the availability of relevant market prices, need to be considered along with varying product features and the degree that supporting operational processes are automated. At the same time, regulators and industry must continue their efforts to increase the standardisation of products and operational processes across markets and jurisdictions.

In addition, greater standardisation of the technical components that support OTC derivatives products and processes is necessary for efficient and effective use of market infrastructure by both market participants and authorities. In particular, common identifiers, reporting formats and technical standards across TRs need further development in order for derivatives transaction data to be aggregated and reconciled across counterparties and markets.

Last, relevant authorities do not yet have the ability to develop a comprehensive view of OTC derivatives markets activity in order to effectively monitor and address vulnerabilities in the financial system. This is mainly due to slow implementation of trade reporting requirements. Moreover, national authorities also do not have sufficient access to supervisory and TR data in line with their regulatory and financial stability responsibilities. For the most part, access has been hampered by legal rather than any technical impediments. Guidelines set out by CPSS-IOSCO should help individual jurisdictions to make the necessary changes to laws and rules, but this process is complicated by cross-border considerations and will take time.

FSB members must persist in addressing these outstanding issues for reforms to OTC derivatives markets not only to be completed, but also to obtain their desired impacts.

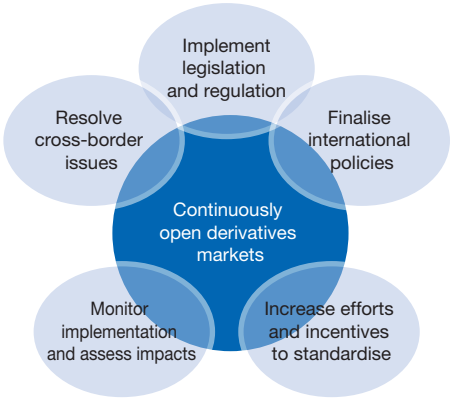
4| The path to completion of the reforms

In order to sustain momentum towards completion of reforms for OTC derivatives markets, a clear path is required that ultimately ends with the fulfillment of the G20's original goals for increasing transparency, mitigating systemic risk, and protecting against market abuse. The road forward must comprise the elimination of regulatory uncertainty in the short term, plus complementary efforts that allow authorities to access needed data and lead more OTC derivatives transactions towards central clearing and trading on organised platforms. Over a longer period, the resulting changes in markets and behaviours need to be monitored and assessed in order to ensure that desired outcomes are reached. The required actions are depicted in Chart 2, and discussed further below.

10 *Conflicts in national regulations arise when the rules of one jurisdiction cannot be followed without contravening a requirement in another jurisdiction. Inconsistencies exist where requirements apply to certain products or participants in one country but not in other countries. Conflicts and inconsistencies in regulations increase the cost of compliance, which may prevent the execution of certain transactions and hamper risk management. Overlaps in national regulations occur when a transaction or market participant is subject to duplicative obligations across jurisdictions, which also increase compliance costs. Gaps, or instances where a transaction or participant is not regulated by any jurisdiction, encourage regulatory arbitrage and increase financial system risk.*

11 *Authorities among several FSB jurisdictions have held multilateral meetings since 2011 to discuss and resolve cross-border differences. However the pace of progress accelerated with the engagement of the leaders of regulatory authorities, starting in late 2012.*

Chart 2
Completing OTC derivatives reforms



The immediate priority for FSB members is providing greater certainty regarding regulatory requirements for OTC derivatives products, participants and transactions. All FSB jurisdictions and member countries must complete the drafting of their regulatory reforms and put them into effect promptly. In particular, legislation and regulation that compels reporting of all OTC derivatives transactions to TRs, and provides authorities with access to those data, must be put into effect as quickly as possible. Trade data will help regulators better understand the characteristics of their markets and in turn help to advance completion of rules for other areas of OTC derivatives reform. It will also help in assessing the degree of market implementation of reforms and enable authorities to take action based on this information.

In parallel, regulators must work together to immediately resolve material conflicts and overlaps in national rules that unduly impose costs for market participants and potentially impair market functioning. Inconsistencies across jurisdictions and areas where there are gaps in the application of rules also need to be addressed to minimise compliance costs, preserve efficiency, and prevent regulatory arbitrage and market fragmentation. Clear milestones and timetables for addressing these issues are crucial for achieving concrete progress, and the FSB will continue to monitor the situation.

Completing regulation across FSB jurisdictions, as well as international coordination among regulators to increase the consistency of regulations will assist movement towards a coherent regulatory approach to defining sufficiently standardised OTC derivatives products, processes and markets. However, regulators must also intensify their efforts in the near-term to increase standardisation related to trade reporting. In particular, the launch of the global legal entity identifier (LEI) system is important for providing standardised identifiers to entities connected to OTC derivatives transactions, and authorities should push ahead to achieve widespread operationalisation and adoption of LEIs.[12] In addition, OTC derivatives regulators, in conjunction with TRs and industry groups, must put in place CPSS-IOSCO guidelines for transaction reporting formats so that the information collected by TRs can be used by authorities to fulfill their regulatory and financial stability responsibilities.

As a complement to completing legislation and regulation that mandates central clearing of standardised OTC derivatives contracts and the trading of these transactions on organised platforms, authorities must also put in place related incentives. Those FSB jurisdictions that have not yet adopted Basel III capital requirements, including rules for counterparty credit risk arising from non-centrally cleared transactions, should quickly do so. Remaining international policy work related to capital and margin requirements for non-centrally cleared transactions should also be completed so that national implementation can follow suit. In addition, national authorities must implement incentives and rules that promote standardisation, which will also direct more OTC derivatives activity to CCPs and organised trading platforms. When the costs of using non-standardised OTC derivatives products are not only sufficient to protect against counter-party default, but are also higher than those of standardised products, market participants will be motivated to increase their use of these products, which will ultimately help increase transparency, contain systemic risk and protect against market abuse.

These actions in the short-term will enable the adoption of consistent, appropriate requirements and incentives across all FSB jurisdictions.

12 *The governance framework for the global LEI system has been solidified with the formulation of the LEI Regulatory Oversight Committee in January 2013 and work underway to establish the Global LEI Foundation in Switzerland. The Foundation Board of Directors will review the proposed operational framework for the global LEI system, developed by industry, to enable central oversight and integration of participating local operating units. See the FSB website for the latest progress report:* http://www.financialstabilityboard.org/.

As implementation proceeds, reforms need to be evaluated not only in terms of the extent to which they have been implemented, but more importantly, in terms of the extent that they meet the underlying goals to increase transparency, reduce systemic risk and protect against market abuse. This requires understanding how the costs and incentives created by the different aspects of OTC derivatives reforms influence market practices. In the development of international policies and national legislation and regulation, FSB members have been considering changes in market structure and the reaction of market participants to these changes. As market implementation expands, the FSB will continue to monitor, analyse, and assess the impacts of OTC derivatives reforms. In addition, as the broader G20 reform agenda advances across all financial markets and participants, the FSB will consider the collective effects of this work to ensure mutual consistency and overall net benefits. This will necessarily involve active coordination among the FSB and its members.

The FSB is confident that the work underway by national financial authorities and international standard setting bodies will result in strong and efficient OTC derivatives markets and ultimately a more resilient global financial system.

References

Bank for International Settlements (BIS) (2012)
Semiannual over-the-counter (OTC) derivatives markets statistics, *www. bis.org/statistics/derstats.htm*, November.

Financial Stability Board (FSB) (2012)
OTC derivatives market reforms, Fourth progress Report on implementation, October 31.

Financial Stability Board (2012)
Letter from chair to G20 Finance Ministers and Central Bank Governors: progress of financial regulatory reforms, *www.financialstabilityboard.org/publications/r_121105.pdf*, October 31.

Norman (P.) (2011)
The risk controllers: central counterparty clearing in globalised financial markets, John Wiley and Sons.

Noyer (C.) (2010)
"Redesigning OTC derivatives markets to ensure financial stability", Banque de France, *Financial Stability Review*, No. 14, pp. I-IV, July.

Russo (D.) (2010)
"OTC derivatives: financial stability challenges and responses from authorities", Banque de France, *Financial Stability Review*, No. 14, pp. 101-112, July.

Regulatory reforms for OTC derivatives: past, present and future

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The economic and financial crisis starting in 2007 revealed significant weaknesses in the resiliency of banks and other market participants to financial and economic shocks. In the context of over-the-counter (OTC) derivatives, which total hundreds of trillions of dollars in notional amounts,[1] the crisis showed that improved regulation of OTC derivatives and markets, together with enhanced market transparency, would be necessary to limit excessive and opaque risk-taking through OTC derivatives and to reduce the systemic risk posed by OTC derivatives transactions, markets and practices.

In consequence, the G20 leaders mandated a comprehensive reform of OTC derivatives markets to reduce systemic contagion and spillover risks. Specifically, they agreed that OTC derivative contracts should be reported to trade repositories, and that all standardised OTC derivatives contracts should be cleared through central counterparties (CCPs) and, where appropriate, traded on exchanges or electronic trading platforms. They further stipulated that non-centrally cleared contracts should be subject to higher capital requirements and that margining standards should be developed for non-centrally cleared trades.

The G20 statement gave impetus to a number of related global initiatives, including work on enhanced regulation of financial infrastructures, capitalisation of financial institutions' exposures to CCPs, and collateralisation of bilateral trades. To achieve the G20's desired outcome of promoting system-wide stability, it is vital that these reforms incentivise financial institutions to use standardised contracts and to clear through a CCP.

This article highlights the pre-crisis conditions in OTC derivatives markets that necessitated reform, details recent and ongoing regulatory efforts to address those shortcomings and to promote system-wide stability, and concludes by discussing plans to assess the impact of the reform programme and potential issues that will need to be monitored as markets respond to the new regulatory framework.

NB: The author would like to thank staff from the Basel Committee's Secretariat and the Sveriges Riksbank for their helpful contributions.

1 A recent BIS survey (Semiannual OTC derivatives statistics at end-June 2012) shows that the notional amount outstanding for OTC derivatives totalled USD 639 trillion in June 2012, while the notional amount outstanding of derivatives traded on exchanges was USD 60 trillion.

1| Pre-crisis conditions in OTC derivatives markets

Factors contributing to the financial crisis have been well documented in this publication and others; I do not intend to repeat all of them here. Rather, here I want to take the perspective of the Basel Committee on Banking Supervision (BCBS). Therefore, this section focuses on the too low capital set aside for counterparty credit risk[2] – a weakness that resulted in serious contagion and spillover effects to the real economy.

However, first, I want to highlight the problem created by the lack of transparency in the over-the-counter (OTC) derivatives market. As was outlined already by Akerlof in 1970,[3] asymmetric information can create market failures. In a crisis, the costs of asymmetric information as well as the probability of market failure will increase. A significant part of the contagion effects stemming from OTC derivatives was due to the lack of published data. Information about prices and notional amounts was known only to trade counterparties. This allowed large risk concentrations to build up beyond the purview of regulators and other market participants. When the crisis broke, this opacity prevented market participants from assessing the financial soundness of their counterparties. As a result of this uncertainty, participants cut back their exposures to large dealers and a cascade of collateral calls triggered asset fire sales. This compounded existing system-wide market and liquidity pressures. Better transparency can reduce the asymmetric information and thus reduce the probability of market failure.

Turning to capital, it is clear that the capital set aside for counterparty credit risk was inadequate during the crisis. The Basel Committee noted the following shortcomings in this area.

- Defaults and deteriorations in the creditworthiness of trading counterparties occurred precisely at the time when market volatilities, and therefore counterparty exposures, were higher than usual. Thus, wrong-way risk[4] was not adequately captured by the capital framework.

- Mark-to-market losses due to credit valuation adjustments (CVA)[5] were not directly captured under the Basel II framework. Loss attribution exercises undertaken in several jurisdictions revealed that a substantial amount of counterparty credit risk losses during the crisis was due to CVA losses rather than actual counterparty default.[6]

- The capital framework did not appropriately reflect the degree of interconnectedness of large financial institutions. As a result, when markets turned down, banks' counterparty exposures to other financial firms went up. Evidence suggests that asset value correlations are at least 25% higher for financial firms than for non-financial firms.

- Closeout periods[7] extended beyond the horizon required for bank capital calculations. This included closeout periods for (i) replacing trades with a counterparty with large netting sets,[8] (ii) netting sets with disputed trades and (iii) netting sets consisting of complex trades or illiquid collateral.

It was also observed that initial margining levels were typically very low at the start of the crisis and increased rapidly during the crisis. This had a destabilising effect on many market participants and increased the risk of default.

2 *Counterparty credit risk is the risk that the counterparty in an OTC derivatives trade or in a securities financing transaction (SFT) fails to meet its obligations. It generally refers to the bilateral credit risk of transactions with uncertain exposures that can vary over time with the movement of underlying market factors.*
3 *Akerlof (G. A.) (1970): "The market for 'lemons': Quality uncertainty and the market mechanism",* Quarterly Journal of Economics, *Vol. 84, No. 3, pp. 488-500.*
4 *Wrong-way risk exists in cases where the exposure to a counterparty increases at the same time as the counterparty's credit quality deteriorates.*
5 *CVA is the risk of loss caused by changes in the credit spread of the counterparty due to changes in the counterparty's credit quality. In other words, CVA is the market value of counterparty credit risk.*
6 *Basel II addressed counterparty credit risk as a default and credit migration risk, but did not fully account for market value losses short of default.*
7 *The closeout period, or margin period of risk, is the length of time between the default of the client (or counterparty) and the time when the bank clearing member can successfully close out the defaulted counterparty's trades and replace the derivatives contracts. During this period, the bank's unhedged risk leaves the bank vulnerable to losses from changes in the market value of the contracts. The longer the margin period of risk, the larger is the potential loss to the bank. There are three key differences between cleared derivatives transactions and bilateral derivatives trades that typically make closeout periods shorter for cleared transactions than for bilateral trades: (i) cleared transactions are standardised; (ii) central clearing may serve to pool liquidity for client contracts; and (iii) closeout procedures for centrally cleared trades are more robust.*
8 *A netting set is a group of transactions with a single counterparty that is subject to a legally enforceable bilateral netting arrangement and for which netting is recognised for regulatory capital purposes under the provisions of paragraphs 96(i) to 96(v) of Annex 4 of the Basel framework.*

In view of these considerable weaknesses, the G20 leaders agreed at their Pittsburgh summit in September 2009[9] that "*all standardised OTC derivatives contracts should be traded on exchanges or electronic platforms, where appropriate, and cleared through central counterparties by end-2012 at the latest. OTC derivatives contracts should be reported to trade repositories. Non-centrally cleared contracts should be subject to higher capital requirements*." Later, in 2011, the G20 agreed to add margin requirements on non-centrally cleared derivatives to the reform programme.[10]

The move towards central clearing is motivated by the belief that central counterparties (CCPs) can mitigate systemic risk and help increase transparency for OTC derivatives by collecting, storing and disclosing data on prices, volumes and positions. They would also serve to reduce counterparty credit risk by:

- imposing multilateral netting across the population of dealers in a given market;
- enforcing the collateralisation of exposures; and
- bringing to bear the resources and risk management practices of CCPs.

While CCPs can strengthen OTC derivatives markets and play a critical role in fostering financial stability, they also concentrate risk. As such, if not properly managed, they can pose significant risks to the financial system and be a potential source of contagion, particularly in periods of market stress.[11] To address these risks, the Committee on Payments and Settlements Systems (CPSS) and the International Organization of Securities Commissions (IOSCO) have established, over the years, international risk-management standards for financial market infrastructures that are systemically important, including CCPs. Although financial market infrastructures, and CCPs in particular, performed well during the recent financial crisis, events highlighted important lessons for effective risk management. These lessons, along with the experience of implementing the existing international standards, led the CPSS and IOSCO to review and update the standards for financial market infrastructures, including CCPs.

2| Recent and ongoing regulatory reform efforts

In response to the crisis, the Basel Committee has agreed reforms to ensure that banks adequately capitalise exposures to counterparty credit risk, whether arising from other banks or from CCPs. It has also worked with other global regulatory bodies to set margining requirements for non-centrally cleared contracts.[12] Completing these reforms in the near term is essential to promoting system-wide stability and to mitigating the potential for future spillover effects on the real economy.

2|1 New capital requirements for counterparty credit risk arising from non-centrally cleared derivatives and securities financing transactions (December 2010)

One of the key lessons of the crisis was the need to strengthen the risk coverage of the regulatory capital framework for banks. Failure to capture major on- and off-balance sheet risks, as well as derivatives-related exposures, was a destabilising factor that exacerbated the repercussions from the financial crisis that began in 2007.

In response to these shortcomings, the Basel Committee adopted a number of critical reforms to ensure appropriate risk coverage of banks' counterparty credit risk exposures arising from OTC derivatives transactions, as well as repo and other securities financing transactions (SFTs). OTC derivatives and SFT exposures were a major source of losses for many internationally active banks between 2008 and 2010.

9 *See declaration at* www.g20.utoronto.ca/2009/2009communique0925.html.
10 *See declaration at* www.g20civil.com/documents/Cannes_Declaration_4_November_2011.pdf.
11 *More specifically, if not properly managed, financial market infrastructures – including CCPs – can be sources of financial shocks, such as liquidity dislocations and credit losses, or a major channel through which these shocks are transmitted across domestic and international financial markets.*
12 *In February 2013, the Basel Committee, in conjunction with IOSCO, and in consultation with CPSS and the Committee on the Global Financial System (CGFS), issued a second consultative proposal on near-final global standards for margin requirements (*www.bis.org/publ/bcbs242.pdf*). The first consultation was in July 2012 (*www.bis.org/publ/bcbs226.htm*).*

These reforms are an important component of the Basel III capital framework, the Basel Committee's central response to the financial crisis, which was published in December 2010.[13]

Basel Committee member countries were supposed to implement these revised capital requirements by 1 January 2013. When compared to Basel II, the new rules – on average – at least double banks' capital requirements for exposures to bilateral counterparty credit risk. As such, these reforms increase the capital required to protect banks from losses stemming from these exposures, which will help to reduce potentially harmful effects on the real economy. The measures also provide incentives to move such transactions to risk-reducing CCPs, as the higher capital requirements for bilateral OTC derivatives and SFTs will increase the costs of bilateral transactions. The enhanced rules also provide incentives to strengthen the management of counterparty credit risk.

Basel III enhancements in capital requirements for non-centrally cleared derivatives and SFTs

In its review of the treatment of counterparty credit risk, the Basel Committee engaged in a wide-ranging effort to identify those areas where capital requirements were inadequate. In conducting this review, the Committee carefully considered:

- areas where the current treatment did not adequately capture the risks during the crisis;
- incentives to move bilateral OTC derivatives contracts to multilateral clearing through CCPs; and
- how the changes could affect the real economy.

In order to address the identified deficiencies, the Committee strengthened the capital requirements for counterparty credit risk. Specifically, for the default and credit migration risk component, banks must adopt enhanced requirements to improve their risk management in order to use the internal model method (IMM).[14] They must also apply more stringent assumptions when estimating the exposure amount, or exposure at default (EAD), used to calculate counterparty credit risk regulatory capital. In addition, all banks (i.e. those using the IMM or less sophisticated methods) must capture the market risk component of counterparty credit risk, which was not previously required under Basel II.

The following is a summary of Basel III's revised capital requirements for bilateral counterparty credit risk arising from OTC derivatives and SFTs. These new requirements imply that banks will have to hold substantially more capital. In addition they create incentives for banks to use CCPs.

Calibration of the exposure at default for exposures to counterparty credit risk

- **Wrong-way risk**. For instruments with specific wrong-way risk, the exposure amount should be the value of the instrument in the event of the underlying reference asset's default. Recoveries may not be taken into account in estimating the loss-given-default (LGD) and EAD.

- **Stress effective expected positive exposures calibration**. The calculation of the exposure amount must reflect a period of stress. In particular, banks are required to use the larger of stressed values or the portfolio level default capital charge using current values. The stress calibration must be generated in a manner similar to that in which market risk stress periods for downturn LGDs[15] are specified. This will address concerns about capital charges falling too low during periods of compressed market volatility, thus helping to counter procyclicality.

- **Short-cut method[16] for collateralised transactions**. The short-cut method for modelling transactions under a collateral agreement has been modified to produce a conservative estimate of exposure over a full year, rather than to capture just the first margin period of risk.

13 *The Basel III capital framework is available at* www.bis.org/publ/bcbs189.pdf.
14 *The IMM is the most advanced approach for counterparty credit risk in the Basel framework. Under the IMM, banks model the exposure profile over a one-year risk horizon, subject to strict management requirements and the supervisor's approval. For further details about the IMM, see the Basel framework, Annex 4, Section V.*
15 *Under paragraph 468 of the Basel framework, banks have to estimate a "downturn LGD", which reflects the losses occurring during a business cycle downturn for regulatory purposes.*
16 *The shortcut method is a simplified method for banks that can estimate the exposure/risk profile using the IMM but are not able to take into account the effect of margining agreements using this method.*

• **Collateral and margining issues**. Standards for collateral management and initial margining have been strengthened. In certain cases, banks will be required to apply longer margining periods as a basis for determining the regulatory capital requirement for their derivatives exposures. The margin period of risk for very large netting sets, netting sets with illiquid collateral or exotic trades, and disputed netting sets has, on average, been doubled compared to Basel II. Also, resecuritisations are no longer considered eligible collateral and haircuts for securitisations have been increased.

Credit valuation adjustment capital charge

The CVA capital charge captures the risk of mark-to-market losses on the expected counterparty credit risk. In other words, CVA is the risk of loss caused by changes in the credit spread of the counterparty due to changes in the counterparty's credit quality.

While Basel II required banks to hold capital to cover the risk of a counterparty default, it did not require capital for CVA risk. As noted earlier, total losses from CVA risk have been greater than those arising from outright defaults. Banks completing bilateral OTC derivatives transactions will be subject to a capital charge for mark-to-market losses (i.e. CVA risk) associated with a deterioration in the creditworthiness of a counterparty.

The capital requirements for CVA risk are significant and are required for all banks that enter into bilateral OTC derivatives transactions, regardless of the banks' level of sophistication. Impact studies conducted by the Basel Committee show that the amount of the CVA capital charge will be similar to the default and credit migration risk capital requirements already required under Basel II. In other words, on average and all else equal, the CVA component will double the regulatory capital requirement for counterparty credit risk. At the same time, it is important to note that a bank will not be required to hold capital for CVA risk when it completes a derivative, repo or securities lending transaction with a CCP as the counterparty. Therefore, this will give banks incentives to clear through a CCP.

Asset value correlations[17]

To address systemic risk within the financial sector, and based on the evidence that financial exposures are more highly correlated than non-financial ones, the asset value correlation parameter, which is a component of the internal ratings-based (IRB) approach formula for calculating capital for credit risk, has been increased by 25% for large regulated financial institutions (defined as banks with assets exceeding USD 100 billion according to the last audited financial statements), and all unregulated financial intermediaries. This raises the risk weights on exposures to financial institutions relative to the non-financial corporate sector.

Ongoing policy work

The Committee is formulating an enhanced non-model-based approach for calculating capital requirements for counterparty credit risk. This approach would replace the current exposure method and standardised method in the Basel capital framework and may be used as an exposure measure for determining margin requirements for non-centrally cleared derivatives as well as a CCP's hypothetical capital requirements (see related discussions below).

2|2 Rules for the capitalisation of exposures to central counterparties

Basel II granted a zero capital charge to trade exposures to CCPs, and could also be interpreted in such a way that a bank with CCP membership (i.e. a "clearing member") would not need to hold any capital for its default fund exposures to a CCP – regardless of the quality of a CCP's risk management practices (e.g., initial margin), its financial resources or its reliance on the default funds provided by its clearing members. Given these considerations and in the light of the increased reliance on CCPs and their importance to the stability of the financial system, the Basel Committee recognised that this treatment was no longer appropriate.

17 *This refers to the Basel II assumptions on correlations across asset classes for the internal ratings-based (IRB) approach. As such, the scope of this new rule goes beyond the counterparty credit risk rules, as this requirement affects* ***all*** *credit risk exposures among financial institutions treated under the IRB approach (i.e. not only exposures to counterparty credit risk arising from OTC derivatives trades and SFTs).*

Since 2009, the Basel Committee has worked to give effect to the G20 leaders' goal of creating incentives for banks to increase their use of CCPs, while at the same time ensuring that banks' exposures to CCPs are adequately capitalised. After two rounds of public consultation, and discussions with the CPSS and IOSCO, the Basel Committee issued in July 2012, as part of Basel III, interim rules for capitalising exposures to CCPs that Basel Committee members were expected to have implemented as of January 2013.[18]

The Basel Committee's framework for capitalising exposures to CCPs relies on the enhanced "Principles for Financial Market Infrastructures" (PFMIs), developed jointly by CPSS and IOSCO and published in April 2012.[19] The CPSS-IOSCO's PFMIs are designed to enhance the robustness of CCPs and other essential infrastructure that support global financial markets. Where a CCP is supervised in a manner consistent with these principles, exposures to such CCPs will receive a preferential capital treatment. CPSS and IOSCO plan to monitor the implementation of the PFMIs across their member jurisdictions, as well as those of Financial Stability Board (FSB) members.

The new rules differentiate between the various types of risk that a bank may incur when clearing a trade through a CCP. The different types of exposure and their corresponding treatment are as follows:

• **Trade exposures** include the initial margin as well as the current and potential future exposure to a CCP arising from OTC derivatives, exchange traded derivatives or SFTs. These must be capitalised against any losses that the bank might suffer if the CCP defaulted. Where the CCP is qualifying, or compliant with the abovementioned PFMIs, this risk is considered to be very low and, therefore, trade exposure to qualifying CCPs will receive a nominal risk weight of 2%. This recognises that CCPs are not risk-free, and helps ensure that banks and supervisors will monitor such exposures.

• **Default fund exposures** arise from clearing members' funded or unfunded contributions towards, or underwriting of, a CCP's mutualised loss-sharing arrangements. As such, these must be capitalised against losses that the bank might suffer due to loss mutualisation if another clearing member should default. The interim rules allow banks to choose from one of two approaches for determining the capital required: (i) a risk-sensitive approach,[20] or (ii) a simplified method under which default fund exposures will be subject to a 1,250% risk weight subject to an overall cap based on the volume of a bank's trade exposures.

• With regard to **indirect clearing**, the Committee has kept in mind, while developing these rules, the need to create incentives to increase the use of CCPs:

  – the interim rules include provisions for indirect clearing that allow clients to benefit from the preferential treatment for central clearing;[21]

  – conversely, for capitalising the exposure that the clearing member has to its clients in respect of clients' cleared transactions, the new rules recognise the risk-reducing aspect of central clearing, in particular, that the closeout period in case of a client default is expected to be shorter when the trade is cleared through a CCP. This addresses concerns about potential disincentives for clearing members to keep providing clearing services and move client trades to central clearing.

Ongoing policy work

Following the issuance of the interim rules for capitalising bank exposures to CCPs, the Basel Committee, CPSS and IOSCO have been

18 *These standards are available at* www.bis.org/publ/bcbs227.htm.
19 *Available at* www.bis.org/publ/cpss101.htm.
20 *Under the risk-sensitive method, the determination of the aggregate capital requirements for a clearing member's exposures to the CCP relies on the comparison of the "CCP's hypothetical capital requirements" (defined as the capital that the CCP should hold if it were a bank and had bilateral trades with all its CMs) with the resources that the CCP has available to absorb losses. For example, once the CCP has resources (either own funds or clearing member default fund contributions) to cover its hypothetical capital requirements, any further exposure of a clearing member bank to the CCP via default funds would be subject only to a nominal capital charge (e.g., 1.6%, assuming a minimum risk weight of 20%).*
21 *To encourage client banks to use CCPs where practicable and to recognise that a client bank may be able to obtain a substantial benefit from transacting through a CCP, the new rules allow a client bank to benefit by indirectly transacting with the CCP provided that: (i) any collateral to the transaction is under arrangements that protect the client against any losses due to the default or insolvency of the clearing member and/or other clients of the clearing member; and (ii) laws, regulation, or administrative arrangements are in place so that offsetting transactions with the clearing member are highly likely to continue to be indirectly transacted through the CCP should the clearing member default or become insolvent. If these two conditions are not met, a client bank should calculate capital requirements against the clearing member.*

working together to develop a long-term solution. As part of this work, these standard setting bodies (SSBs) will consider the non-internal modelled approach being developed by the Basel Committee, together with other methodologies for estimating trade and default fund exposures to CCPs. The new solution will replace the interim rules that were published in July 2012. The Basel Committee will continue to actively monitor the capital requirements in this area, and their interaction with other policy initiatives, to ensure they remain both robust and consistent with the broader G20 objectives.

2|3 Margin requirements for non-centrally cleared derivatives

A significant proportion of OTC derivatives are not standardised and will thus not be centrally cleared.[22] Non-standardised products will continue to be subject to bilateral counterparty risk management and capital requirements (as enhanced by Basel III, summarised above).

In 2011, the G20 agreed to add margin requirements on non-centrally cleared derivatives to the reform programme and called upon the Basel Committee and IOSCO to develop, for consultation, consistent global standards for these margin requirements. In response, the Committee and IOSCO, in consultation with CPSS and the CGFS (Committee on Global Financial System), are developing standards on margin requirements for non-centrally cleared derivatives. The collaborative nature of this work among several SSBs is key since the effectiveness of margin requirements could be undermined if the requirements were not consistently agreed and implemented internationally.

Objectives of margin requirements for non-centrally cleared derivatives

Margin requirements for non-centrally cleared derivatives have two main benefits.

- **Reduction of systemic risk**. Margin requirements for non-centrally cleared derivatives are expected to reduce contagion and spillover effects by ensuring that collateral is available to offset losses caused by the default of a derivatives counterparty. Margin requirements can also have broader macroprudential benefits, by reducing the financial system's vulnerability to potentially destabilising procyclicality and limiting the build-up of uncollateralised exposures within the financial system.

- **Promotion of central clearing**. In many jurisdictions central clearing will be mandatory for most standardised derivatives. But clearing imposes costs, in part because CCPs require margin to be posted. Margin requirements on non-centrally cleared derivatives, by reflecting the generally higher risk associated with these derivatives, will promote central clearing, making the G20's original 2009 reform programme more effective. This could, in turn, contribute to the reduction of systemic risk.

Nevertheless, the potential benefits of margin requirements must be weighed against the liquidity impact that would result from derivatives counterparties' need to provide liquid, high-quality collateral to meet those requirements, including potential changes to market functioning as result of increased overall demand for such collateral. Financial institutions may need to obtain and deploy additional liquidity resources to meet margin requirements over and above current levels. Moreover, the liquidity impact of margin requirements cannot be considered in isolation. Rather, it is important to recognise that ongoing and parallel regulatory initiatives will also have significant liquidity impacts; examples of such initiatives include the Basel III liquidity standards (i.e. the liquidity coverage ratio and the net stable funding ratio) and global mandates for central clearing of standardised derivatives.

Key principles and proposed requirements

In July 2012, the Basel Committee and IOSCO, in consultation with CPSS and CGFS, issued for consultation a proposal for margin requirements on non-centrally cleared OTC derivatives.[23] In parallel, an impact study was conducted to help inform final decisions on the calibration of the new standards.

The consultative paper articulated the initial policy proposals for margin requirements for non-centrally

22 *G20, Cannes summit final declaration* (http://www.fondation-farm.org/IMG/pdf/declarationfinalesommetcannes_en.pdf).
23 *Available at* www.bis.org/press/p120706.htm.

cleared derivatives through key principles addressing seven main elements:

- appropriate margining practices should be in place with respect to all derivatives transactions that are not cleared by CCPs;

- all financial firms and systemically important non-financial entities ("covered entities") that engage in non-centrally cleared derivatives must exchange initial and variation margin as appropriate to the risks posed by such transactions;

- the methodologies for calculating initial and variation margin that must serve as the baseline for margin collected from a counterparty should (i) be consistent across entities covered by the proposed requirements and reflect the potential future exposure (initial margin) and current exposure (variation margin) associated with the portfolio of non-centrally cleared derivatives at issue and (ii) ensure that all exposures are fully covered with a high degree of confidence;

- in the event of a counterparty default, assets collected as collateral for initial and variation margin purposes should be capable of being liquidated within a reasonable timespan to generate proceeds that will sufficiently protect collecting entities covered by the proposed requirements from losses on non-centrally cleared derivatives. Such assets should be highly liquid and, after accounting for an appropriate haircut, they should be able to hold their value at a time of financial stress;

- initial margin should be exchanged by both parties, without netting of amounts collected by each party (i.e. on a gross basis), and held in such a way as to ensure that (i) the margin collected is immediately available to the collecting party in the event of the counterparty's default; and (ii) the collected margin must be subject to arrangements that protects the posting party to the full extent possible under applicable law in the event that the collecting party enters bankruptcy;

- transactions between a firm and its affiliates should be subject to appropriate variation margin arrangements to prevent the accumulation of significant current exposure to any affiliated entity arising from non-centrally cleared derivatives;

- regulatory regimes should interact so as to assure sufficiently consistent and non-duplicative regulatory margin requirements for non-centrally cleared derivatives across jurisdictions.

Ongoing policy work

As noted above, in February 2013, the Basel Committee and IOSCO issued a near-final consultation paper, together with results from a quantitative impact study conducted in September 2012. This second consultation will allow market participants to better understand the margining standard, its implementation schedule and potential impact and future monitoring plans.

3| Monitoring and assessing impact of regulatory reforms

The global SSBs recognise that coordination is crucial in order to achieve the G20 objectives. Given the multiple regulatory changes undertaken in parallel, they also recognise the necessity of jointly evaluating the appropriateness and the interaction of the regulatory reforms, especially as market practices might change. Furthermore, they acknowledge that the potential benefits of the regulatory reforms must be weighed against the costs and liquidity impact that would result from some of the regulatory changes.

In this context, the OTC Derivatives Coordination Group[24] has initiated efforts to ensure a proper coordination among the SSBs in their efforts to meet the G20 objectives. Two of these efforts are discussed below.

3|1 Assessment of incentives created by OTC derivatives regulatory reforms

To achieve the G20's desired outcome of promoting system-wide stability, it is important that the combined effect of the relevant financial reforms creates **incentives** for market participants to use

24 *The OTC Derivatives Coordination Group comprises the chairs of the FSB, the BCBS, the CGFS, the CPSS, and the Board of IOSCO.*

standardised contracts and to centrally clear. Even if mandates may be put in place within some jurisdictions to enforce the central clearing of standardised OTC derivatives products at CCPs, the use of non-standard, economically similar products could provide an avenue for circumventing mandatory clearing if incentives are not properly aligned. This illustrates the importance of understanding the incentives that market participants face to centrally clear OTC derivatives.

Incentives will depend, in part, on the relative financial cost of bilaterally and centrally cleared transactions. The important components of these costs are the relative levels of capital and margin requirements, key aspects of which were discussed in the preceding section. Assessing the complete set of reforms as a package is critical to delivering on the G20 objective.

In late 2011, the OTC Derivatives Coordination Group requested an evaluation of whether the OTC derivatives regulatory reforms developed or under development by the relevant SSBs create sufficient and appropriate incentives for market participants to centrally clear OTC derivatives.[25] Under the direction of the Basel Committee's Chairman, an OTC Derivatives Assessment Team was formed in 2012 to carry out an analysis within the official sector. To inform its analysis, the assessment team is engaging with industry representatives to gather their views on the financial costs and benefits of the various reform initiatives. The feedback received is critical to ensuring that an appropriate incentive structure is achieved.

3|2 Macroeconomic assessment of the OTC derivatives regulatory reforms

The OTC Derivatives Coordination Group is also coordinating an international cooperative effort to undertake a quantitative macroeconomic impact assessment of the various regulatory reforms focused on OTC derivatives markets. The focus of this work will be on the macroeconomic impact of reforms affecting margining, clearing, collateral and capital adequacy practices related to OTC derivatives.

The assessment will seek to examine both the transient and longer-term macroeconomic benefits and costs of the proposed regulatory reforms to these markets. The macroeconomic benefits of the reforms are expected to come in the form of a reduction in forgone output from a lower frequency and severity of financial crises, as well as from more efficient allocation of capital and resources as externalities are internalised. By contrast, costs may arise from a fall in the availability or an increase in the costs of the intermediation and risk transfer services supporting economic activity.

The results of the macroeconomic impact study will form an important part in the finalisation of the relevant international policies. The findings of the impact study – on a preliminary basis if necessary – are intended to be available before the G20's September 2013 Summit meeting.

4| Concluding remarks

The OTC derivatives markets reforms agreed by the G20 aim at making the financial system safer by limiting excessive and opaque risk-taking through OTC derivatives. The reforms will make OTC derivatives markets more transparent, by enforcing reporting to trade repositories, promoting central clearing, as well as trading on exchanges or electronic platforms, where possible. Non-centrally cleared trades will be subject to higher capital requirements as well as new margin requirements. This will not only make counterparties to a bilateral trade less vulnerable to contagion, but will also promote central clearing.

Notably, the reforms will result in a concentration of risk in CCPs. As such, it is absolutely crucial that these infrastructures are properly managed and supervised. CPSS and IOSCO will undertake monitoring to ensure that implementation of their enhanced PFMIs is consistent across jurisdictions.

The global SSBs recognise that coordination is crucial to meet the G20 objectives. With multiple regulatory changes undertaken in parallel, they

25 *The assessment of incentives focuses only on global regulatory reforms (i.e. regulatory reforms put forward by the global SSBs: BCBS, CGFS, CPSS, and IOSCO). National or jurisdictional implementations of these reforms are not taken into account.*

recognise the necessity of jointly evaluating the appropriateness, and the interaction, of regulatory reforms, especially as market practices might change in the coming years. An important part of these monitoring and evaluation efforts is to weigh benefits against costs, and ensure that the combined effect of the relevant financial reforms creates the right incentives for market participants.

However, to achieve the desired outcome, it is not sufficient to reach agreement on any new rules on an international scale. It is also imperative that countries implement the agreements into their national rules and regulations in a full and timely manner and that supervision is efficient and effective. The Basel Committee has put in place a framework for assessing and monitoring the implementation of the Basel standards in its member countries. The first assessments have been made public. Other SSBs are developing similar frameworks. It is important that these endeavours are strict and thorough to ensure that the goals of the G20 are reached but also to promote a level-playing field and, most importantly, to ensure global financial stability.

Overview of international work towards OTC derivatives markets reform and remaining challenges

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This article delineates the initiatives taken by standard setting bodies including International Organization of Securities Commissions, for which the author serves as Chairman of the Board to set up international standards, as well as efforts made by regulators of major over-the-counter (OTC) derivatives jurisdictions, to fulfill the Pittsburgh G20 leaders' commitment on OTC derivatives market reform. The aim of the article is to provide an overview of reforms undertaken by both of international organisations and major national authorities in the last few years, as well as major challenges ahead to be addressed.

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The recent financial crisis that started in 2007-2008 exposed weaknesses in the structure and operations of the over-the-counter (OTC) derivatives markets, that had contributed to the build-up of systemic risk. The crisis demonstrated the potential for contagion arising from the interconnectedness of OTC derivatives market participants and the limited transparency of counterparty relationships. To address these weaknesses, in September 2009, G20 leaders in Pittsburgh called for reforms in OTC derivatives markets, and agreed on the following:

"*All standardized OTC derivative contracts should be traded on exchanges or electronic trading platforms, where appropriate, and cleared through central counterparties (CCPs) by end-2012 at the latest. OTC derivative contracts should be reported to trade repositories (TRs). Non-centrally cleared contracts should be subject to higher capital requirements. We ask the Financial Stability Board (FSB) and its relevant members to assess regularly implementation and whether it is sufficient to improve transparency in the derivatives markets, mitigate systemic risk, and protect against market abuse.*"

Building on these commitments, the G20 leaders agreed at the June 2010 Toronto Summit to work in a coordinated manner to accelerate the implementation of OTC derivatives regulation and supervision and to increase transparency and standardisation, stating the following:

"*We pledged to work in a coordinated manner to accelerate the implementation of OTC derivatives regulation and supervision and to increase transparency and standardization. We reaffirm our commitment to trade all standardized OTC derivatives contracts on exchanges or electronic trading platforms, where appropriate, and clear through CCPs by end-2012 at the latest. OTC derivative contracts should be reported to TRs. We will work towards the establishment of CCPs and TRs in line with global standards and ensure that national regulators and supervisors have access to all relevant information.*"

The aim of this article is to provide an overview of recent developments in the international efforts towards OTC derivatives reforms and to indicate the challenges ahead. The International Organization of Securities Commissions (IOSCO), along with the Bank for International Settlements (BIS) Committee on Payment and Settlement Systems (CPSS), has been one of the main standard setting bodies (SSBs) developing the relevant standards and policy recommendations required to build stronger financial market infrastructures (FMIs) with appropriate oversight. Therefore, such work at IOSCO and CPSS will be introduced below as necessary. The author has served as the Co-Chair of the CPSS-IOSCO Steering Group since August 2011 and as the Chairman of the Board of IOSCO since May 2012, but any views expressed below are attributed to the author only, and are not necessarily identical to those of the organisations he represents.

1| Developments in international initiatives

Since last year, several international initiatives have been taken by the G20, FSB, and other SSBs to continue the work undertaken in OTC derivatives market reforms.

1|1 Recent G20 agreements

At the level of the G20, leaders as well as Ministers and Central Bank Governors have been closely monitoring the implementation of the commitments made at Pittsburgh. The G20 leaders' Declaration at the Los Cabos Summit in June 2012 stated the following:

"*We reaffirm our commitment that all standardized OTC derivative contracts should be traded on exchanges or electronic trading platforms, where appropriate, and cleared through central counterparties by end-2012, OTC derivative contracts should be reported to trade repositories and non-centrally cleared contracts should be subject to higher capital requirements. We welcome the FSB progress report on implementation. Now that substantial progress has been achieved in the four safeguards for a resilient and efficient global framework for central clearing, jurisdictions should rapidly finalize their decision-making and put in place the needed legislation and regulations to meet the G20 commitment for central clearing. (…) Towards reducing systemic risk, we… call on CPSS and IOSCO to continue their work on systemically important market infrastructures.*"

More recently, the communiqué by Ministers of Finance and Central Bank Governors of the G20, issued in November 2012 stated the following:

"*We agree to put in place the legislation and regulation for OTC derivatives reforms promptly and act by end-2012 to identify and address conflicts, inconsistencies and gaps in our respective national frameworks, including in the cross-border application of rules.*"

As discussed further below, work by international SSBs and FSB has helped in identifying key policy measures to meet the G20 goals, but work towards national implementation of the G20 commitments has started to show divergences both in their content and timing, and potential conflicts, inconsistencies and gaps have been identified which require urgent action to address. If not properly addressed, such conflicts, inconsistencies and gaps could give rise to unnecessary burdens on market participants, regulatory arbitrage, and unintended concentration of risks.

1|2 Work at the Financial Stability Board

The FSB has become an important coordinator of the various strands of work undertaken by a broad range of international SSBs and among the various stakeholders of OTC derivatives.

The four safeguards

In January 2012, the FSB provided guidance to help jurisdictions make informed decisions in whether to embark on the use of global CCPs to meet the G20 commitments. More specifically, the need to put in place four safeguards for building a resilient and efficient global framework for central clearing was identified. The FSB also undertook to monitor the steps taken by the relevant international bodies and national authorities to build the safeguards.

The FSB OTC Derivatives Coordination Group (ODCG), which is composed of the Chairs of the Basel Committee on Banking Supervision (BCBS), Committee on the Global Financial System (CGFS), CPSS, IOSCO and FSB, agreed to coordinate the work of these international bodies to achieve substantial progress in building the safeguards by mid-2012. This timing was chosen to support national authorities in meeting the G20 commitments by the end of 2012, particularly to centrally clear all standardised OTC derivatives. These safeguards, along with the internationally agreed measures taken to achieve them, are as follows:

- fair and open access by market participants to CCPs, based on transparent and objective criteria (addressed within the CPSS-IOSCO's "Principles for Financial Market Infrastructures" (PFMIs), with members' commitments to implementation);

- cooperative oversight arrangements between relevant authorities, both domestically and internationally and on either a bilateral or multilateral basis, that result in robust and consistently applied regulation and oversight of global CCPs (addressed through the responsibilities for authorities under the PFMIs and individual cooperative agreements in place or under development for CCPs, with members' commitments to implementation);

- recovery and resolution regimes that aim to ensure that the core functions of the CCPs are maintained even during times of crisis. Such regimes need to take into consideration the interests of all jurisdictions in which a CCP is systemically important (PFMIs deal with this issue and, to supplement them, CPSS-IOSCO issued in July 2012 a consultative report on the application of the Key Attributes of Effective Resolution Regimes to CCPs and other FMIs); and

- appropriate liquidity arrangements for CCPs in the currencies in which they clear (addressed through the PFMIs and also through considerations by the Economic Consultative Committee (ECC) of the BIS).

Monitoring progress in the reform measures

In its report on the implementation of OTC derivatives markets reform issued in October 2010 entitled "Implementing OTC Derivatives Market Reforms", the FSB made twenty-one recommendations addressing practical issues that authorities may encounter in implementing the G20 leaders' commitments. At the November 2010 Seoul Summit, the G20 leaders endorsed the FSB recommendations and asked the FSB to monitor progress in the OTC derivatives markets reform regularly. Following the October 2010 report on the twenty-one recommendations, the FSB subsequently published four progress reports in April 2011, October 2011, June 2012 and October 2012. Further reports are due going forward.

In its recent progress reports, the FSB has noted that progress had been made in the setting of international standards, the advancement of national legislation and regulation by a number of jurisdictions, and in practical implementation of the reforms concerning market infrastructure and activities. It cautioned, however, that much remained to be completed by the end-2012 deadline to achieve the G20 commitments, and concluded that all jurisdictions and markets needed to aggressively push ahead to achieve full implementation of the reforms by end-2012 to meet the G20 commitments in as many areas as possible.

As the end-2012 implementation deadline is now passed, we can register substantial progress in the following areas, for example:

- international principles/standards to support implementation of the G20 commitments are now largely in place, or are being finalised;

- work to put in place the four safeguards for a global framework for central clearing is still underway, and all FSB members have declared their approach to central clearing;

- national legislation and regulation are well advanced in a number of jurisdictions, particularly those with the largest markets in OTC derivatives;

- financial market infrastructures for central clearing and trade reporting are now in place for all categories of OTC derivatives, and are expanding their capacity to meet the needs in meeting G20 commitments.

Despite such progress, it is now evident that the G20 commitments have not been fully met in many jurisdictions by the end-2012 deadline. In many jurisdictions, required legislation and regulations are not yet complete or implemented fully. Inconsistencies between national/regional rules have surfaced, and implementation of the rules are uneven and sometimes in conflict with each other across jurisdictions, both in terms of content and timing. Extraterritorial application of certain national/regional rules is starting to cause regulatory conflicts/overlaps. Uncertainty about the rules to be implemented is becoming a major issue in the preparation of market participants to meet their obligations for clearing, reporting and trading. Therefore, there is renewed urgency in encouraging and monitoring implementation across all jurisdictions in a consistent manner. At the same time, it should be noted that new issues such as domestic privacy laws and blocking statutes are also emerging with respect to reporting of counterparty information to a TR and regulators' access to data held in TRs.

It is important to note that national authorities and market participants have not renounced their commitments to complete the agreed reforms, despite the fact that the end-2012 deadline is now passed. Going forward, the FSB and its members will need not only to assess whether detailed individual reform measures have been fully implemented, but also monitor whether – looked at as a whole – the steps taken are sufficient to meet the G20's underlying goals of improving transparency in the derivatives markets, mitigating systemic risk, and protecting against market abuse. At the same time, possible market developments and unintended consequences will also need to be taken into account.

The G20 commitments in each of the reform areas – trade reporting, standardisation, central clearing, capital and margining rules, and trading on exchanges or organised platforms – are meant to altogether contribute to those broader goals. Going forward, it is important to prioritise remaining work, and to assess the progress and the overall impact of the reforms with those goals in mind, and regularly analyse whether the incentives created by the different aspects of the reform process help and support each other in the achievement of those goals.

1|3 Work at IOSCO

Throughout the reform process outlined above, IOSCO, as one of the principal SSBs in the area, has published three important reports containing policy recommendations and standards with the aim of providing necessary guidance for jurisdictions in meeting their G20 commitments. The three reports are briefly introduced below:

Report on requirements for mandatory clearing

The FSB recommended in its October 2010 report above that IOSCO, working with other authorities as appropriate, should coordinate the application of central clearing requirements on a product and participant level, and any exemptions from them as a means of minimising the potential for regulatory

arbitrage as the G20 commitments on central clearing are implemented.

Against this backdrop, IOSCO published in February 2012 a report entitled "Requirements for Mandatory Clearing" which outlined seventeen recommendations that authorities should follow in establishing a mandatory clearing regime within their jurisdictions.

Inter alia, this report recommended the creation of a framework for mutual communication among authorities in deciding and introducing mandatory clearing requirements to enhance consistent implementation of those requirements across jurisdictions. Furthermore, with respect to the cross-border application of mandatory clearing requirements, this report recommended that authorities coordinate by identifying overlaps, conflicts and gaps between mandatory clearing regimes with respect to cross-border application of the clearing obligation. This report further recommends that authorities give due consideration to allowing the use of third-country CCPs.

As regards determination of a product or set of products subject to a mandatory clearing obligation, this report outlines a "bottom-up approach" by CCPs, and a "top-down approach" by authorities. This report recommends that authorities implementing a mandatory clearing regime consider using these two approaches in their decision-making processes.

Concerning determination of exemptions to mandatory clearing, this report considers some types of exemptions that may be granted, and recommends steps that authorities should take to ensure appropriate communication of the exemptions to, as well as coordination with, other relevant authorities. This is in line with the FSB's October 2010 report which recommends that authorities should appropriately tailor any exemptions to mandatory clearing, and should not grant exemptions where doing so could create systemic risk.

Report on trading and its follow-on report

In an effort to address the G20 commitment that all standardised derivatives contracts be traded on exchanges or electronic trading platforms, where appropriate, the FSB recommended that IOSCO, with the involvement of appropriate authorities, conduct an analysis of the benefits and costs associated with increasing trading of derivatives on such platforms. IOSCO's report entitled "Report on Trading of OTC Derivatives" which was published in February 2011 aimed to undertake this analysis, with the goal of providing an analytical tool for regulators that could inform their current and future efforts to address the commitment towards trading of derivatives on those platforms.

This report emphasises that it is appropriate to trade standardised derivatives contracts with a suitable degree of liquidity on "exchanges or electronic trading platforms", provided that a flexible approach encompassing a range of platforms that would qualify as "exchanges or electronic trading platforms" for derivatives trading is taken.

Market regulators would have the flexibility to specify the types of trading platforms that are most appropriate for derivatives trading in their jurisdiction, depending upon the mix of products traded in a given market.

This report stated that market regulators could undertake a range of actions to facilitate a transition of derivatives trading from OTC to such platforms which should demonstrate certain features (grouped into eight categories).

A follow-on analysis to the above report on trading (Follow-on Report) which was published in January 2012 described the different types of trading platforms currently available for the execution of OTC derivatives transactions in IOSCO member jurisdictions (broadly classified either as multi-dealer platforms or as single-dealer platforms). Generally speaking, this Follow-on Report did not identify material differences in the capacity of single and multi-dealer platforms to provide efficient and transparent trading facilities.

Derivatives market intermediary report

The objective of the report "International Standards for Derivatives Market Intermediary Regulation" which was published in June 2012 was to provide high-level international standards for the regulation of market participants that are in the business of dealing, making a market or intermediating transactions in OTC derivatives. In particular, this report focused on the market participants who should be regulated as Derivatives Market Intermediaries (DMIs), given

their types and levels of involvement within the OTC derivatives markets, and described the substantive areas that required further work, including regulation.

This report makes recommendations with respect to the substantive areas including registration/licensing, capital or other financial resources requirements for non-prudentially regulated DMIs, business conduct standards, business supervision, and recordkeeping.

With regard to registration/licensing, this report recommends that DMIs should be subject to registration or licensing and applicable substantive regulations and/or requirements and standards once registered by the relevant authorities. In relation to financial resources requirements for non-prudentially regulated DMIs, this report recommends that market authorities should consider imposing some form of capital or other financial resources requirements for DMIs that are not prudentially regulated that reflect the risks that these intermediaries undertake.

This report also notes that cross-border consistency among market authorities with respect to the regulation of DMIs is essential to successful oversight of the global OTC derivatives market particularly because many DMIs operate in multiple jurisdictions.

1|4 Work at CPSS-IOSCO

During the past few years, CPSS and IOSCO have been working jointly to enhance and strengthen international standards for financial market infrastructures for payment and settlement, including in particular, the area of OTC derivatives.

Principles for financial market infrastructures

CPSS and IOSCO published jointly in April 2012 a comprehensive set of principles applicable to FMIs of all types (PFMIs). The new principles replaced previously existing recommendations and principles applicable to financial market infrastructures, which included CCPs and TRs for OTC derivatives. Overall, the new standards substantially strengthened standards for risk-management in credit and liquidity risk, provided new requirements in such areas as business risk, and broadened the scope and applicability of the principles to different types of FMIs. The principles are complemented by five responsibilities of authorities to provide for the effective regulation, supervision and oversight of FMIs.

This report supports the initiatives of the G20 and the FSB to strengthen core financial infrastructures and markets and incorporates guidance for CCPs that clear OTC derivatives. Importantly, this report supports and complements the G20 and FSB strategies and the four safeguards with respect to cooperation among authorities, fair and open access, and recovery and resolution of financial market infrastructures. CPSS and IOSCO recognise the need for effective cooperation and coordination among central banks, market regulators and other relevant authorities, both domestically and internationally, due to the rising importance of global FMIs that serve multiple jurisdictions and markets as well as the increasing interconnectedness of FMIs.

While the focus of the principles is on ensuring that FMIs operate as smoothly as possible in normal circumstances, it is possible that in certain extreme circumstances an FMI may face such an extreme level of stress that it might have difficulty satisfying its obligations and responsibilities. Depending on the specific situation and the powers available to authorities in relevant jurisdictions, in such cases, actions may be implemented by the FMI, relevant authorities, or both to ensure the continuation of essential services and to mitigate disruptions to the financial system. The principles identify measures that FMIs should take to prepare for and facilitate the implementation of their own recovery or orderly wind-down plans. FMIs should also consider applicable resolution regimes in their design and operations. Further work underway in this regard is elaborated *infra* (section "Consultative report on recovery and resolution of FMIs").

Report on data reporting and reporting requirements

The FSB October 2010 report also recommended that CPSS and IOSCO develop both for market participants reporting to TRs and for TRs reporting to the public: (1) minimum data reporting requirements and standardised formats; and (2) the methodology and mechanism for the aggregation of data on a global basis. Consistent with the FSB report, IOSCO formed the Task Force on OTC Derivatives Regulation to, among other matters, work jointly with CPSS to develop reporting and aggregation standards.

The "Report on Data Reporting and Aggregate Requirements" specifies minimum requirements for reporting data to a TR and for the reporting by a TR to regulators, as well as types of acceptable data formats. This report also discusses issues relating to authorities' and reporting entities' access to data, and disseminating OTC derivatives data to the public.

With respect to the access by authorities to TR-held data, it is important that authorities are ensured to have access to the TR data necessary to carry out their functions. In this regard, CPSS and IOSCO are working on guidance for TRs and authorities aimed at facilitating minimum access for authorities to TR data needed to support their mandates and responsibilities. The range of authorities in this context includes central banks, market regulators and TR supervisors. CPSS and IOSCO held roundtables with TRs and other stakeholders in October 2012 to solicit input to the drafting of this guidance.

In addition, this report addresses data aggregation mechanisms and tools needed to enable authorities to aggregate data in a manner that fulfills their regulatory mandates, such as to propose the introduction of legal entity identifiers (LEIs). The expeditious development and implementation of a standardised LEI is recommended, and in this regard, work to establish a global LEI system was undertaken at the FSB. A body to provide official oversight of the global LEI system has been set up in the shape of the newly created Regulatory Oversight Committee.

Consultative report on recovery and resolution of financial market infrastructures

In November 2011, the G20 endorsed the FSB's Key Attributes of Effective Resolution Regimes for Financial Institutions (Key Attributes) which set out the core elements necessary to establish a regime for resolving financial institutions without severe systemic disruption and without exposing taxpayers to loss. In the case of FMIs, the Key Attributes expressly require that resolution regimes be established in a manner appropriate to FMIs and their critical role in financial markets.

The disorderly failure of an FMI could lead to severe systemic disruptions, if it causes markets to cease to operate effectively. Ensuring that FMIs can continue to perform critical operations and services as expected in a financial crisis is therefore central to the recovery plans they formulate and the resolution regime that applies to them. Maintaining critical operations is essential to ensure FMIs serve as a source of strength and continuity for the financial markets they serve.

The "Consultative Report on Recovery and Resolution of FMIs" which was published in July 2012 supports the work to build the necessary safeguards against disorderly failure of FMIs by providing guidance on the essential features of recovery and resolution regimes to ensure that the core functions of CCPs and other types of FMI can be maintained during times of crisis in all jurisdictions where the CCP is systemically important.

The purpose of this report is to outline the features of effective recovery and resolution regimes for FMIs in accordance with the Key Attributes and consistent with the principles of supervision and oversight that apply to them. In doing so, the report also helps develop a common interpretation of how the Key Attributes apply to the recovery and resolution of FMIs in all relevant jurisdictions. This report also presents a number of questions and issues, which are related, in particular, to the methods, scope and extent of loss allocation arrangements that are an essential part of recovery and resolution for some types of FMI.

1|5 Work on margin requirements for non-cleared derivatives transactions

In November 2011, the G20 leaders agreed to add the development of margin requirements on non-centrally-cleared derivatives to the reform program that the G20 leaders initiated to reduce the systemic risk of OTC derivatives markets. The objective of this work is to reduce the risk of OTC derivatives trades which are not standardised and therefore could not be centrally-cleared in their current form, and to create appropriate incentives for those trades to shift to central clearing.

Following a first consultative report released in July 2012, the BCBS and IOSCO published a second consultative report in February 2013 entitled "Margin requirements for non-centrally-cleared derivatives" that could further mitigate systemic risk in the OTC derivatives markets. Further work is

continuing to develop policy recommendations which will be informed by an analysis of the economic impact of the new margin requirements taken together with other related measures including capital requirements on the market participants and haircuts on collateral. For these requirements to create the appropriate incentives to encourage standardisation and promote central clearing of derivatives, an analysis of incentives created by the associated regulatory measures needs to be conducted and cross-market analysis carried out. Discussions are currently underway among relevant stakeholders, including prudential supervisors, market regulators, central banks and market participants, before finalisation of the report.

2| Major challenges ahead

Despite the progress in international initiatives to meet the G20 commitments and changes in national legislation and regulations to implement them mentioned above, jurisdictions are facing challenges in fully implementing the reforms in time. The most pressing challenges and concerns, among others, as noted in the communiqué by Ministers of Finance and Central Bank Governors of the G20 in November 2012, are related to issues arising from cross-border application of different national and regional legislation and regulations, given the cross-border nature of OTC derivatives transactions.

Recently, there are growing concerns among regulators and market participants about emerging conflicts or overlaps between national and regional laws and regulations. To address these concerns, much greater international coordination and cooperation among regulators is needed. The following actions would normally need to be followed to avoid conflicting or overlapping cross-border regulations and to minimise any undue burdens on market participants.

First, it is important that the details of the applicable laws and regulations are made clear as much as possible before their implementation, in order to minimise regulatory uncertainty.

Second, once the details are made available, regulators should work together to avoid outright conflicts and minimise overlaps as much as possible, ideally before the rules are applied in their jurisdictions. Reliance on foreign regulators can be arranged through approaches of mutual recognition, substituted compliance, and registration categories and exemptions, or a combination of those approaches. Reliance on foreign regulators ensures that there is no conflict or overlap of applicable rules to entities operating cross-border, and to transactions that take place across borders. It not only enables an efficient and effective use of the limited supervisory resources of the regulator, but also, even more importantly, will remove legal uncertainty and significantly reduces the compliance costs of market participants and infrastructure operators in all jurisdictions.

Third, since cross-border transactions, by their nature, will be subject to regulations of two or more jurisdictions, arrangements would need to be made between the relevant regulators to avoid duplication. There may be additional costs involved in ensuring compliance with several different rules, and such costs should be minimised. Furthermore, in some cases, certain activities or transactions could be legally prevented from taking place because of conflicting regulation in different countries, and arrangements would need to be made in order to enable such activities and transactions, if they are considered legitimate. Such cases can arise in the context of central clearing requirements, where a CCP is not recognised in all of the relevant jurisdictions for the cross-border transactions concerned. This kind of conflict could be avoided through enhanced coordination and cooperation between regulators.

Fourth, a sufficient transition period and adequate relief measures for foreign entities and infrastructure operators are needed to address the difficulties that they face in complying with home regulations. A certain amount of time is also required to work to avoid regulatory conflicts and inconsistencies arising from differences in the content and the timing of implementation of national or regional regulations.

In this regard, to promote further international cooperation, the FSB urged a group of major OTC derivatives market regulators to pursue further discussions to (a) identify the cross-border application of rules to infrastructure, market participants, and products; (b) identify concrete examples of any overlaps, inconsistencies and conflicts; and (c) develop options for addressing these issues.

In response to this call by the FSB, leaders of regulators of major OTC derivatives jurisdictions, including

regulators from the United States, European Union and Japan, met at the end of November 2012 and agreed to a set of high-level operating principles and identified areas for further exploration in the regulation of the cross-border OTC derivatives market. This effort culminated in the joint press statement "Operating Principles and Areas of Exploration in the Regulation of the Cross-border OTC Derivatives Market" published at the beginning of December 2012.

The joint press statement was intended to address important issues requiring international coordination and cooperation, and to present a useful way forward. This includes (a) an understanding on clearing determinations (prior-consultation when making clearing determinations), (b) an understanding on sharing of information and supervisory and enforcement cooperation (relevant supervisory authorities enter into supervisory and enforcement cooperation arrangements), (c) an understanding on timing (an orderly implementation process and a reasonable limited transition period) and (d) areas of exploration regarding the scope of regulation and recognition or substituted compliance for cross-border compliance (possible approaches to prevent the application of conflicting rules and the desire to minimise the application of inconsistent and duplicative rules).

The agreement was a useful step in further promoting coordination and cooperation among the regulators of OTC derivatives in the major markets of the world, as noted in the communiqué by Ministers of Finance and Central Bank Governors of the G20, issued in February 2013, and the regulators agreed to meet and consult regularly to coordinate in order to address any outstanding issues.

3| Conclusion

As noted above, there is a need to continue to pursue the reform efforts described above to put in place the legislation and regulation for OTC derivatives reforms fully, on a timely and consistent basis. Regulators need to work promptly to identify and address conflicts, inconsistencies and gaps in the respective national and regional frameworks, including in the cross-border application of those rules, so that we can achieve the G20's goals of improving transparency in the derivatives markets, mitigating systemic risk, and protecting against market abuse. Strengthening economic impact analysis – both macro and micro – needs to be undertaken.

As the global standard setting body in the area of market regulation, IOSCO, together with other SSBs, in particular CPSS and BCBS, stands ready to support those global efforts. While the need for much closer coordination and cooperation between regulators of the world is becoming a matter of urgency, the institutional framework for enabling such coordination and cooperation is still at a very early stage of development. Further efforts would need to be made by the G20 and the relevant international organisations, national and regional regulatory bodies, and other relevant stakeholders in the coming years, to enhance their coordination and cooperation to meet the challenges of the globalised markets. Work on OTC derivatives market reform is a cornerstone of such efforts, and progress is urgent in order to achieve the goal of maintaining the integrity and stability of the global financial markets, and preventing the recurrence of financial crises in the future.

References

Committee on Payment and Settlement Systems (CPSS) and Technical Committee of the International Organization of Securities Commissions (IOSCO) (2012)
"Report on OTC derivatives data reporting and aggregation requirements", January.

Committee on Payment and Settlement Systems and Technical Committee of the International Organization of Securities Commissions (2012)
"Principles for Financial Market Infrastructures", April.

Committee on Payment and Settlement Systems and Board of the International Organization of Securities Commissions (2012)
"Recovery and resolution of financial market infrastructures: Consultative report", July.

Financial Stability Board (FSB) (2010)
"Implementing OTC derivatives market reforms", October.

Financial Stability Board (2012)
"OTC derivatives market reforms fourth progress report on implementation", October.

Kono (M.) (2012)
"Statement before the Subcommittee On General Farm Commodities and Risk Management Committee On Agriculture US House of Representatives", December.

Technical Committee of the International Organization of Securities Commissions (2011)
"Report on trading of OTC derivatives", February.

Technical Committee of the International Organization of Securities Commissions (2012)
"Follow-on analysis to the report on trading of OTC derivatives", January.

Technical Committee of the International Organization of Securities Commissions (2012)
"Requirements for mandatory clearing", February.

Technical Committee of the International Organization of Securities Commissions (2012)
"International standards for derivatives market intermediary regulation", June.

Consistency of international rules and extraterritoriality

International cooperation: a *sine qua non* for the success of OTC derivatives markets reform

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The international dimension of the reform of over-the-counter derivatives markets is absolutely vital for its success: at end-2011, notional outstanding on these markets amounted to approximately EUR 700 trillion. The initiative to reform these markets was launched by the G20's international commitments agreed to in Pittsburgh in September 2009 and in Cannes in 2011. These commitments outline the objectives of the reform: mandatory centralised clearing, standardisation, reporting to trade repositories, collateral exchanges for non-centrally-cleared contracts. In order to achieve these international objectives, each country must first adopt appropriate "domestic" legislation. While reform is effectively being implemented internationally (notably via the Dodd-Frank Act in the United States and European Market Infrastructure Regulation – EMIR in Europe), it is more than ever crucial that the new rules established at national levels should function smoothly at the global level. To achieve this goal, two conditions must be satisfied: first, there must be adequate harmonisation of the regulatory content and second, there should be effective international mechanisms for coordinating the application of national rules.

The international dimension of over-the-counter (OTC) derivatives markets is one of the key drivers of regulatory reform.

Given their scale, these markets (with notional amounts outstanding of USD 639 trillion at end-June 2012) undoubtedly represent a crucial challenge for international financial stability. Cross-border transactions account for the bulk of these contracts. For example, at end-June 2012, 80% of credit derivative transactions were concluded between counterparties established in different countries.[1]

At a political level, this reform would not have been possible without strong international commitment. Implementation of the reform of these markets was launched decisively by an agreement among the G20 leaders in Pittsburgh in September 2009. National attempts to reform OTC derivatives markets during the 1990s had failed[2] because unilateral initiatives risked prompting regulatory arbitrage in the absence of sufficient guarantees regarding short-term implementation of equivalent reforms in other jurisdictions.

Today – a little more than three years after Pittsburgh – as this reform is being introduced in most of the G20 countries, notably via the implementation of the Dodd-Frank Act in the United States and of European Market Infrastructure Regulation (EMIR) in Europe,[3] the international dimension seems even more crucial. In other words, the international impetus that was crucial for the launch of this reform is now equally – and perhaps even more – crucial for the success of its effective implementation. Yet despite the significant international efforts in this direction, the challenge still seems to be underestimated.

For the new rules to function smoothly at a global level, two conditions must be met: adequate harmonisation of the regulatory content, and effective international mechanisms for coordinating the application of more than one set of "domestic rules".[4]

1| Harmonisation of rules: a necessary but not sufficient prerequisite

1|1 Major efforts have been made to harmonise the rules

Harmonisation of rules across jurisdictions[5] is an essential condition for the effective international application of reforms decided at the domestic level. In fact, adoption by a jurisdiction of rules not ensuring an equivalent level of protection to those adopted by other jurisdictions would automatically create opportunities for financial players to arbitrate in favour of the rules of that jurisdiction and to organise their activities so as to benefit from this. As a response, other jurisdictions could be tempted to relax their rules, thereby triggering a negative spiral that would undermine the general level of protection offered by the regulatory environment.

Conscious of these regulatory arbitrage risks, the G20 authorities rapidly set up structures aimed at harmonising principles for the implementation of each of the key elements of OTC derivatives market reform. These key elements include the requirement for central counterparty (CCP) clearing, the requirement to report to a trade repository (TR) as well as the requirement to collateralise contracts that are not centrally cleared.

In order to promote these reforms, in April 2010, the Financial Stability Board (FSB) created the OTC Derivatives Working Group (ODWG) which has played a key role in transposing the G20's agreed objectives into domestic regulations. Its first report, published in October 2010, established twenty-one recommendations on practical issues facing supervisory authorities in their implementation of the G20 commitments. The group subsequently extended its work to monitoring the progress made in each jurisdiction through the publication of half-yearly assessment reports.

1 *See BIS data published in November 2012.*
2 *See Gillian Tett's Fools' Gold (2009) for a description of these reform initiatives, particularly in the United States.*
3 *EU Regulation No. 648/2012 came into force on 16 August 2012. The Commission adopted most of the technical standards on 19 December 2012.*
4 *To avoid any confusion concerning the exact meaning of the expression "national rules" in the context of the European Union, we use, in this article, the term "domestic rules" to refer to rules applicable to the European Union as a whole or to a particular non-EU country.*
5 *The term "harmonisation" does not imply a complete alignment of the regulations, but rather a sufficient degree of convergence to allow coherence of the contents of the regulations.*

In addition, the ODWG has appointed several other working groups to consolidate the implementation principles for certain specific points of the reform. In this framework, the OTC Derivatives Regulators Forum (ODRF), which brings together thirty-eight authorities responsible for supervising OTC derivatives markets, has worked on harmonising the supervision of CCPs and TRs, as well as harmonising the type of data they collect. IOSCO (International Organization of Securities Commissions) has set up a task-force for OTC derivatives regulation.

At the same time, the Bank for International Settlements's Committee on Payment and Settlement Systems (CPSS) and IOSCO have conducted a systematic review of the risk management standards applied to market infrastructures. The higher risk concentration in CCPs as a result of clearing obligations required strengthening the risk management principles applicable to these infrastructures.

Lastly, following the G20 Cannes summit in November 2011, the Basel Committee and IOSCO set up a joint working group on **harmonisation of margin requirements** for non-centrally-cleared derivatives.

This increase in efforts towards international harmonisation should be viewed positively. However, the specific nature of the current process concerning OTC derivatives should be stressed: **international rules for OTC derivatives have been defined in parallel with the adoption of domestic regulations** and not sequentially, as, for example, with the prudential regulatory process for banks (Basel II, Basel III). This need to work in parallel was to a large extent motivated by the G20's end-2012 deadline. The deadline has prompted rapid action by authorities in order to comply with the G20 commitment and ensured mobilisation of all of the reform's stakeholders. This would not have been possible if domestic legislation had been postponed until international principles were finalised. However, the price of such rapid progress has been greater complexity of the harmonisation and implementation work.

In addition to these formal structures, the important role played by the numerous informal bilateral contacts between domestic authorities should be noted. The European Commission, for example, maintains very close contacts with the competent authorities of the principal countries involved in OTC derivatives markets reform, and this has allowed a deeper mutual understanding of our respective approaches. These contacts have been recently formalised in the framework of the OTC Derivatives Regulators Group (ODRG).

1|2 Harmonisation without coordination can lead to inefficiencies

Although harmonisation of the content of regulations is a necessary condition for limiting the risks of regulatory arbitrage, it is not sufficient to ensure efficient international implementation of OTC derivatives reform.

The large volume of cross-border OTC derivatives transactions increases the probability of transactions being subject to the simultaneous application of different domestic rules. With each counterparty in a transaction being subject to the legislation of the State in which it is established, a transaction may be subject to at least two different sets of national legislation.

This situation is particularly problematic when the two sets of legislation impose obligations that are incompatible with each other. If the **counterparties are not able to simultaneously comply with the two sets of regulations, they may be unable to enter into cross-border transactions** which may lead to unhedged risks in the market and sub-optimal economic results.

One example of such a conflicting situation between different rules is the case of a class of derivative products that is subject to a clearing obligation in one jurisdiction, but not in the other. In this case, one counterparty would be subject to a clearing obligation whereas the other party would have to comply with the regime applicable to uncleared transactions, i.e. involving the bilateral exchange of margins. The prohibitive cost of this situation (due to having to pay both CCP and bilateral margins) would probably lead the counterparties to elect not to enter into transactions together. It could even be legally impossible to enter into business if the party with no clearing obligation were

not authorised by the laws applied in its home country to use the same CCP as that used by its transaction counterparty.

Without necessarily making the conclusion of contracts impossible, inconsistencies across different sets of national legislation could seriously complicate compliance and increase the costs of transactions. The definition of eligible types of assets that may be used as collateral within the framework of non-centrally cleared transactions is a good example. If there were only partial convergence of the eligible assets defined by the two domestic regulatory frameworks, counterparties established in the two jurisdictions would have to work with a restricted range of mutually eligible collateral. Further, this implies differentiated management of the collateral stock, which would be a source of complexity and inefficiency.

As a result, they might decide to **give preference to transactions with domestic counterparties subject to the same set of rules,** in order to increase the range of eligible assets. A third category of difficulties, no less problematic, stems from the risk that certain transactions **might escape all regulatory control by not being covered** by any domestic regulations. There can be no doubt that financial players have already employed creativity to exploit possible gaps in regulatory frameworks. To control situations where a maximum risk of regulatory arbitrage exists, regulators must have tools that allow them to effectively counter this type of regulatory evasion.[6]

These difficulties cannot be resolved by simple international harmonisation of regulatory content. While harmonisation can limit the scope of a problem, it cannot provide a solution once a problem has arisen. To do so, an effective mechanism for internationally coordinating the application of domestic regulations is necessary, allowing supervisors to ensure that no transaction remains unregulated and that each transaction is only subject to a single jurisdiction or set of regulations.

2| The need for effective international coordination of the implementation of new rules is urgent

2|1 Essential elements of an effective coordination mechanism

The first step for effective coordination is to clearly define the scope of application for each set of domestic legislation, in order to identify any possible gaps or overlaps. Definition of an extremely broad territorial scope of application providing **direct regulatory competence over any transaction likely to impact a country's jurisdiction is not a solution.** This, for example, is the approach adopted by the Commodity Futures Trading Commission (CFTC) in its *Interpretive guidance* published in July 2012.[7] By proposing that entities established in the United States and outside the United States should register as swap dealers or major swap participants, the CFTC aims to drastically reduce the risk of regulatory gaps. However, this proposal would also have the effect **of exacerbating the risks of overlap related to the simultaneous application of several sets of domestic legislation.** It is therefore preferable to define a limited territorial scope of application. Moreover, this territorially limited approach is compatible with general principles of international law such as the principle of international comity.[8]

The second essential element of this mechanism must be the possibility to **comply with foreign legislation when it delivers equivalent results to the legislation of the home country.** This approach allows resolution of overlap situations. Where two sets of legislation apply to the same situation, counterparties should have the possibility of applying the legislation of their choice, provided that the two sets of legislation are equivalent. This "equivalence condition" is crucial for preventing the risk of regulatory arbitrage. Where it does not exist, counterparties might be tempted to systematically apply the most flexible conditions, which would lead to unacceptable erosion of regulation.

6 *See for example Article 4(4) of EMIR which provides for the adoption of a regulatory technical standard for contracts that should be subjected to the clearing obligation in order to prevent any evasion from this obligation.*
7 *"Cross-border application of certain swaps provisions of the Commodity Exchange Act", 77 FR 41214, 12 July 2012.*
8 *A principle of international law establishing the duty of State authorities to respect the territorial competence and laws of other States in order to promote better international coordination.*

The third element, **cooperation between supervisory authorities in implementing this approach, is equally important.** Compliance with foreign legislation does not mean that supervisors abandon their right to oversee relevant transactions. It is crucial that supervisory authorities **should be able at all times to obtain information concerning the adequate regulation of transactions under foreign law and appropriate supervision by the supervisory authority in the third country concerned.** Practical application of this cooperation must be based on agreements between supervisory authorities guaranteeing permanent access to information, including in times of crisis. It is also worth noting that a country allowing compliance with another country's law retains an essential lever, namely the possibility of withdrawing, at any time, its decision to recognise the equivalence of the third country's legislation if it considers that the conditions prevailing at the moment of its recognition no longer exist.

This approach, based on the three elements mentioned above, has been used in numerous different contexts in EU legislation. EMIR provides several equivalence mechanisms, particularly in the area of the recognition of CCPs and TRs established in third countries, as well as in the area of handling "duplicative" requirements (Article 13 of EMIR). The latter article provides a resolution tool for the above-mentioned cases of overlapping and/or conflicting rules by offering counterparties established in the European Union the possibility of complying with the application of an equivalent foreign law when dealing with foreign counterparties. The co-legislators nevertheless made the implementation of this provision conditional upon the non-distortive application of the foreign law. This non-distortive condition could be difficult to satisfy in situations where the foreign law provides an extremely broad territorial scope of application.

Some of these topics are also discussed in the *Interpretive guidance* proposed by the CFTC. The concept of "substituted compliance" has a number of similarities with the provisions in EMIR.[9] It allows, in certain cases, non-US entities to comply with the obligations of US law by applying the legislation of their home country in cases where it is considered "similar" to US legislation. However, the proposed scope is more restrictive than the scope of EMIR's Article 13 as it would only be applied to transactions between non-US counterparties and not to transactions between US entities and non-US entities.

2|2 Can these principles be easily achieved?

The principles discussed above are essential for successful implementation of OTC derivatives markets reform. They will allow the reliable and effective functioning of the regulatory provisions adopted in our respective jurisdictions.

However, their application is only possible within a concerted framework that ensures their adoption by each jurisdiction. In effect, it would not be a viable situation for counterparties in a particular jurisdiction to comply with the application of foreign laws or regulations without the existence of reciprocal arrangements, as it would lead to the systematic disapplication of domestic laws in respect of cross-border transactions.

The implementation of these principles must therefore involve an agreement between all jurisdictions concerned by OTC derivatives markets reform. This agreement must be reached before the new rules applying to these products are definitively introduced in order to avoid any significant disruption of OTC derivatives markets.

International regulators are working hard to resolve these questions. Some encouraging evidence of progress is beginning to emerge. The CFTC's recent temporary exemption decision (published on the 21st of December) which envisages a more restricted definition of the territorial scope of application of the regulations applying to swap dealers is a positive sign. However, so far, there has been no guarantee that the CFTC will adopt this approach in its definitive regulations. We should encourage our American counterparts to continue in this direction. In addition, last November, the OTC Derivatives Regulators Group[10]

9 *See article by Tafara (E.) and Peterson (R.J.) (2007): "A blueprint for cross-border access to US investors: A new international framework", Harvard International Law Review, which partially inspired the US approach.*

10 *This group brings together the market regulators from the United States, Japan, Australia, Canada, Brazil, Switzerland, Hong Kong, Singapore and the European Union (ESMA and European Commission).*

agreed on a work plan to solve these problems. It is very positive that the subject of international coordination has been clearly identified at an international level and is now being dealt with by a specialist group. Nevertheless, having scored an international try, we now need to convert it!

I would like to emphasise that implementation of the G20's objectives is a vital step towards safeguarding global financial stability. The decision which kick-started this reform could not have been taken without the coordinated action of Heads of State and Government. We should try not to lose the original spirit of this initiative. International coordination remains a *sine qua non* condition for the success of the major collective efforts undertaken over recent years. We must now agree on common principles that will ensure fluid and effective interaction between our regulations.

Containing extraterritoriality to promote financial stability

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The extraterritorial effect of national regulations has become a topic of acute concern with the intensification of regulatory measures after the financial crisis, notwithstanding the G20's efforts to promote global standards of financial-industry regulation. This article points out the need for high-level attention to the practical complexities, intrusiveness and inefficiencies arising from the extraterritorial reach of specific national legislation. Adequately strengthening and promoting international coordination of financial regulation is of the essence in order to prevent regulatory arbitrage and avoid fragmentation. It highlights the fundamental role the Financial Stability Board should play to foster more coordinated and sustained international efforts to minimise extraterritoriality of national rules and manage down inefficiencies in order to facilitate the smooth achievement of G20 objectives and to eliminate barriers to doing business on a cross-border basis.

Extraterritoriality has become a topic of acute interest with the intensification of regulation after the financial crisis. Although it has been ever present, concerns about the phenomenon have increased because of the complexity and intrusiveness of certain new legislation which is coming into force with broad, and in some cases novel, extraterritorial effects.

It is troubling that problems of extraterritoriality are accelerating at a time when the G20 has set ambitious goals for global standards of financial-industry regulation. This article suggests that a contributing element is that the G20 has not yet specifically dealt with the issue of extraterritoriality, either in principle or practice, in the context of its broad-ranging global financial sector stability and reform agenda being implemented through the Financial Stability Board (FSB) and its associated international regulatory bodies. The result is that an important dimension of the problem of creating truly global standards of financial regulation has not yet been fully addressed, allowing issues of extraterritoriality to arise without a guiding framework as national implementation of both global and national policy initiatives proceeds.

It is therefore essential to direct high-level attention to the practical complexities and concerns arising from the extraterritorial reach of specific national legislation. This approach will call for an important role for the FSB, in its position at the center of the development of the regulatory framework for the international financial system, to foster more coordinated efforts and help manage down the inefficiencies of extraterritoriality in order to facilitate the smooth achievement of the G20 objectives.

1| What is meant by extraterritoriality?

Broadly, extraterritoriality refers to laws passed by national legislatures that, whether intended or not,[1] have an impact upon persons or activities outside their borders. Extraterritoriality challenges the traditional "Westphalian" concepts of sovereignty in two ways: first by the intrusion of one country's rules into another country's business, which many see as an affront to sovereignty; and second, by the difficulty of limiting legislation to one country in an increasingly globalised economy, which may make it difficult to achieve the goals of legislation in a comprehensive way.

Extraterritoriality may be therefore defined as a situation in which regulation adopted in one jurisdiction affects directly or indirectly, and to a material extent, activities or entities in other jurisdictions.

Extraterritorial application of one country's regulations with effects in other countries can arise in various ways, but instances of extraterritoriality can be said to fall into three broad categories.

- **Licensing.** The terms on which a jurisdiction licenses entities to conduct business can have extraterritorial effects. The simplest situation is when a jurisdiction (Jurisdiction *X*) restricts the cross-border or foreign activities of entities it incorporates or for which it is the primary supervisor. Licensing restrictions by a country on "its" entities are perhaps the most straightforward and least troublesome or controversial manifestation of this category of extraterritoriality. The more complex cases arise when Jurisdiction *X* uses licensing of foreign entities to do business in its territory to restrict their activities outside of its boundaries.

Fallout effects in other countries occur in cases in which a substantive restriction imposed by Jurisdiction *X* on "its" entities in effect limits the products that can be marketed to them in other markets, because *X* entities can only purchase such products if structured in accordance with *X*'s requirements, even if such products meet similar requirements with similar goals in the other markets.

- **Cross-border transactions.** A country may impose substantive or procedural requirements on transactions that take place with its citizens and domiciliaries, or that occur outside of its territory with a person over whom it would assert some kind of control or jurisdiction. Thus, it may extend its requirements to transactions occurring substantially

1 *A significant decision of the United States Supreme Court requires that legislation include explicit intent to claim extraterritorial jurisdiction: Morrison v. National Australian Bank Ltd. The Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank Act) explicitly authorised extraterritorial reach of certain provisions, but also acknowledges the need to take into account extraterritorial effects and mandated US regulatory agencies to seek international harmonisation with their international counterparts – Sections 719(c), 752(a).*

or entirely outside its bounds if conducted with one of "its" entities, even if such entity is a foreign-regulated branch or affiliate, and even if the transaction conforms in all respects with the laws of another jurisdiction, including laws with the same aims as the laws through which Jurisdiction *X* asserts extraterritorial control. One of the most challenging aspects of cross-border financial transactions is devising a framework as to which country's laws should govern. Without a solution, if each jurisdiction seeks to apply its requirements to transactions based on the jurisdictional origins of counterparties or on the substantive or foreseeable effects of a transaction, conflict and inefficiency are inevitable.[2]

• **Asserted extraterritorial control.** Sometimes Jurisdiction *X* may overtly design its regulations to have extraterritorial reach, based on asserted effects of the matter intended to be regulated in its jurisdiction. Although legislation in such instances generally requires some effect on Jurisdiction *X* or "its" persons, the connection required may be attenuated or even quite minimal, whereas the assertion of compliance requirements and enforcement measures may be dramatic. Jurisdiction *X* may conclude such measures are necessary to prevent flow of risks into its country through its entities or to prevent harm to its citizens if certain transactions are not prohibited or regulated, the so-called risk contagion effect.

2| The increase of extraterritoriality in the financial system and models of regulatory development

The global nature of financial firms and markets means that regulations may have effects extraterritorially, either by accident or design.[3]

Although ever present in some form, extraterritoriality can be seen as a sign of an environment of increasing regulatory complexity.[4] The focus at both the G20 and national levels on systemic risk has led to an expansive view of what must be done, through licensing, prudential regulation, and through transactional regulation, to protect national economies, and has provided new justifications for actions with extraterritorial effect – to avoid importing risks or to prevent systemic breakdown, which may easily come from abroad in an interconnected world.

Paradoxically, such complexity seems to be leading to regulatory fragmentation, of which extraterritoriality is a symptom, despite the significant efforts being expended to create global standards. In addition to the costs imposed on firms and the loss of efficiency in markets, extraterritoriality impinges on the sovereignty of other jurisdictions and may conflict with or complicate their own regulatory regimes and policy goals.

Extraterritoriality by design in an attempt to solve national regulatory problems also undermines trust among jurisdictions, instead of creating incentives to develop coordination and strengthen mutual reliance.

Three models of regulatory development

There are at least three models of development of regulations of international significance, with varying degrees of extraterritorial impact.

• **The global model** describes regulations developed within a global framework in response to a common need, often under the aegis of the G20. Where such regulation is applied on a consistent basis (i.e. without national deviation or gold-plating) there should be no scope for disruptive extraterritorial effects of national regulations, because regulatory objectives can be achieved on a reliable basis by the authorities of each jurisdiction. However, in the case of gold-plating, there are several examples of countries that, asserting their authority in implementing a particular regulation, do not follow the path of regulatory harmonisation.

• **The hybrid model** describes the situation where, despite the need for a global standard or a broad framework agreed to in principle, legislation or

2 *European Market Infrastructure Regulation (EMIR) (July 2012).*
3 *For a fuller discussion of issues of extraterritoriality arising from current US legislation, with extensive discussion of the literature and legal theory on the subject, see Greene and Pothia (June 2012).*
4 *Extraterritoriality is an increasing issue also in other areas and not specifically restricted to the financial regulatory system. Examples include antitrust, human rights, climate change, sanctions, intellectual property, etc. See Directorate General for External Policies of the Union,* The extraterritorial effects of legislation and policies in the EU and US *(May 2012).*

regulation is developed at a national or regional level ahead of, or inconsistently with, any detailed global standard. This may involve licensing or transactional extraterritoriality, or even asserted extraterritorial control, and may arise because:

- the global process is inefficient or slow or there is inconsistent enforcement among jurisdictions;
- one jurisdiction is ahead of others in terms of development (or by virtue of its first-mover position), or otherwise insists on front running the international process of establishing standards;
- one or more jurisdictions have very strong prior views about the form that regulation should take, even if the G20 has defined a global approach;
- one jurisdiction insists on rules to achieve its own policy goals by imposing requirements on foreign entities, as in the complex tax reporting and withholding requirements of FATCA (the US Foreign Account Tax Compliance Act), or on specific anti-money laundering or anti-terrorist finance rules that go beyond international norms; or
- a jurisdiction argues that there are local "specificities" that necessitate a variation.

The hybrid model does not in all instances imply extraterritorial application of regulation but it clearly creates the scope for uncoordinated extraterritorial effects, which can have unforeseen consequences, resulting in the creation of an uneven playing field. In particular the scope for extraterritorial impositions will be greatest in the early phase of disparate policy development, and it may continue unmitigated if a global standard does not emerge, with mechanisms to ensure comparable interpretation and application.

• **The domestic model** describes the case in which a regulation, often driven by national interests, is not part of the globally agreed agenda. This approach will be appropriate in the case of market conduct or transactional regulation, for example, where market conditions differ from regime to regime and there is less need or scope for a global approach. Domestic models may also be developed in jurisdictions which see themselves as having special needs that cannot be fully addressed by a global framework or in jurisdictions which have concerns or preferred solutions that are not shared by the rest of the global regulatory community (for example the interaction of retail and wholesale banking as addressed by differing licensing measures such as the US Volcker Rule and the UK Vickers Commission recommendations).

A decision to apply a domestic framework extraterritorially should depend to a large extent on whether this is necessary to achieve the (largely domestic) goals of the regulation. However, this criterion may often be lost sight of as domestic legislators or regulators may be insensitive to extraterritorial effects of domestically driven policy, or may be aggressive about asserting control whenever there are "effects" on the domestic market, however secondary or attenuated.

The experience of the crisis and the complexity of financial structures may induce design of policies that have intended or unintended extraterritorial effects, whether in hybrid or domestic models. The concern to catch all conceivable risks to a home country's firms and financial stability in the post-crisis environment, and the perception that risk may be "imported" through the interconnected global system, may lead to extraterritorial effects, especially where international standards are not yet settled.

But, in some cases, the problem seems to be in part one of timing, perhaps more than substance. The US agencies proposed Single Counterparty Credit Limits (SCCLs)[5] a few months ahead of the Basel Committee on Banking Supervision (BCBS) was to begin consideration of large-exposures standards.[6] This anticipation of the international standard may reflect local concerns, but the substance of large-exposures limitations is the same for all firms everywhere so, taking a step back, there is no very obvious reason why the compliance problems and level playing field issues created by different standards in one country could not be avoided. Even if, as indicated in the US proposed enhanced prudential standards for foreign banking organisations,[7] the United States may amend the proposed SCCL rules when BCBS comes up

5 *Federal Reserve on enhanced prudential standards and early remediation requirements for covered companies (January 2012).*
6 *Stefan Ingves speech in Panama City (November 2012).*
7 *Federal Reserve System on foreign banking organizations and on foreign nonbank financial companies (December 2012).*

with international standards on large exposures, it would clearly have been preferable to have the international discussion develop a consensus first, rather than having one country go ahead, creating issues of intellectual, political and policy inertia that may complicate more than assist the debate.

3| Why is extraterritoriality a concern at present?

At the most general level, extraterritoriality is of concern because it disrupts the normal relationship of regulatory powers and transgresses sovereignty as generally understood. At a time when regulatory cooperation is more vital than ever, extraterritoriality is, in effect, the opposite of the agreed standards, regulatory recognition and cooperatively executed policies that are called for; it sows the seeds of complexity, distrust and conflict among regulatory and political authorities. At a time when the G20 has recognised the necessity of supporting a globalised economy, extraterritoriality not only acts contradictorily to regulatory cooperation but reverses globalisation in its best sense, easily sliding into regulatory protectionism. Thus, it operates against stability and undermines the potential to maximise economic growth on a reasonable and sound basis. It also reflects reluctance to rely on other regulators even when market standards are clearly converging.

For example, firms subject to direct supervision or oversight from parallel authorities in different countries for the same activities are likely to find inconsistent or conflicting directives, requests for data in incompatible formats or under varying definitions, and the danger of confusion or lower-quality compliance. The authorities, in turn, will find they are faced with a complex coordination problem if they are to avoid conflicts and misunderstandings because of likely incompatible requests.

Furthermore, whilst extraterritorial application of a specific regulation or extension of court jurisdiction is not necessarily the result of protectionism, there is a good chance, especially in the current environment, that extraterritorial reach will reflect protectionism, whether intentionally or not. For example, one very direct manifestation of extraterritoriality motivated by protectionism arises in situations in which the development of a hybrid or domestic regulation by Jurisdiction *X* creates competitive disadvantages for firms domiciled in Jurisdiction *X* (regardless of whether operating in the country of domicile or abroad). In this case, there may be a strong incentive for the *X* authority to seek to apply the measure extraterritorially in an attempt to re-level the playing field where other countries have not adopted the same policy. Draconian assertion of extraterritorial control may be emerging as the most evident (if unintended) form of protectionism, if it becomes no longer worth doing business in a country or even with its entities because of the complexities that result therefrom. The general reaction of non-US banks (including the several concerns expressed by institutional representatives and authorities of European Union, United Kingdom and Japan) to the first iteration of the Commodity Futures Trading Commission's (CFTC) stringent proposals for swaps regulation[8] led, for example, some of them to the conclusion that they would be better off simply avoiding US counterparties in covered transactions, being concerned about unnecessarily burdensome compliance and entity registration requirement.[9]

Despite the concerns about financial protectionism, also discussed at the G20 level since its first meeting in 2008, it remains important to stress that protectionism tends to have a significant negative impact on economic and financial recovery, with concrete risks of increasing the cost of financial services provided in a particular jurisdiction and reducing the potential for economic growth and job creation.

It is all too evident how extraterritorial regulation can create confusion and legal uncertainty, in terms of application of requirements, conduct of business rules and other specific rules that may or may not be required. Especially in this period of financial distress, it is critical that policy-makers and legislators find an agreed and common path through these difficulties, trying to avoid regulatory ambiguity and any possible unknown or unnecessarily burdensome consequences. If not, it will contribute to the growing danger – which runs contrary to the G20

8 *Proposed CFTC cross-border release on swap regulations (July 2012).*
9 *ISS-MAG – International Securities Services (2012).*

goal of a global market with global standards – of regulatory fragmentation: it contributes to the risk that countries may retreat into self-interest and regulatory arbitrage,[10] ultimately risking a reduction in the ability of regulators to regulate an increasingly globalised capital market.[11]

4| Over-the-counter derivatives market implementation and extraterritoriality

Extraterritoriality is increasingly intruding in many areas of financial regulation, potentially imposing costs on firms and creating distortions in the market if not checked. The examples are several and could include specific aspects of the proposed Volcker and Vickers rules, capital requirements, credit rating agency regulation, securitisation rules, trading-platform regulation, tax rules and resolution frameworks.

However, let us now particularly focus on the OTC derivatives markets, the global and cross-border nature of which makes consistent regulation particularly important.

At the September 2009 G20 meeting in Pittsburgh, the overarching global goal was clearly stated: *"All standardised OTC derivative contracts should be traded on exchanges or electronic trading platforms, where appropriate, and cleared through central counterparties by end-2012 at the latest. OTC derivative contracts should be reported to trade repositories."*[12] Global bodies including the FSB, the BCBS and the International Organization of Securities Commissions (IOSCO) have been therefore working to implement changes recommended by the G20 policy statement. However, national regulators have often sought to fine-tune global standards to suit their local financial systems or to make their own interpretations without consultation of the best way to carry out the G20 mandate. The result is that what is now emerging from national supervisors goes well beyond the agreed mandate, or any actual needs arising from local specificities, to the extent the various regulations are dangerously inconsistent in certain areas.

As indicated by the FSB's fourth progress report on implementation of OTC derivatives reforms, market infrastructure is in place and can be scaled up, but *"regulatory uncertainty remains the most significant impediment"* to further progress.[13]

The CFTC, the Securities and Exchange Commission (SEC) and prudential regulators in the United States have made significant progress on the detailed rules to implement the OTC derivatives regulations and clearing reforms contained in the Dodd-Frank Wall Street Reform and Consumer Protection Act, while in Europe, the main legislation is the European Market Infrastructure Regulation (EMIR), supported by further reforms in the Markets in Financial Instruments Directive and the Capital Requirements Directive 4.

When it comes to extraterritoriality, US and EU regulators want to ensure the same things: that domestic markets do not face "risk contagion" by engaging with less strictly regulated "foreign" counterparties; and that domestic institutions do not lose business to foreign entities that face a less onerous regulatory framework.[14]

Despite the fact that the proposed new regulations are in response to the same G20 mandate, the current state of the OTC framework underlines the risk of market fragmentation if new rules are not implemented in a harmonised way. At the moment, while uncertainties remain about details and definitions, the two major concerns of market participants are that the clearing, collateral, transparency and territorial obligations involved in the reform are not only likely to have highly negative market effects, but that there may well be two major, strict, but inconsistent bodies of regulation, each having extraterritorial effects not obviated by the other. As to the first concern, some commentators have argued that, especially for end-users of OTC derivatives,

10 The Economist *(April 21, 2012).*
11 *ICSA (May 2012).*
12 *G20 leaders Statement: The Pittsburgh Summit (September 2009).*
13 *FSB, OTC derivatives market reforms – Fourth progress report (October 2012).*
14 *David Felsenthal (January 2012).*

the current configuration of the proposed reforms could impair market liquidity, increase the cost of instruments, and negatively impact cash flow planning, which will increase the cost of, and act as a constraint on, hedging activities. Moreover, there is growing concern that the requirements to clear OTC derivatives through central counterparties (CCPs) will concentrate risks in the system in ways that will create a new sort of systemic risk, while mitigating bilateral risks. This issue is recognised by the public sector, but it is not clear how it will ultimately be resolved. While the narrower effect on day-to-day transactions may be relatively easy to foresee, the wider market impact will take time to evolve.[15] Whatever the eventual solutions to these substantive problems may be, authorities must address and resolve the second issue, *viz.* the very troubling conflict of extraterritorial regulations intended to regulate a global market in accordance with the G20's intent. To the extent the substantive concerns remain open after arrangements are finalised, conflicting extraterritorial effects between systems would only compound them. As it stands, the US regulations would require all swap dealers and security-based swap dealers to register with the CFTC and SEC and open up entire non-US entities to US regulation on margin and other requirements that they are already subject to by their home country regulators, while the EU regulations imply that institutions in non-EU countries may be pressured to comply with EMIR despite trading solely with non-EU entities.[16]

A recent joint statement by leaders of authorities with responsibility for regulation of OTC derivatives shows a good-will desire to overcome the obstacles to international consistency that the proposed global OTC derivatives regulation has encountered, but is only very tentative about the prospects of solving them, stressing local concerns rather than the need for an integrated, consistent international regime free of extraterritoriality and conflicts, and recognising the need to not unduly interfere with cross-border transactions.[17] It recognises that conflicting or inconsistent cross-border application of rules may inhibit attainment of G20 goals or impose undue burdens, and the need to prevent the application of conflicting rules. It calls for an effort to address conflicts, inconsistencies, and duplicative rules, including standards to assess whether national regimes achieve particular outcomes in order to facilitate mutual recognition or substituted compliance by the different authorities (see the further discussion below), in order to overcome conflicting or inconsistent requirements. This is positive as far as it goes, but still represents an expectation to remain in a mode of exploration and consultation for some time to come, with caveats and hesitations about the prospects of overcoming the many obstacles that are identified. More ambition is therefore required.

However, it is valuable to underline some encouraging developments. A recent statement[18] by its Chairman before the US House Financial Services Subcommittee on Capital Markets and Government Sponsored Enterprises would suggest that the CFTC is moderating the stance of its original proposals that substituted compliance by any firm would have to be based on a rule-by-rule assessment of the regimes of other jurisdictions applicable to it, and likely moving toward a policy of permitting broader substituted compliance. Following his testimony, the CFTC approved (on December 21, 2012) an exemptive order[19] that provides time-limited relief and phased compliance (until July 12, 2013) for foreign swap dealers with respect to the swaps provisions of the Dodd-Frank Act. It also provides simplifications that, if maintained, would reduce the number of non US entities required to register, and some relief from transaction-level regulation. Most importantly, the relief period provides time for the CFTC to work with foreign regulators as they implement comparable requirements and as the CFTC develops a substituted compliance programme. The purpose of the order is to foster an orderly phase in to the

15 *David Felsenthal (January 2012).*
16 *EMIR (2012), Article 4 (1.(v)): Counterparties should clear all OTC derivatives contracts if those contracts have been concluded* "between two entities established in one or more third countries that would be subject to the clearing obligation if they were established in the Union, provided that the contract has a direct, substantial and foreseeable effect within the Union or where such an obligation is necessary or appropriate to prevent the evasion of any provisions of this Regulation". *However, it is not clear how this process is going to work out in practice or how the interaction with other authorities, especially the United States, will work.*
17 *Joint press statement of leaders on operating principles and areas of exploration in the regulation of the cross-border OTC derivatives market, available at the website of the US CFTC (December 2012).*
18 "For firms that do register with the CFTC, we are very committed to allowing for substituted compliance or permitting market participants to comply with Dodd-Frank Act through complying with comparable and comprehensive foreign regulatory requirements." *CFTC Chairman Gensler testimony (December 12, 2012).*
19 *CFTC final exemptive order regarding compliance with certain swap regulations (December 2012).*

new swaps regulatory regime and to provide market participants greater certainty regarding their obligations with respect to cross-border swap activities. Also encouraging in this connection are the statements of the European Securities and Markets Authority (ESMA) about its commitment to joint action and mutual understanding among the regulators, such as ESMA and the CFTC, that are tasked with implementing legislation mandated by G20 commitments on derivatives.[20] Successful completion of transatlantic coordination in this spirit should go a long way toward removing the extraterritoriality concerns that have plagued this important part of the G20 program.

5| Ways to mitigate the dangers of extraterritoriality

While it is unlikely that governments would ever give up the right to enact legislation with extraterritorial effects, the growing complexity and intensity of post-crisis regulation has made the issue all the more significant. Means can and should be developed to allow rules to operate across borders without unduly restricting cross-border activity and flows of funds or creating unnecessary compliance and enforcement complexities.

In particular the FSB, as a part of its general financial-stability remit, should encourage member countries to be more active in considering issues of extraterritoriality in advance of finalising legislation or regulation and to mitigate such effects. Multilateral institutions and fora such as the FSB, the BCBS and the Committee on Payment and Settlement Systems (CPSS), the International Association of Insurance Supervisors (IAIS), IOSCO and the OTC Derivatives Regulators' Forum, the Financial Action Task Force, and the Organisation for Economic Cooperation and Development (OECD) have a key role to play in helping create a harmonised framework to support cross-border activity as well as providing guidance as to when it is critical to have consistent implementation of G20 principles and when the detail of that implementation is less important for systemic-risk mitigation.

A conscious approach to managing down the problems caused by extraterritoriality could be developed along the following lines:

- **A commitment to limit the use of hybrid and domestic solutions to instances where there are genuine jurisdiction-specific issues to be addressed.** A comprehensive approach to global solutions as envisioned by the G20 program would minimise the use of bespoke licensing or transactional solutions based on disparate views of the nature of a problem (e.g., overcoming technical differences in OTC derivatives or securitisation regulation; conforming large-exposures rules to standards that will be determined by the BCBS), confining measures deviating from the international standard to instances where markets and market structures clearly warrant differentiated approaches. When, for example, a jurisdiction has decided to insulate retail banking from proprietary trading and market making as an important domestic policy, it could still consult through the FSB on ways to implement its rules while minimising disruption of other markets.

- **Aim for effective global standards and coordination.** For issues and markets that are truly global in nature, global standard setters are best placed to identify and agree on policy responses that will be effective – obviating the need for hybrid and domestic solutions which carry scope for extraterritorial applications.

The development of truly global solutions requires agreement regarding the problem to be solved (e.g., market failures, regulatory gaps), consensus on the appropriate regulatory response and consistent implementation. Despite various challenges arising from conflicting extraterritorial effects of domestic laws not contemplated in the standards, the FSB's Standing Committee on Standards Implementation has been playing an important role in regulatory convergence on issues of systemic importance. As stated in the FSB Charter,[21] the Committee has been working proactively to *"ensure comprehensive and rigorous implementation monitoring of international financial standards, agreed G20 and FSB commitments"*, to promote the useful process of

20 *ESMA Chairman Maijoor, Written Statement (December 13, 2012).*
21 *Charter of the Financial Stability Board, Article 16.*

"peer reviews amongst its members" and indeed trying to *"encourage global adherence to prudential regulatory and supervisory standards"*.

For global standards to be developed in a way that avoids issuing overly general international principles for the sake of agreement, compounding the risk of fragmentation at the domestic level, the G20 should assure that international standard setters and regulators are given time, adequate staff and resources to establish high-quality standards that fully meet the needs of developed markets.

Confidence in the quality of regulation in other countries and the level of cooperation among regulators might induce jurisdictions to return to the pre-crisis norm of generally limiting such legislation to activities within a country's own bounds, and cut back the recent tendency to be expansive because of systemic concerns or alleged dangers of importing risk.

• **G20 member governments should agree to consult** with the FSB and with each other on new regulatory measures with cross-border effects before passage of legislation or beginning the administrative implementation process; while the sovereignty of national legislators should certainly not be compromised, an agreement among executive branches to vet proposals before beginning the legislative process could head off unnecessary conflicts.

• **Work toward mutual recognition or substituted compliance.** Where global standards exist, mutual recognition among regulators would greatly increase regulatory effectiveness and efficiency – the concept of which is for example indicated in the EMIR with reference to the recognition of third-country infrastructures such as CCPs or Trade Repositories[22] – especially given the increase of complexity of regulations affecting cross-border transactions and firms (the US CFTC's recognition of this issue is discussed below). It is equally important that, where a common, cross-jurisdiction issue is identified but there is no global standard, policy makers work toward mutual recognition of local (hybrid or domestic) standards.

Another way of expressing the concepts of mutual recognition is through the concept of *substituted compliance* – as introduced via thoughtful law-journal articles and applied for the first time explicitly in the CFTC interpretive guidance on cross-border application of certain swaps provisions[23] – so that a foreign entity may comply as to certain entity level requirements with its home country rules provided those are comparably robust.

Either version would have to be based on acceptance that, while specific regulations may differ, regulators can have confidence in one another's regimes to achieve broadly comparable outcomes. Such confidence may not always exist in the aftermath of the crisis, but rebuilding it should be a priority of the G20 and the FSB. Too often discussions of consistency of interpretation or enforcement bog down in defeatism about what can be achieved, or excessive focus on exact congruence of details. Priority attention by the international instances such as the Basel Committee, IOSCO, IAIS and (for tax) the OECD to consistency of implementation and interpretation could achieve much, but the effort is only beginning.

Mutual recognition or substituted compliance can bring great benefits to regulators and to firms, by reducing the inefficiencies created by technical differences across jurisdictions, by sparing regulators the costs and legal issues of enforcing regulations across borders, and by reducing compliance costs, risks and conflicts. However, care must be taken that mutual recognition or substituted compliance is not perceived to depend upon the direct equivalence, clause by clause, of the foreign *regulations* to be recognised; rather it should be judged in terms of consistency of goals and comparability of *outcomes*.[24]

22 *EMIR (2012), Articles 25 and 77.*
23 *Tafara and Peterson (2007).*
24 *The problems that arise from assuming that the only alternatives are literal equivalence or extraterritorial interference with other jurisdictions are amply illustrated by a recent speech by Governor Daniel Tarullo, "Regulation of Foreign Banking Organizations", (November, 27 2012). Partly motivated by concerns that the US's long-standing reliance on foreign regulators to assure adequate capitalization of foreign banks active in the United States, Governor Tarullo proposed a retreat to a more territorial approach, clearly at odds with the G20 mandate to consistent global regulation, expressed in particular for purposes of resolution by the FSB in its Key Attributes of Effective Resolution Regimes for Financial Institutions (October 2011). Fear of extraterritoriality or of the inadequacy of foreign regulation should not prompt jurisdictions to exacerbate regulatory fragmentation by pulling up the drawbridges. Rather, the solution is to establish clear, reliable international standards, enforced with the broad consistency envisioned by the G20 and the FSB peer review processes. The means to achieve a reliable international regime for resolution have been discussed at length by the Institute of International Finance (IIF) in its report, Making resolution robust – Completing the legal and institutional frameworks for effective cross-border resolution of financial institutions (June 2012).*

The ability of Jurisdiction *X* either to determine equivalence or to enter into mutual recognition or substituted compliance arrangements with third countries will have a material impact on the ability of cross-border financial services activity to continue to play its important role in the global economy in the post-financial crisis era.[25]

Requiring highly literal, provision-by-provision "equivalence" determinations can paradoxically increase rather than decrease extraterritorial effects, and, at worst, lead to an "extraterritorial arms race" among jurisdictions.

The effective use of supervisory colleges could serve as a valuable tool in advancing the objective of mutual recognition. While colleges are functioning in some contexts, by all accounts they have a long way to go to deliver the kind of seamless and effective cross-border supervision that is needed. The need for better coordination is a widely agreed "lesson learned" of the crisis, yet diverging forces of national interest and jurisdiction seem to be pulling against the potential for improvement.

Another valuable option would to be to enhance cooperative structures such as IOSCO's Multilateral Memorandum of Understanding (MMOU), which standardises the process by which securities commissions who are members of IOSCO can obtain information from other member securities commissions for enforcement purposes. A step forward could be developing this model for international regulatory convergence, so that regulators would feel they have access to and share information in the context of cross-border transactions, taking steps for example as freezing assets, producing documents, etc., beyond the powers currently envisaged by the MMOU.

• **Modernise and reaffirm basic principles.** The concepts of international comity and of national treatment of foreign firms have deep roots in both international and local law. Similarly, the principle that a given jurisdiction should in general only regulate, restrict, or punish conduct directly occurring within or affecting its markets has long standing and has recently been reaffirmed in national law.

However, these long-standing principles may need to be rethought and reaffirmed in the post-crisis world, in the light of a global financial system transcending national boundaries.

These concepts, perhaps in somewhat modernised forms, can, in conjunction with the mutual respect and deference that goes under the heading of "mutual recognition" or "substituted compliance", form the basis for principles of regulation and supervision that would backstop the G20 principles, achieving broad regulatory goals while avoiding conflicts, inefficiencies and duplications. The US Executive Order *"Promoting International Regulatory Cooperation"*[26] suggests a more harmonised path on international regulations in other sectors: such approach should be extended in the area of financial sector regulations as well.

• **Medium term: need for a comprehensive solution.** The promotion and development of specific treaties for converged regulation across the major markets (for example, roughly analogous to the World Trade Organisation structure) could ensure consistent and rigorous implementation of agreed standards and could represent an essential tool for an effective and functional cooperation. With such a framework in place, there would be much less need for extraterritorial application of domestic law to prevent any potential risk of contagion. Proposing a Convention[27] or establishing a clearly defined International Cooperation Accord[28] to be signed by the authorities in different jurisdictions could therefore facilitate effective coordination among regulators and define suitable mechanisms to resolve potential extraterritorial conflicts. While there has been resistance in the official sector to such ideas, despite the need not to waste the opportunities and insights created by the crisis, there is a good case for approaching the definitive and reliable solutions that such agreements would create, rather than attempting to rely on goodwill cooperation to solve the problems of national regulation in a globalised economy. These arguments become all the more compelling if a longer time horizon is taken, looking perhaps 15-20 years out, when, as the Secretary General of IOSCO has recently argued, there are likely to be several more major financial centers of

25 *Ng (May 2012).*
26 *White House Executive Order (May 2012).*
27 *IIF,* Making resolution robust *report (June 2012).*
28 *IIF response to BCBS consultation on Domestic SIB (August 2012). The topic of promoting an international cooperation agreement has also been discussed in several international fora.*

international stature and therefore the complexities of voluntary cooperation become all the greater.[29]

6| Conclusions

When the G20 gathered in Washington (2008) and London (2009), the world was facing a deep financial crisis which threatened to turn into a global depression. Facing such severe economic conditions, joint efforts were implemented in order permanently to enhance the resilience of the global system. With signs of recovery in some places and ongoing difficulties in others, the focus has started shifting toward domestic interests. As national regulators assert their authority over international finance, conflicts and inefficiencies can arise in all sorts of areas,[30] which is why the G20 goal of global standards is so important.

Therefore adequately strengthening and promoting international coordination on financial regulation is of the essence in order to prevent regulatory arbitrage, to avoid ring-fencing and other distortions and fragmentation, to ensure a level playing field among market participants, and, of course, to avoid delaying appropriate and timely implementation of G20 objectives.

In the area of OTC derivatives, it is true that jurisdictions have been attempting, both bilaterally and multilaterally, to identify cross border issues. Despite encouraging developments at the end of 2012, progress to date in such discussion has been slow. At this writing, the critical issue is whether the CFTC, ESMA and other international authorities will find common ground for the implementation of the G20 derivatives proposals such that the disturbing extraterritoriality of the CFTC's original proposals, which is now partially held in abeyance by temporary regulations, can be avoided.

In light of the growing international concern about extraterritoriality, the FSB, as the guardian of global standard setting, should act to foster more international coordination to minimise extraterritorial application of national rules. Given its current mandate to achieve harmonious regulation of international markets in order to support global economic growth, the actions suggested above could, without abridging national sovereignty in any essential way, mitigate the downside effects of extraterritoriality by the suite of actions suggested in this article.

The FSB should also take upon itself to pursue the bolder but ultimately more effective option of pursuing the ideas set forth in the last bullet of section 5 above and the ideas proposed by the Secretary General of IOSCO. These ideas are challenging and will require much debate but, taking a longer view, there is a strong case to be made that ultimately an international convention will be the cleanest, most effective way of achieving the regulatory goals of the G20, especially as additional financial centers develop their full potential.

The FSB should convene a global and multilateral colloquium of public and private sector leaders (standard setters, industry and other stakeholders) from a broad range of jurisdictions to discuss the dimension of the issue and promote the development of guidelines that would help limit its extent, underlining for example the importance of mutual recognition (or "substituted compliance") and how markets should decide when and how to implement this approach.

It would also help if the FSB were to publish a regular status report on extraterritoriality and its impact, which would shine a public spotlight on emerging issues with the same type of moral force that exists in capital and other regulatory areas,[31] and would be incremental to its overall peer-review programme and assist with the ongoing task of promoting financial stability.

Last but not least, the private-sector associations – IIF included – could undertake periodic assessment of national developments to bring to the attention of the FSB issues of emerging concern vis à vis extraterritoriality.

The G20 and FSB already have a daunting agenda; however, adding attention to extraterritoriality to their specific areas of concern will advance the overall programme and, most likely, facilitate their overall task of constant analysis of the international financial system by assuring focus on centrifugal forces undermining their agenda.

29 *David Wright, IOSCO Secretary General remarks at the Atlantic Council, page 10 (2012).*
30 The Economist, *cit. 11.*
31 *An example could be the Australian draft legislation in relation to OTC derivatives. The document highlights the pressure being placed on jurisdictions by the United States and European Union to implement equivalent legislation.*

References

Commodity Futures Trading Commission (CFTC) (2012)
"Proposed interpretative guidance on cross-border application of the swaps provisions of the Dodd-Frank Act", Federal Register, Vol. 77, No. 134, July.

Commodity Futures Trading Commission (2012)
"Joint press statement of leaders on operating principles and areas of exploration in the regulation of the cross-border OTC derivatives market", Press release: PR6439-12, December 4.

Commodity Futures Trading Commission (2012)
"Final exemptive order regarding compliance with certain swap regulations", Press release: PR6478-12, December 21, *http://www.cftc.gov/PressRoom/PressReleases/pr6478-12.*

Directorate General for External Policies of the Union (Direct. B, Policy Dept.) (2012)
"The extraterritorial effects of legislation and policies in the EU and US", EXPO/B/DEVE/FWC/2009-01/Lot3/03, May.

Dodd-Frank Wall Street Reform and Consumer Protection Act (2010)
Section 719(c) requiring the Commodity Futures Trading Commission (CFTC) and the Securities and Exchange Commission (SEC and, together with the CFTC, the Commissions) jointly to study and then report to Congress on swap regulation and clearinghouse regulation in the United States, *http://www.sec.gov/rules/other/2011/34-64926.pdf.*

European Market Infrastructure Regulation (EMIR) (2012)
Regulation (EU) of the European Parliament and of the Council on OTC derivatives, central counterparties and trade repositories, No. 648/2012, *Official Journal of the European Union*, July 4, *http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:201:0001:0059:EN:PDF.*

Federal Reserve System (2012)
"Enhanced prudential standards and early remediation requirements for covered companies", Proposed Rule, Federal Register, Vol. 77, No. 3, January 5.

Federal Reserve System (2012)
"Enhanced prudential standards and early remediation requirements for foreign banking organizations and foreign non-bank financial companies", Regulation YY; Docket, No. 1438, December 14.

Felsenthal (D.) (2011-2012)
"What's over the horizon for OTC derivatives?", Clifford Chance publications, December 20, & The Harvard Law School Forum on corporate governance and financial regulation, January 14.

Financial Stability Board (FSB) (2011)
"Key attributes of effective resolution regimes for financial institutions", October, *http://www.financialstabilityboard.org/publications/r_111104cc.pdf.*

Financial Stability Board (2012a)
"Charter of the Financial Stability Board", Article 16 – Standing Committee on Standards Implementation (SCSI), June, *http://www.financialstabilityboard.org/publications/r_120809.pdf.*

Financial Stability Board (2012b)
"OTC derivatives market reforms", Fourth progress report, October, *https://www.financialstabilityboard.org/publications/r_121031a.pdf.*

G20 Information Center (2009)
"G20 leaders statement: The Pittsburgh summit", strengthening the international financial regulatory system – improving over-the-counter derivatives markets, September 24-25, *http://www.g20.utoronto.ca/2009/2009communique0925.html.*

Gensler (G.) (2012)
"Testimony form the CFTC Chairman before the US House Financial Services Subcommittee on capital markets and government sponsored enterprises", Washington DC, December 12, *http://www.cftc.gov/PressRoom/SpeechesTestimony/opagensler-129.*

Greene (E. F.) and Boehm (J. L.) (2012)
"The limits of 'name-and-shame' in international financial regulation", *Cornell Law Review*, Vol. 97:1083.

Greene (E. F.) and Pothia (I.) (2012)
"Examining the extraterritorial reach of Dodd-Frank's Volcker Rule and margin rules for uncleared swaps – a call for regulatory coordination and cooperation", *Capital Markets Law Journal*, Vol. 7, No. 3, pp. 271.

Ingves (S.) (2012)
"Current focus of the Basel Committee: raising the bar", Speech at the 7th High-Level Meeting jointly organised by the Association of Supervisors of Banks of the America, the Basel Committee on Banking Supervision

and the Financial Stability Institute, Panama City, November 15, *http://www.bis.org/speeches/sp121115.pdf*.

Institute of International Finance (IIF) (2012)
"IIF market monitoring group", Press release, November 29, *http://www.iif.com/press/press+400.php*.

Institute of International Finance (2012)
"Making resolution robust – completing the legal and institutional frameworks for effective cross-border resolution of financial institutions", June 7, *http://www.iif.com/press/press+259.php*.

Institute of International Finance (2012)
Response to the BCBS consultative document: "A framework for dealing with domestic systemically important banks", August 1.

International Council of Securities Associations (ICSA) (2012)
"Importance of multilateral global coordination", Letter to FSB, May 23, *http://www.icsa.bz/img/letter_pdf/ICSA-Letter-Mutual-Recognition.pdf*.

ISS-MAG (2012)
"Foreign banks to CFTC: don't bother us with US swaps regs", *http://www.iss-mag.com/regulations-and-compliance/foreign-banks-to-cftc-dont-bother-us-with-us-sw*.

Lee (A.) (2012)
"US must see other countries have laws too", *The Financial Times*, Opinion, December 27, *http://www.ft.com/intl/cms/s/0/64660dc4-4b89-11e2-887b-00144feab49a.html*.

Maijoor (S.) (2012)
"Written statement from the chair of the European Securities and Marks Authority (ESMA) to the Agriculture Committee of the US House of Representatives on the Dodd-Frank derivatives reform and the challenges facing US and international markets", December 13, *http://www.esma.europa.eu/system/files/2012-824.pdf*.

Ng (L.) (2012)
"Third country's issues in current EU financial services regulation", *Butterworth's Journal of International Banking and Financial Law*, May.

Shearman & Sterling LLP (2012)
"OTC derivatives regulation and extraterritoriality II", Memorandum, Financial Institutions Advisory & Financial Regulatory, September 5.

Supreme Court of the United States (2010)
Morrison *et al.* versus National Australian Bank Ltd *et al.*, 130 S. Ct. 2869, *http://www.supremecourt.gov/opinions/09pdf/08-1191.pdf*.

Tafara (E.) and Peterson (R. J.) (2012)
"A blueprint for cross-border access to US investors: a new international framework", *48 Harv. Int'l L.J. 31* (2007) and *Federal Register*, Vol. 77, No. 134, Thursday, July 12, 2012, 41214, 17 CFR Part 1, (CFTC Proposed Rules).

Tarullo (D.) (2012)
"Regulation of Foreign Banking Organizations", Speech, Yale School of Management Leaders Forum, November 28, *http://www.federalreserve.gov/newsevents/speech/tarullo20121128a.pdf*.

The Economist (2012)
"Reshaping banking: the retreat from everywhere", Briefing, April 21
http://www.economist.com/node/21553015.

The Treasury, Government of Australia (2012)
Corporations Legislation Amendment (Derivatives Transactions) Bill 2012, paragraph 1.15/1.16, *http://www.treasury.gov.au/ConsultationsandReviews/Submissions/2012/Derivative-Transactions*.

The White House, Office of the Press Secretary (2012)
"Promoting international regulatory cooperation", Executive order, May 1, *http://cdn.govexec.com/media/gbc/docs/pdfs_edit/050112cc1.pdf*.

Wright (D.) (2012)
Remarks of the Secretary General of IOSCO at The Atlantic Council, Washington DC, December 10, *http://www.iosco.org/library/speeches/pdf/20121210-Wright-David.pdf*.

International swaps market reform
Promoting transparency and lowering risk

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In 2010, the US Congress passed the historic Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank Act). The CFTC is more than 80 percent complete with Dodd-Frank Act swaps market reform rulewriting, and now the marketplace is increasingly shifting to implementation of common-sense rules of the road.

Swaps market reform is about ensuring the vast derivatives marketplace serves the rest of the economy. In the aftermath of the 2008 global financial crisis, the G20 leaders agreed that it was time to bring transparency and oversight to the opaque swaps market. Since then, there has been significant global progress on reform. We continue to work in a coordinated way to implement the critical reforms agreed to in the aftermath of the global financial crisis. Regulators around the globe are making great progress, but we all must complete the task to bring transparency to these markets and protect the public.

I want to thank the Banque de France, Governor Christian Noyer, and First Deputy Governor Anne Le Lorier for asking me for my thoughts on finance and our global efforts to bring reform to the over-the-counter (OTC) derivatives markets. I'm honored to be writing for a French publication. Though I don't speak the language, two of my three daughters are fluent, and we look forward to reading the *Financial Stability Review*.

The role of finance and financial markets is to ensure that finance serves the rest of the economy. It does so by allocating and pricing the savings and investments of the public and helping businesses grow and manage their risks. It is to allow the public unfettered access to markets and information and to establish prices transparently and free of fraud and manipulation.

As the financial system failed in 2008, the swaps market, which was basically not regulated in the United States, Europe, Canada or Asia, failed to meet these objectives. The 2008 global financial crisis caused great damage. It affected millions of bystanders far and wide. Eight million American jobs were lost, and families across Europe are still struggling with the ongoing debt crisis.

Since the swaps market emerged in the 1980s, it has operated without the basic transparency and common-sense rules of the road that Americans have benefitted from since the 1930s. In the aftermath of the Great Depression, President Roosevelt and Congress put in place securities and futures market reforms. Those historic reforms established a foundation of transparency, competition and market integrity for the futures and securities markets. This democratisation of financial markets has led to many decades of US economic growth and innovation.

The Commodity Futures Trading Commission (CFTC) is one of two US market regulators. Futures have traded in the United States since the Civil War, when farmers and grain merchants came together and created a new type of marketplace. It was not until sixty years later that the Congress first passed legislation to regulate these markets. Our predecessor was set up in the 1930s to oversee the commodities market and related futures market. Initially, the futures market was where farmers, ranchers and producers sought to lock in the price of corn, wheat and other commodities at harvest time and manage their risk. By the 1970s, the CFTC's mission expanded to cover futures on other markets. This included metals, such as gold and silver, and energy markets for oil and natural gas. It also includes financial derivatives for interest rates and the stock market.

The derivatives markets, both the futures and swaps markets, allow companies to manage their risk through a derivatives contract, allowing them to focus on servicing customers, producing products, innovating and investing in the economy. With financial reform, the CFTC now oversees both the futures and swaps markets. These markets are vast. Together, the notional value of the US markets is more than USD 300 trillion – or more than USD 20 of derivatives for every dollar of goods and services produced in the US economy.

1| New international consensus to reform the swaps market

In 2009, a new international consensus was formed when the G20 leaders met in Pittsburgh. The leaders agreed the previously unregulated swaps market should be brought into the light through transparency and oversight by the end of 2012. Specifically, the agreement said: "*All standardised OTC derivative contracts should be traded on exchanges or electronic trading platforms, where appropriate, and cleared through central counterparties by end-2012 at the latest. OTC derivative contracts should be reported to trade repositories. Non-centrally cleared contracts should be subject to higher capital requirements.*"

Since the 2009 meeting in Pittsburgh, each of the major market jurisdictions has been coordinating on implementing reforms to achieve these goals. Given our different cultures, political systems and legislative mandates, some differences are inevitable, but we have made great progress internationally on an aligned approach to legislation and now to implementation of reform.

The CFTC has consistently engaged with our international counterparts through bilateral and multilateral discussions to promote robust and consistent swaps market reform. We have worked with numerous authorities in Europe, including the European Securities and Markets Authority (ESMA), the Banque de France, the Autorité des marchés financiers (French Financial Market Authority), the European Commission, as well as with financial regulators in Asia and Canada. The CFTC also is participating in

and working closely with international standard setting bodies to develop and implement international standards for the swaps market.

The United States, Europe, Japan, Singapore, Australia, and the largest provinces in Canada have all made substantial legislative progress on reform.

In 2010, the US Congress passed the historic Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank Act). The law gave the CFTC oversight of the swaps marketplace, in addition to the futures market the agency has traditionally overseen. The law also gave the Securities and Exchange Commission (SEC) oversight of the security-based swaps market.

The CFTC is more than 80 percent complete with Dodd-Frank Act swaps market reform rulewriting, and now the marketplace is increasingly shifting to implementation of common-sense rules of the road.

For the first time, the public is benefiting from seeing the price and volume of each swap transaction. This post-trade transparency builds upon what has worked for decades in the futures and securities markets. The new swaps market information is available free of charge on a website, like a modern-day ticker tape.

For the first time, the public is benefitting from the greater access to the markets and the risk reduction that comes with central clearing.

For the first time, the public is benefitting from regulation of swap dealers. As of early March 2013, seventy-three swap dealers had registered. They are subject to standards for sales practices, recordkeeping and business conduct to help lower risk to the economy and protect the public from fraud and manipulation. Two major swap participants also had registered.

2| Transparency – lowering cost and increasing liquidity, efficiency, competition

The US transparency reforms of the 1930s have increased liquidity and competition in the securities and futures markets for decades. Such transparency – both pre- and post-trade – levels the playing field by giving all market participants access to critical pricing and transaction information.

The swaps market, however, prior to the passage of the Dodd-Frank Act, has not benefited from such transparency and competition. In fact, prior to reform, the swaps market has been the world's largest dark market.

With the passage of financial reform and the CFTC's completed rules, light is now being brought to these markets. Since December 31, 2012, provisionally registered swap dealers have been reporting in real time their interest rate and credit index swap transactions to the public and to regulators through swap data repositories. These are some of the same products that were at the center of the 2008 global financial crisis. Starting February 28, swap dealers began reporting swaps transactions in equity, foreign exchange and other commodity asset classes. Other market participants began reporting this month.

With these transparency reforms, the public and regulators now have their first full window into the swaps marketplace post-trade, a fundamental shift for the markets.

Reform will not be completed, though, unless the public also gets the benefit of transparency prior to the transaction. The Dodd-Frank Act mandated that standardised swaps (those required to be cleared and made available for trading) be traded on traditional exchanges or a new trading platform, called swap execution facility (SEF). SEFs will allow multiple market participants to view the prices of multiple available bids and offers, which will build on the democratisation of the swaps market that comes with the clearing of standardised swaps. The multilateral platform approach (what we call many to many) in the United States supports greater transparency for market participants.

The European and Japanese transparency reforms, as well as initiatives well underway in other jurisdictions – when fully implemented – will further align international reform efforts to bring transparency to the swaps market. The European Union has completed regulatory reporting under European Market Infrastructure Regulation (EMIR), which went into force in March. Further, Europe is considering pre- and post-trade public transparency through Markets in Financial Instruments Directive (MiFID 2) and Markets in Financial Instruments Regulation (MiFIR).

I look forward to Europe implementing such public transparency reforms, including multilateral trading platforms. It is important that we align internationally to bring transparency to the public seeking to hedge risk or invest.

Japanese transparency reforms require the reporting of certain classes of OTC derivatives, including interest rate, foreign exchange, equity and credit derivatives transactions.

3| Clearing – lowering risk and democratising the market

Clearinghouses have lowered risk for the public and fostered competition in the futures market since the late 19th century. Clearinghouses act as middlemen between two parties to a transaction, guaranteeing the obligations of both parties. Clearing has democratised the market by fostering access for farmers, ranchers, merchants, and other participants.

As of last month, the vast majority of interest rate and credit default index swaps are being brought into central clearing. Swap dealers and the largest hedge funds were the first to be required to clear. Compliance is being phased in for other market participants through this year.

Other jurisdictions also have made significant progress in fulfilling the G20 commitment to bring swaps into central clearing. Japan completed a clearing requirement in November 2012. Under EMIR, Europe soon will move to a clearing requirement as well. We understand that ESMA will be considering such matters this year. When completed, three major jurisdictions – Europe, Japan and the United States – will have a clearing requirement in place.

4| Swap dealer oversight – promoting market integrity and lowering risk

The US Congress included comprehensive oversight and registration of swap dealers as a foundational piece of the Dodd-Frank Act. It did so to promote market integrity and lower risk to taxpayers and the rest of the economy. The US Congress wanted end-users to continue benefitting from customised swaps (those not brought into central clearing) while being protected through the express oversight of swap dealers. In addition, the Dodd-Frank Act extended the CFTC's existing oversight of previously regulated intermediaries to cover their swaps activity.

The initial group of seventy-three provisionally registered swap dealers includes the largest domestic and international financial institutions dealing in swaps with US persons. Of the thirty non-US entities, five are French. It includes the sixteen institutions commonly referred to as the G16 dealers. Other entities are expected to register over the course of 2013 once they exceed the *de minimis* threshold for swap dealing activity.

In addition to reporting their trades with US persons to both regulators and the public, swap dealers will implement crucial back office standards that lower risk and increase market integrity. These include promoting the timely confirmation of trades and documentation of the trading relationship. Swap dealers also will be required to implement sales practice standards that prohibit fraud, treat customers fairly and improve transparency. These reforms will be phased in this year.

The CFTC is collaborating closely domestically and internationally on a global approach to margin requirements for uncleared swaps. We are working along with the Federal Reserve, the other US banking regulators, the SEC and our international counterparts on a final set of standards to be published by the Basel Committee on Banking Supervision (BCBS) and the International Organization of Securities Commissions (IOSCO). The CFTC's proposed margin rules excluded non-financial end-users from margin requirements for uncleared swaps. We have been working with global regulators for a consistent approach with regard to margin for uncleared swaps, and more specifically, for end-users. I would anticipate that the CFTC, in consultation with European regulators, would take up final margin rules, as well as related rules on capital, in the second half of this year.

Although no other country has a specific swap dealer registration regime, within EMIR, there are many requirements for risk mitigation similar to those that apply to swap dealers under the Dodd-Frank Act.

5| International coordination on swaps market reform

As the CFTC and the international regulatory community move forward on bringing reform to the swaps market, we all recognise that risk has no geographic boundary. Money can move in and out of markets and jurisdictions with the click of a mouse. Risk from the US housing and financial crisis contributed to economic downturns around the globe. Further, when a run starts on one part of a modern financial institution, almost regardless of where it is in the world, it invariably means a funding and liquidity crisis rapidly spreads to the entire consolidated financial entity.

The nature of modern finance is that large financial institutions set up hundreds, if not thousands of legal entities around the globe. They do so in an effort to respond to customer needs, pursue funding opportunities, improve risk management and comply with local laws. They do so as well, though, to lower their taxes, manage their reported accounting, and minimise regulatory, capital and other requirements, so-called "regulatory arbitrage". Many of these legal entities, however, are still directly connected back to their US parent. When an affiliate of a large, international financial group has problems, the markets accept this will infect the rest of the group.

This phenomenon was true with the overseas affiliates and operations of American International Group (AIG), Lehman Brothers, Citigroup, Bear Stearns and Long-Term Capital Management.

AIG Financial Products, for instance, was a Connecticut subsidiary of the New York insurance giant that used a British branch and an overseas-registered bank subsidiary to run its swaps operations in London. Its near-collapse ultimately required a government bailout of more than USD 180 billion and nearly brought down the US economy.

Last year's events of JPMorgan Chase, where it executed swaps through its London branch, are a recent reminder of this reality of modern finance. Though many of these transactions were entered into by an offshore office, the bank here in the United States absorbed the losses. Trades booked offshore by US financial institutions should not be confused with keeping that risk offshore.

The US Congress addressed this reality in the Dodd-Frank Act, which states that swaps reforms shall not apply to activities outside the United States unless those activities have "a direct and significant connection with activities in, or effect on, commerce of the United States".

To give financial institutions and market participants guidance on this provision, the CFTC last June sought public consultation on its interpretation of this provision. The proposed guidance is a balanced, measured approach, consistent with the cross-border provisions in the Dodd-Frank Act and the recognition that risk easily crosses borders.

As the CFTC completes the cross-border guidance, I believe it is critical that Dodd-Frank reform applies to transactions entered into by branches of US institutions offshore, between guaranteed affiliates offshore, and for hedge funds that are incorporated offshore but operate in the United States. Otherwise, American jobs and markets may move offshore, but, particularly in times of crisis, risk would come crashing back to the US economy.

The proposed guidance includes a commitment to permitting foreign firms and, in certain circumstances, overseas branches and guaranteed affiliates of US swap dealers, to meet Dodd-Frank requirements through compliance with comparable and comprehensive foreign rules. We call this "substituted compliance".

The Commission also proposed granting time-limited relief until this July for non-US swap dealers (and foreign branches of US swap dealers) from certain Dodd-Frank swap requirements.

In December, the Commission finalised the time-limited relief. In July 2013, when the relief expires, various Dodd-Frank requirements will apply to non-US swap dealers. Overseas banks that wish to look to substituted compliance to fulfill Dodd-Frank requirements are encouraged to engage now with the CFTC, as well as their home country regulators.

Under this time-limited relief, foreign swap dealers may phase in compliance with certain entity-level requirements. In addition, it provides relief for foreign dealers from specified transaction-level requirements when they transact with overseas affiliates guaranteed by US entities, as well as with foreign branches of US swap dealers.

The relief, as an interim step, took a narrower, more territorial-based approach to the definition of "US person".

The Commission is seeking yet additional public comment on the "US person" definition, as well as the aggregation requirements with respect to the *de minimis* calculation for swap dealer registration and the treatment of a "foreign branch".

Further, we must ensure that collective investment vehicles – including hedge funds, that either are managed (or otherwise have their principal place of business) in the United States or are directly or indirectly majority owned by US persons – are not able to avoid clearing or any other Dodd-Frank requirement simply due to how they are organised. If we don't ensure for this, the Post Office boxes may be offshore, but the risk will flow back to the United States.

The CFTC recognises the importance of international cooperation and coordination in the regulation of this highly interconnected global market. To this end, the CFTC has actively engaged in substantive discussions with foreign counterparts in an effort to better understand and develop a more harmonised cross-border regulatory framework.

6| Libor

This *Financial Stability Review* comes at a critical juncture.

It comes as there has been a lot of media attention surrounding the three enforcement cases against Barclays, Union Bank of Switzerland (UBS) and Royal Bank of Scotland (RBS) for manipulative conduct with respect to the London Interbank Offered Rate (Libor) and other benchmark interest rate submissions.

More importantly, it comes as market participants and regulators around the globe have turned to consider the critical issue of how we reform and revise a system that has become so reliant on Libor, Euribor and similar rates.

I believe that continuing to reference such rates diminishes market integrity and is unsustainable in the long run.

Recently, the public has learned that there are a number of factors that call into question the integrity of Libor, Euribor and other similar rates.

Foremost, the interbank, unsecured market to which Libor, Euribor and other such rates reference has changed dramatically. Some say that it is has become essentially nonexistent. In 2008, Mervyn King, the Governor of the Bank of England, said of Libor: "*It is, in many ways, the rate at which banks do not lend to each other.*" He went on further to say: "*[I]t is not a rate at which anyone is actually borrowing.*"

There has been a significant structural shift in how financial market participants finance their balance sheets and trading positions. There is an increasing shift from borrowing unsecured (without posting collateral) toward borrowings that are secured by posting collateral. In particular, this shift has occurred within the funding markets between banks.

The interbank, unsecured market used to be where banks funded themselves at a wholesale rate. The 2008 financial crisis and subsequent events, however, have shattered this model. The European debt crisis that began in 2010 and the downgrading of large banks' credit ratings have exacerbated the hesitancy of banks to lend unsecured to one another.

Other factors have played a role in this structural shift. Central banks are providing significant funding directly to banks. Banks are more closely managing demands on their balance sheets.

Looking forward, recent changes to Basel capital rules will take root and will move banks even further from interbank lending. The Basel III capital rules now include an asset correlation factor, which requires additional capital when a bank is exposed to another bank. This was included to reduce financial system interconnectedness. Furthermore, the rules introduce a liquidity coverage ratio (LCR). For the first time, banks will have to hold a sufficient amount of high quality liquid assets to cover their projected net outflows over thirty days.

At an IOSCO roundtable on financial market benchmarks held in London in February, one major bank indicated that the LCR rule alone would make it prohibitively expensive for banks to lend to each other in the interbank market for tenors greater

than thirty days. Thus, this banker posited that it is unlikely that banks will return to the days when they would lend to each other for three months, six months or a year.

The public also has learned that Libor and Euribor – central to borrowing, lending and hedging in our economies – has been readily and pervasively rigged.

Barclays, UBS and RBS were fined USD 2.5 billion for manipulative conduct by the CFTC, the UK Financial Services Authority (FSA) and the US Justice Department. At each bank, the misconduct spanned many years; took place in offices in several cities around the globe; included numerous people – sometimes dozens, and even senior management; and involved multiple benchmark rates and currencies. In each case, there was evidence of collusion.

In the UBS and RBS cases, one or more inter-dealer brokers painted false pictures to influence submissions of other banks, i.e. to spread the falsehoods more widely. Barclays and UBS also were reporting falsely low borrowing rates in an effort to protect their reputation.

These findings are shocking, though the lack of an interbank market made the system more vulnerable to such misconduct.

In addition, a significant amount of publicly available market data raises questions about the integrity of Libor and similar rates today.

A comparison of Libor submissions to the volatilities of other short-term rates reflects that Libor is remarkably more stable than any comparable rate. For instance, in 2012 – looking at the two hundred and fifty-two submission days for three-month US dollar Libor – the banks did not change their rate 85 percent of the time. Some banks did not change their submissions for three-month US dollar Libor for upwards of one hundred fifteen straight trading days. This means, in effect, that one bank represented that the market for its funding was completely stable for one hundred fifteen straight trading days or more than five months.

Further, when comparing Libor submissions to the same banks' credit default swap spreads or to the broader markets' currency forward rates, there is a continuing disconnect between Libor and what those other market rates tell us.

Nassim Nicholas Taleb, the bestselling author of *The Black Swan*, has written a recent book called *Antifragile: things that gain from disorder*. He notes that systems that are not readily able to evolve and adapt are fragile. Such systems succumb to stress, tension and change. One of his key points is that propping up a fragile system in the interest of maintaining a sense of stability only creates more instability in the end. One can buy an artificial sense of calm for a while, but when that calm cracks, the resulting turmoil is invariably greater.

I think that the financial system's reliance on interest rate benchmarks, such as Libor and Euribor, is particularly fragile. These benchmarks basically haven't adapted to the significant changes in the market. Thus, the challenge we face is how the financial system adapts to this significant shift.

International regulators and market participants have begun to discuss transition. The CFTC and the FSA are co-chairing the IOSCO Task Force on Financial Market Benchmarks. One of the key questions in the consultation with the public is: how do we address transition when a benchmark is no longer tied to sufficient transactions and may have become unreliable or obsolete?

Without transactions, the situation is similar to trying to buy a house, when the realtor cannot provide comparable transaction prices in the neighborhood – because no houses were sold in the neighborhood in years.

Given what the public has learned, it is critical to move to a more robust framework for financial benchmarks, particularly those for short-term, variable interest rates. A reference rate has to be based on facts, not fiction.

I recognise that moving on from Libor and Euribor may be challenging. Today, Libor and Euribor are the reference rates for a significant portion of the international futures and swaps market and the basis for many mortgages written in Europe and the United States.

Yet, as the author Nassim Taleb might suggest, it would be best not to fall prey to accepting that Libor or any benchmark is "too big to replace".

7| Conclusion

The role of finance is to serve the rest of the economy. Swaps market reform is about ensuring the vast derivatives marketplace serves the rest of the economy. In the aftermath of the 2008 global financial crisis, the G20 leaders agreed that it was time to bring transparency and oversight to the opaque swaps market. Since then, there has been significant global progress on reform. We continue to work in a coordinated way to implement the critical reforms agreed to in the aftermath of the global financial crisis. We must complete the task to bring transparency to these markets and protect the public.

CPSS-IOSCO Principles for financial market infrastructures: vectors of international convergence

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New and more demanding international standards for payment, clearing and settlement systems, including central counterparties (CCPs) have been issued in April 2012 by the Committee on Payment and Settlement Systems (CPSS) and International Organization of Securities Commissions (IOSCO). These "Principles for financial market infrastructures" will provide important support for the G20 strategy to make the financial system more resilient by promoting central clearing and trade reporting of over-the-counter derivatives. CPSS and IOSCO members strove to adopt the new standards by the end of 2012. Financial market infrastructures (FMIs) are expected to observe the standards as soon as possible. Regulators and the financial industry worldwide need to work hand in hand to ensure international convergence in the ongoing implementation process.

This article reviews and assesses how the Principles contribute to the global agenda for reforming financial markets, outlines the various roles and functions that the new Principles have for FMIs and regulators, explains the motivation for reviewing regulatory standards for FMIs, and sets out in greater detail the new and strengthened regulatory requirements that have come out of the review process. It emphasizes the importance of consistent implementation at global level for achieving regulatory convergence and explains how the international regulatory community intends to proceed towards this end. Finally, the article sketches some of the core elements of ongoing work in view of developing a recovery and resolution framework for FMIs.

Financial market infrastructures (FMIs) for the clearing, settlement and reporting of financial transactions – payment systems, central counterparties (CCPs), central securities depositories (CSDs), securities settlement systems and trade repositories – form the backbone of the financial system by providing the networks through which financial transactions are being processed and the involved counterparties are interconnected. Owing to this central role, FMIs concentrate significant financial and/or operational risks and deepen interdependencies among the participants in the markets they serve. Sound FMI functioning is therefore a key element of an appropriate framework to safeguard financial stability. While the primary responsibility for taking appropriate measures in this regard rests with the operators of FMIs, FMIs are in addition closely overseen and supervised.

As a result of financial globalisation, the membership, product and currency coverage of FMIs and their related financial risk implications have become increasingly cross-border in nature. Furthermore, interdependencies between FMIs have also grown significantly (CPSS, 2008). Against this background, authorities have developed global standards for FMIs to ensure robust FMI risk management and disclosure across jurisdictions, including initially the 2001 Core principles for systemically important payment systems, the 2001 Recommendations for securities settlement systems and the 2004 Recommendations for central counterparties. The effective implementation of those standards was promoted through the self-commitment of authorities around the world who adopted the standards as well as through their use as benchmarks for financial sector assessments of the International Monetary Fund (IMF) and the World Bank.

International efforts to promote the safety and resilience of FMIs demonstrated their value during the financial crisis erupting in 2008, when FMIs managed the heightened market instability, spikes in transaction volumes, and the default of Lehman Brothers as a major FMI participant without any major disruptions. Overall, by acting as a buffer for the increased and more volatile trading activity, the smooth functioning of FMIs contributed to market confidence and played an important role in limiting the financial and economic impact of the financial turbulences. Moreover, financial sector segments with less developed FMIs – in particular over-the-counter (OTC) derivatives markets – proved much more vulnerable to deficiencies in market transparency and financial risk management during the crisis (Russo, 2010). Considering also the significant systemic risk implications of OTC derivatives markets (ECB, 2009), the G20 decided at the 2009 Pittsburgh Summit to enhance the use of FMIs for these products notably through mandatory central clearing and reporting obligations.[1]

Nevertheless, there is no room for complacency regarding the safety of FMIs. First, the **growing use of FMIs** across financial markets – partly as a consequence of the G20 OTC derivatives reform agenda, but also relating to the growing use of CCPs for other products such as repos – warrants particular attention to ensure that FMIs apply state-of-the-art risk management technologies and enable effective market discipline through adequate disclosure. Second, the crisis highlighted **specific challenges in today's financial system** – e.g., relating to liquidity risk management, scarcity of high-quality collateral, inherent procyclicality of the financial system and complexity of effective oversight and supervision in a cross-border context – that are relevant not only for financial institutions but just as much for FMIs. Third, public sector support to financial institutions during the crisis may to some extent have limited the financial implications for FMIs. Against this background, it should be ensured that FMIs would be fully prepared for **even more severe stress scenarios**.

It is against this backdrop that in 2010 the Committee on Payment and Settlement Systems (CPSS) and the Technical Committee of the International Organization of Securities Commissions (IOSCO) decided to review and update the existing international standards for FMIs. Following extensive public consultation the "Principles for financial market infrastructures" (PFMIs) – replacing the previous CPSS and IOSCO standards for FMIs – were issued in April 2012.[2]

1 *In addition, the G20 called for trading of standardised OTC derivatives on electronic trading platforms or exchanges, where appropriate, and for higher capital requirements for non-centrally cleared OTC derivatives.*
2 *CPSS and IOSCO members had committed to adopt the new Principles by the end of 2012 and to put them into effect as soon as possible. FMIs are expected to observe them as soon as possible.*

This article reviews the main changes introduced by the PFMIs (Section 1), priorities regarding their effective and consistent implementation (Section 2), as well as their interaction with the on-going work of CPSS and IOSCO on FMI recovery and resolution (Section 3). It closes with some conclusions from the analysis (Section 4).

1| Overview of some important new requirements

CPSS and IOSCO have strengthened the international standards for FMIs by raising minimum requirements including and in particular for the management of financial risks. An FMI or its participants may face credit and liquidity risks arising from the FMI's payment, clearing, and settlement processes. Although there is often significant interaction between credit and liquidity risk, these risks are distinct concepts and are therefore addressed in separate principles, which was not the case in the previous international standards for payment systems, CCPs, and securities settlement systems. In addition to these new and more demanding financial risk requirements, the PFMIs also contain a number of new requirements that did not previously exist mainly aimed at addressing business risk, the need to protect indirect participants through effective segregation, and the need to address risks relating to tiering.

1|1 New credit risk requirements

A clear distinction has been introduced between current exposures and potential future exposures, both of which need to be covered fully with a high degree of confidence. While current exposures can be precisely determined, the determination of potential future exposures is more difficult and requires the development of adequate stress scenarios that the FMIs need to be able to handle with sufficient collateral. The PFMIs put much greater emphasis and contain more guidance on the definition of such crisis scenarios. In particular, they have strengthened the minimum requirements applicable to CCPs by specifying that CCPs which are involved in activities which have a more-complex risk profile or which are systemically important in multiple jurisdictions should maintain at a minimum financial resources to cover the default of the **two** participants **and their affiliates** that would cause the largest credit exposure to the CCP. The previous CPSS-IOSCO Recommendations for CCPs only required the coverage of the largest single exposure and did not consider a participant's affiliates. Of note, the PFMIs clarify that these are only minimum standards, which may very well call for much higher collateral requirements if market conditions are expected to be particularly severe.

A further important new requirement in the PFMIs concerns payment systems that employ a deferred net settlement (DNS) mechanism. Such systems may face financial exposures arising from their relationships with their participants or their payment and settlement processes. Importantly, the PFMIs distinguish between DNS systems with and without settlement guarantee. A DNS payment system that explicitly guarantees settlement, whether the guarantee is from the FMI itself or from its participants, should maintain sufficient financial resources to cover fully all current and potential future exposures using collateral and other equivalent financial resources. Even if a DNS payment system does not provide a settlement guarantee, but where its participants face credit exposures arising from its payment and settlement processes, it should maintain, at a minimum, sufficient resources to cover the exposures of the two participants and their affiliates that would create the largest aggregate credit exposure in the system. The latter is an important new qualification that has been introduced in the PFMIs to explicitly recognise the systemic impact that a default of an important participant could have even if the payment system itself is not exposed to credit risk.

Finally, and very importantly, the PFMIs contain provisions requiring contingency planning for credit losses that are not covered by the resources which are part of the regular risk management waterfall and go thus beyond the amount of financial resources as required by the PFMIs. An FMI should analyse and plan for how it would address any such uncovered credit losses. An FMI's rules and procedures should indicate its process to replenish any financial resources it may employ during a stress event, so that it can continue to operate in a safe and sound manner. For instance, an FMI's rules and procedures might provide the possibility to allocate uncovered credit losses by writing down potentially unrealised gains

by non-defaulting participants and the possibility of calling for additional contributions from participants based on the relative size and risk of their portfolios. As such, this provision serves as a starting point for the ongoing work on the recovery of FMIs, which is discussed at greater length below.

1|2 New liquidity risk requirements

The PFMIs also contain new requirements to address liquidity risks specifying that an FMI should maintain sufficient liquid resources in all relevant currencies to effect same-day and, where appropriate, intraday and multiday settlement of payment obligations with a high degree of confidence under a wide range of potential stress scenarios that should include the default of the participant and its affiliates that would generate the largest aggregate liquidity obligation for the FMI. In contrast to the requirements on credit risk, a CCP that is involved in activities with a more-complex risk profile or that is systemically important in multiple jurisdictions should only **consider** maintaining additional liquidity resources sufficient to cover the default of the **two** largest participants, whereas coverage of the largest **two** exposures is a hard requirement for credit risk management. This subtle yet important difference comes from the fact that a given requirement for liquidity risk is potentially significantly more demanding than the same requirement for credit risk. This is because the credit risk principle allows non-cash assets to be counted towards the coverage requirement, allowing for appropriately prudent haircuts, whereas the proposals for the liquidity standard require these assets to be convertible into cash via committed secured facilities on the day of default. Also, to take the example of a cash delivery versus payment CCP, to cover the credit risk from a participant's default requires sufficient financial resources only to cover the risk of potential movements in the price of the assets due to be sold on a given day with the required degree of confidence (i.e. probably a small proportion of the value of the asset to be sold). But to cover the liquidity exposures from a default requires financial resources equal to the entire value of the asset to be sold.

Moreover, the PFMIs also contain new requirements specifying the range of funding arrangements that are eligible to meet the liquidity risk requirements. More specifically, for the purpose of meeting its minimum liquid resource requirement, an FMI's qualifying liquid resources in each currency may include cash at the central bank of issue and at creditworthy commercial banks, committed lines of credit, committed foreign exchange swaps, and committed repos, as well as highly marketable collateral held in custody and investments that are readily available and convertible into cash with prearranged and highly reliable funding arrangements, even in extreme but plausible market conditions.

The PFMIs also put greater emphasis on the need for the stress testing of liquidity needs and resources. To this end, stress scenarios should consider the design and operation of the FMI, include all entities that might pose material liquidity risks to the FMI (such as settlement banks, nostro agents, custodian banks, liquidity providers, and linked FMIs), the multiple roles that participants may play with respect to the risk management of the FMI, and assess the probability of multiple failures and the contagion effect among its participants that such failures may cause.

1|3 New margin and collateral requirements

New margin and collateral requirements have been introduced in the PFMIs that go beyond what was required previously. In particular, under the new requirements, initial margin methodologies should be such that they not only consider "normal" market conditions as was required under the CPSS-IOSCO Recommendations for CCPs, but also extreme events that occurred in the past as well as simulated data projections that would capture plausible events outside of the historical data, especially for new products. Collateral requirements have also been strengthened in particular with a view of avoiding concentration risk, wrong-way risk and procyclicality. Procyclicality has been a source of concern in the recent financial crisis as it may cause or exacerbate financial instability. For example, in a stressed market, an FMI may require the posting of additional collateral both because of the decline of asset prices and because of an increase in haircut levels. Such actions could exacerbate market stress and contribute to driving down asset prices further, resulting in additional collateral requirements. This cycle could exert further downward pressure on asset prices.

In order to avoid such effects, an FMI should, to the extent practicable and prudent, apply stable and conservative haircuts that are calibrated to include periods of stressed market conditions in order to reduce the need for procyclical adjustments.

1|4 New non-financial risk related requirements

The PFMIs contain some new provisions aimed at improving the management of risks other than financial risks stemming from the default of a participant. In particular, a new principle has been introduced which requires that a CCP has rules and procedures that enable the segregation and portability of the positions of a participant's customers and the collateral provided to the CCP with respect to those positions. Appropriate segregation and portability within a CCP is especially important in light of the G20 mandate for the central clearing of standardised OTC derivatives products.

Moreover, general business risk has been explicitly recognised as an important source of financial losses that are not related to a participant's default. New requirements have been introduced that are designed to protect participants and the financial system from the risk that an FMI could cease operations suddenly as a result of business losses that are unrelated to participant defaults. Specifically, an FMI is required to hold liquid net assets funded by equity equal to at least six months of current operating expenses so that it can continue providing operations and services, either as a going concern or during its recovery or orderly wind-down, if it incurs general business losses. These assets are in addition to resources held to cover participant defaults or other risks covered under the financial resource principles.

Finally, also in response to mandatory clearing of OTC derivatives and as a way of accessing CCPs, indirect participation in CCPs has gained in importance, which has led to much more risk concentration on a few large global dealers. The PFMIs explicitly recognise that dependencies and risk exposures (including credit, liquidity, and operational risks) inherent in such tiered arrangements can present risks to the FMI and its smooth functioning as well as to the participants themselves and the broader financial markets. In response, new provisions have been introduced that require an FMI to identify, monitor, and manage the material risks it faces from indirect participants. The PFMIs even go as far as to encourage direct participation, for example by establishing objective thresholds above which direct participation would normally be encouraged where an indirect participant accounts for a large proportion of the transactions processed by an FMI.

2| Implementation and the need for consistency

2|1 Main implementation tools

Given the need for the PFMIs to be compatible with different types of FMIs and the specific legal and institutional settings in multiple jurisdictions, they are formulated as adaptable, high-level guidance. In order to ensure that this flexible framework nevertheless promotes an effective level playing field across FMIs and jurisdictions, the CPSS and IOSCO members have agreed to assist each other in the practical application of the PFMIs. Well-coordinated approaches are particularly important in view of the increased cross-border financial stability implications of FMIs and their high degree of interconnectedness, as set forth above. CPSS and IOSCO have agreed on three main tools to ensure the effective and consistent implementation of the PFMIs.

First, the PFMIs specify the **responsibilities of authorities in implementing the PFMIs**. This includes general criteria for appropriate and effective regulation, supervision and oversight (Responsibility A), powers and resources of authorities for carrying out these functions (Responsibility B), clear definition and adequate transparency regarding the respective policies (Responsibility C), authorities' commitment to the adoption of the PFMIs and their consistent application across all relevant FMIs (Responsibility D) and requirements for cooperation across authorities (Responsibility E). While all of these principles are critical to ensure the effective implementation of the PFMIs, *Responsibility E* is particularly important from a cross-border consistency point of view. Responsibility E requires close communication and consultation among all authorities for which an FMI has significant financial stability implications. This is a key tool to achieve

the effective on-going supervision and oversight of cross-border and multicurrency FMIs, in line with the perspectives of all relevant jurisdictions and authorities, as well as common assessments of those infrastructures' observance of the PMFIs.

Second, the CPSS and IOSCO have developed an **assessment methodology** that provides guidance for assessing observance of the PFMIs (CPSS and Board of IOSCO, 2012). This framework follows the structure of the key considerations for each of the principles addressed to FMIs and the responsibilities of authorities and sets forth questions and a rating scheme to help assessors to determine the degree of compliance and to prioritise action to address identified shortcomings. The assessment methodology is designed for use both by authorities (i.e. when assessing the observance of the PFMIs by infrastructures and/or their own compliance with the principles addressed to authorities) and infrastructures (i.e. when taking decisions and implementing policies and procedures to ensure effective observance of the PFMIs). In addition, the IMF and the World Bank will employ the assessment methodology in the context of their Financial Sector Assessment Program and technical assistance programmes.

Third, the CPSS and IOSCO have issued a **disclosure framework** for FMIs in order to promote adequate and comparable public information about infrastructures' activities, risk profile and risk management practices and their compliance with the PFMIs (CPSS and Board of IOSCO, 2012). The enhanced transparency is intended to facilitate effective market discipline and to thereby provide further impetus for infrastructures' compliance with the PFMIs.

2|2 Progress so far

The **implementation process for the PFMIs is still at a relatively early stage**. Authorities had committed to strive for implementation of the PFMIs by the end of 2012 but important rules – notably those related to OTC derivatives infrastructures – have not yet been fully adopted by all CPSS and IOSCO members.[3] Similarly, cooperative arrangements for several major cross-border and multicurrency FMIs are not yet in place. It will be important to address these delays as soon as possible to address the resulting regulatory uncertainty and to promote effective progress towards highest standards of safety and efficiency for all relevant FMIs.

Additional concerns arise from **risks of overlaps and even inconsistencies of authorities' rules for OTC derivatives infrastructures**. Such problems could arise for example where **authorities may apply domestic requirements to foreign FMIs** that seek to provide their services to domestic clients, rather than permitting those FMIs to conduct their activities subject to comparable rules issued by their home jurisdictions. Indeed, whereas European Union rules for OTC derivatives infrastructures – notably the European Market Infrastructure Regulation (EMIR) and the proposed revision of the Markets in Financial Instruments Directive ("MiFID 2") – include a general process for recognising "equivalent" regimes in other jurisdictions, this may not be the case in other major jurisdictions, especially in the United States. Under the Dodd-Frank-Act foreign FMIs are generally subject to US rules if their activities have a direct and significant connection with US business, which would for most non-US FMIs active in the US imply double regulation. Such regulatory overlaps would not only be extremely costly but would also hamper regulatory compliance in cases where the detailed technical rules may not be fully compatible, thereby creating unintended new risks to the effective regulation and oversight of FMIs. The extraterritorial approach envisaged in the United States has therefore raised significant concerns by authorities and infrastructures worldwide.[4] In view of the strong feedback received, the US authorities are currently considering whether there may be enhanced scope for "substituted compliance" for foreign FMIs in line with their home country rules.

Another source of regulatory risk and uncertainty is **divergence in the interpretation of the G20 mandate**. If the scope of mandatory clearing and reporting obligations differs or requirements for

3 *For a recent overview of the state of the implementation of OTC derivatives regulatory reforms across jurisdictions see FSB (2012): "OTC derivatives market reforms: fourth progress report on implementation", 31 October, table 2, p. 13.*

4 *See the responses to the CFTC's proposed "Interpretative guidance and policy statement of the cross-border application of certain swaps provisions of the Commodity Exchange Act", which include contributions for example from the European Commission as well as from Asian-Pacific authorities, and which are available at:* http://comments.cftc.gov/PublicComments/CommentList.aspx?id=1234.

the risk management of OTC derivatives FMIs are not sufficiently congruent across jurisdictions, this could give rise to regulatory arbitrage and may hamper the effective implementation of the G20 reform objective. Indeed, there are indications for substantial differences in these areas, for instance concerning the scope of the mandatory clearing obligation and related exemptions (e.g., for certain asset classes or non-financial institutions) as well as requirements for CCPs' capital, margin, collateral and segregation arrangements.

The international community has fully recognised the above risks. In October 2012, the Financial Stability Board (FSB) urged authorities to take action by end-2012 to identify conflicts, inconsistencies and gaps in their respective rules and to work together quickly to address the identified issues (FSB, 2012). In November 2012, regulators from Australia, Brazil, the European Union, Hong Kong, Japan, Canada, Switzerland and the United States issued a joint statement on "Operating principles and areas of exploration in the regulation of the cross-border OTC derivatives market".[5] While the regulators acknowledged various potential conflicts, inconsistencies and duplicative requirements within their respective (contemplated) rules and considered possible exemptions of foreign financial institutions and infrastructures on the basis of regulatory equivalence, concrete options to address these issues will still need to be discussed. Regulators agreed to meet again in 2013 to continue work on these issues within a "reasonable, limited transition period". Given that the G20 deadline for OTC derivatives reform in principle expired already by end-2012 and more generally with a view to supporting the timely and effective implementation of the PFMIs, regulators should commit to a clear roadmap as soon as possible. Furthermore, it would seem helpful for regulators to consider transitional moratoria on the cross-border application of their rules until the respective issues have been fully resolved.

3| Recovery and resolution

The disorderly failure of an FMI can lead to severe systemic disruptions if it causes markets to cease to operate effectively. Ensuring that FMIs can continue to perform critical operations and services as expected in a financial crisis is therefore central to the recovery plans they formulate and the resolution regime that applies to them. Maintaining critical operations should allow FMIs to serve as a source of strength and continuity for the financial markets they serve. This aim is all the more necessary given the commitment made by G20 leaders in 2009 that all standardised OTC derivatives should be cleared through CCPs. To support this G20 commitment, the FSB identified four safeguards to help establish a safe environment for clearing OTC derivatives through a global framework of CCPs. One of these safeguards is to establish effective resolution regimes.

Accordingly, all types of FMIs should generally be subject to regimes and strategies for recovery and resolution. Consistent with this approach, the PFMIs require that FMIs have effective strategies, rules and procedures to enable them to recover from financial stresses. The Financial Stability Board's "Key attributes of effective resolution regimes for financial institutions" further require that jurisdictions establish resolution regimes to allow for the resolution of a financial institution where recovery is no longer feasible. An effective regime must enable resolution without causing systemic disruption or exposing the taxpayer to loss. For FMIs, this means applying particular emphasis on ensuring that the relevant authorities are given powers to maintain an FMI's critical services if they consider this necessary to maintain stability. To this end, CPSS and IOSCO published for public comment a consultative report on the "Recovery and resolution of financial market infrastructures". The consultation ended on 28 September 2012. CPSS and IOSCO are currently in a process of reviewing the comments received in the consultation in order to assess whether and how to elaborate further on the Principles and to provide guidance to FMIs and authorities.

In parallel, the European Commission released a public consultation on the recovery and resolution of financial institutions other than banks, including FMIs, which ended on 28 December 2012. The ECB in general welcomes the European Commission's initiatives in this field, however with the following qualifications. First, in view of the specific nature of FMIs that makes them different from banks, there is a need for establishing

5 *See* http://www.sec.gov/news/press/2012/2012-251.htm.

a European recovery and resolution regime which is specifically designed for the purposes of FMIs and distinct from the resolution framework for banks. Second, a European recovery and resolution regime should cover all types of FMIs including CCPs, CSDs, payment systems, and trade repositories. This is also the approach taken by CPSS-IOSCO at global level. Third, in order to ensure international consistency in requirements for the recovery of FMIs, the **forthcoming** EU recovery and resolution regime for FMIs should be aligned with the international standards as being developed by CPSS and IOSCO. Fourth, the resolution of FMIs requires swift decision taking that cannot afford lengthy coordination processes among a multitude of authorities. Moreover, many FMIs are so large in size and scope that their failure would, on the one hand, endanger the financial system of several countries at the same time, but on the other hand, be too large for the national government of the home country to be supported in case of stress and thereby causing or exacerbating funding problems for the sovereign, which might further destabilise the financial sector. For these reasons, a centralised resolution authority in particular for CCPs, international CSDs, and large-value payment systems would be very beneficial. Fifth, while effective recovery and resolution regimes are important for all types of FMIs, FMIs are very different in nature, are exposed to different types of risks, and their failure may have different systemic implications. Careful distinction therefore needs to be made between the different risk profiles that FMIs may have. Finally, the distinction between the resolution regime for FMIs and regular insolvency rules needs to be clearly drawn. A resolution regime for FMIs may either replace ordinary insolvency law or complement it as an intermediate step needed to prevent insolvency.

It is vital that the work on the recovery of FMIs both in the European Union and at global level move forward swiftly and be finalised in the course 2013. It is equally vital that, similar to the PFMIs, any additional requirements that may be developed to ensure the recovery of PFMIs be implemented consistently across all jurisdictions.

4| Conclusions

4|1 Rulemaking and standard setting should be completed as soon as possible

Despite substantial progress, the G20 commitments on OTC derivatives have not been fully met by the end-2012 deadline. Legislation and required regulatory rule-making are not yet complete even in the major OTC derivatives market jurisdictions, where most of the progress has been made. Uncertainty about regulatory requirements is impeding progress by market participants to meet the G20 commitments for clearing, reporting and trading. As implementation takes place, the reforms themselves and the reactions of market participants are reshaping markets in ways that are not yet fully understood. More specifically in view of FMIs, work is ongoing to develop an effective framework for ensuring the recovery of FMIs. It is vital that this work both in the European Union and at global level moves forward swiftly and be finalised in the course 2013.

4|2 Risks of remaining inconsistencies need to be addressed

Conflicts, inconsistencies and gaps in regulations across jurisdictions need to be addressed, particularly those related to cross-border participants and trades. Conflicting or inconsistent cross-border application of rules to market participants, intermediaries, infrastructures and products may inhibit the execution or clearing of certain cross-border transactions or impose additional compliance burdens. It is therefore important to develop concrete and practical solutions with respect to any conflicting application of rules, identify inconsistent or duplicative requirements and attempt to reduce the regulatory burdens associated with such requirements, and identify gaps and reduce the potential for regulatory arbitrage. The PFMIs play an important part in the G20/FSB financial reforms, including in the key area of OTC derivative market reforms. For the PFMIs to be effective, it is important that they are implemented consistently and in full in all jurisdictions.

4|3 Need for comprehensive and continuous assessment of entire reform process

The OTC derivatives reform process including for FMIs serving these markets consists of a multitude of individual reforms. Their implementation will not be complete in 2013. Rather, it is an ongoing process that needs to be continuously monitored, assessed, and reviewed on a long-term basis over several years. A lot of issues have not yet been fully analysed and can only be better understood over the course of time once reforms have been further implemented. For example, the systemic implications of the evolving global financial market infrastructures (such as the emergence of few large globally acting CCPs) are not known. Moreover, it is unclear how much standardisation of OTC derivatives products is needed and how much customisation is acceptable. There is still not even a generally accepted definition of standardisation. Furthermore, while a lot of emphasis has been put on the collection of and access to data, there is no clear understanding on how to use and interpret the data in a meaningful way. Finally and more generally, the collective impact of different market reforms on incentives, liquidity needs, systemic risk protection and overall functioning of markets are not known at this stage. As a result, it will be important to keep momentum in the OTC derivatives reform process beyond 2013. To this end, the preparation of a multi-year plan for deepening the monitoring of the implementation of OTC derivatives reforms including for FMIs will be helpful.

References

Committee on Payment and Settlement Systems (CPSS) (2008)
"The interdependencies of payment and settlement systems", June.

Committee on Payment and Settlement Systems (CPSS) and Board of International Organization of Securities Commissions (IOSCO) (2012)
"Principles for financial market infrastructures: Disclosure framework and assessment methodology", December.

European Central Bank (ECB) (2009)
"OTC derivatives and post-trading infrastructures", September.

Financial Stability Board (FSB) (2012)
"OTC derivatives market reforms. Fourth progress report on implementation", pp. 1, October 31.

Russo (D.) (2010)
"OTC derivatives: financial stability challenges and responses from authorities", Banque de France, *Financial Stability Review*, No. 14, July.

Trade repositories, transparency and prevention tools to mitigate systemic risk

A transparency standard for derivatives

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Derivatives exposures across large financial institutions often contribute to – if not necessarily create – systemic risk. Current reporting standards for derivatives exposures are nevertheless inadequate for assessing these systemic risk contributions. In this paper, the author explains how a transparency standard, in contrast to the current standard, would facilitate such risk analysis. He also demonstrates that such a standard is implementable by providing examples of existing disclosures from large dealer firms in their quarterly filings. These disclosures often contain useful firm-level data on derivatives, but due to a lack of standardisation, they cannot be aggregated to assess the risk to the system. He highlights the important contribution that reporting the "margin coverage ratio", namely the ratio of a derivatives dealer's cash (or liquidity, more broadly) to its contingent collateral or margin calls in case of a significant downgrade of its credit quality, could make toward assessing systemic risk contributions.

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Derivatives exposures across large financial institutions often contribute to – if not necessarily create – systemic risk. During a crisis, lack of adequate understanding of such exposures often compromises regulatory ability to unwind an institution, inducing large-scale backstops and counterparty bailouts. It is often claimed – in spite of the massive assistance that was provided in this crisis to deal with derivatives exposures – that derivative contracts are well collateralised so that counterparty risk on derivatives exposures is not a significant issue. Documenting evidence that supports or refutes this claim beyond reasonable doubt is currently infeasible due to the poor quality – and lack of standardisation – of derivatives disclosures by financial firms. Nevertheless, all available evidence points against the claim that counterparty risk in derivative exposures is always well collateralised.

In many important cases that contributed to the crisis, most notably but not exclusively the case of American International Group (AIG) Financial Products, collateralisation was weak.[1] Some reports also suggest that the problem is probably of non-trivial magnitudes and that going forward derivatives exposures are likely to remain a potentially important contributor to systemic risk. For instance, using information from the 10-Q quarterly statements, the International Monetary Fund (IMF) reports estimate that the five key institutions that are active in the over-the-counter (OTC) derivatives market – Goldman Sachs, Citigroup, JPMorgan, Bank of America, and Morgan Stanley – were jointly carrying almost USD 500 billion in OTC derivative payables exposure as of the third quarter of 2009.[2] The report also estimates that five largest European banks – Deutsche Bank, Barclays, Union Bank of Switzerland (UBS), Royal Bank of Scotland (RBS) and Credit Suisse – had about USD 600-USD 700 billion in under-collateralised risk (measured by residual derivative payables) as of December 2008. This residual exposure arises for two reasons, as per the IMF report. First, sovereigns, as well as AAA-rated insurers, corporations, large banks and multilateral institutions "do not post adequate collateral since they are viewed by large complex financial institutions as privileged and (apparently) safe clients." Second, dealers have agreed in their bilateral contracts not to mandate adequate collateral for dealer-to-dealer positions whereby credit-worthy dealers often post no collateral to each other for these contracts.

These reports raise several pertinent questions:

- What is the true potential exposure on derivatives dealings of large institutions?

- How much of this exposure is collateralised?

- Is collateral posted adequate under some conservative requirements of maximum counterparty risk in case of system-wide stress when besides the emergence of counterparty risk, positions become illiquid, hard to replace and may have to be unwound at short notice?

- Are derivatives being deployed in under-collateralised manner to undertake significant maturity transformation and taking on attendant liquidity risks?[3]

This article addresses these questions by examining the theoretical justification for a transparency standard for derivatives positions. To demonstrate that such a standard is implementable, the article shows examples of existing disclosures from large dealer firms in their quarterly filings. These disclosures often contain useful firm-level data on derivatives, but due to a lack of standardisation, these are not aggregation-friendly for assessing the risk to the system. The note highlights the important role for tracking of a margin coverage ratio (MCR), namely the ratio of a derivatives dealer's cash (or liquidity, more broadly) to its contingent collateral or margin calls in case of a significant downgrade of its credit quality.

1 *For example,* The financial crisis inquiry Report, *released in January 2011, reports:* "In the housing boom, credit default swaps (CDS) were sold by firms that failed to put up any reserves or initial collateral or to hedge their exposure. In the run-up to the crisis, AIG, the largest US insurance company, would accumulate a one-half trillion dollar position in credit risk through the OTC market without being required to post one dollar's worth of initial collateral or making any other provision for loss. AIG was not alone…"

2 *Singh (M.) (2010): "Collateral, netting and systemic risk in the OTC derivatives market",* IMF Working Paper *10/99.*

3 *In terms of "risk topography", derivatives can be considered the mechanism to build contingent exposures – across states of nature and over time – which when not adequately collateralised or capitalised lead to liquidity risk. Thus, derivatives facilitate complex forms of "liquidity mismatch", discussed in greater detail elsewhere by Markus Brunnermeier, Gary Gorton and Arvind Krishnamurthy.*

1| Case for regulatory and market disclosure of standardised derivatives reports

It is useful to understand theoretically the market failure in the provision of information in derivatives markets. Acharya and Engle (2009) and Acharya and Bisin (2010) formalise this idea under the notion of a "counterparty risk externality".[4]

To illustrate the idea, suppose that counterparty A agrees to pay B. Then, A turns around and sells a similar contract to C. The addition to A's position from the contract with C dilutes the payoff on its contract with B in case that A turns out ex-post to not have adequate funds to repay both B and C. Thus, B's payoff dependency on what else A does represents a negative payoff externality on B due to A's counterparty risk. The key efficiency question is whether B can adequately reflect this risk in charging price or adopting risk controls (e.g., margins or overall position limits) on A. Clearly, B's ability to do so depends upon whether B can observe what A does.

Now, if markets are organised over-the-counter as with many derivatives contracts, there is opacity at level of derivatives positions of a financial firm. As a result of this opacity, counterparty risk externality described above cannot be adequately reflected in price and collateral arrangements. More broadly, since generating information about each firm's derivatives positions requires its cooperation but benefits the system at large, the firm may not fully internalise the social benefits of transparency. This theory predicts thus that there will be too little production of private information in settings that involve counterparty risk externality. Acharya and Engle (2009) and Acharya and Bisin (2010) present several proposals to address this market failure.

One proposal is that central clearing and margining on exchanges get around this failure (at least when viewed in the realm of a particular clearinghouse or exchange). Central counterparty (CCP) or trade-guaranteeing body or exchange can observe end-of-day (or even intra-day) positions, and set position limits, concentration limits and margin calls accordingly. This arrangement works best if the same clearing entity clears most products. Yet, many markets, especially for complex and customised derivatives will almost necessarily remain OTC. They cannot easily be standardised if their primary purpose is to provide customised hedging to some end-users and the system may not find it profitable to incur transaction costs in setting up clearinghouses or exchanges for these products if their volumes are thin. For these remaining derivatives, some regulators have proposed addressing counterparty risk directly by limiting leverage (charging adequately high margin requirements) against them. Still, regulatory attempts to do design such instrument-specific requirements have failed miserably in the design of capital requirements even on simpler instruments such as mortgages, loans and lines of credit.

A second proposal, not necessarily exclusive of the first one, is to rely more on markets' transparency at large. Suppose information on derivatives position of a financial firm was made available to market participants. This would enable better pricing and managing of counterparty risk by markets themselves. This way, dealers would be incentivised to lower their counterparty risks in an efficient manner. With a market-wide standard, dealers would also be incentivised to provide transparency about their own management of counterparty risk, a move that would benefit them the most in times of significant aggregate uncertainty when customers tend to leave business with riskier counterparties, triggering a "franchise value run", as witnessed by Goldman Sachs and Morgan Stanley around the collapse of Lehman Brothers, and instead "fly to quality".

A common argument against such public transparency of positions and counterparty level data is that it reduces economic benefits of undertaking these positions in the first place and could reduce risk-sharing gains for the economy. A compromise would be to provide market transparency with a reasonable lag, so that price impacts for trading parties are minimised, and yet the lagged information is useful for counterparty risk assessments.

Finally, it is highly likely that an efficient transparency standard for derivatives will in turn produce an efficient information system at each financial firm that aggregates its own derivatives positions in different subsidiaries, markets and countries. This could improve firm's own risk management by

4 *Acharya (V. V.) and Engle (R.) (2009): "Derivatives trades should all be transparent",* Wall Street Journal, *15 May 2009, and Acharya (V. V.) and Bisin (A.) (2010): "Counterparty risk externality: centralised versus over-the-counter markets",* Working Paper, *NYU-Stern.*

providing timely information to senior management and chief risk officers about enterprise-wide risks.

2| A TRANSPARENCY STANDARD FOR DERIVATIVES AND COUNTERPARTY RISK

What might a transparency standard for derivatives look like? Here is an example. All dealers as well as large swap players provide to a centralised data repository frequent (for example, weekly or bi-weekly) risk reports on their derivatives positions as follows.

- Classification of exposures into:
  - product types (such as single-name credit default swaps (CDS), index CDS, interest rate swaps, currency swaps, commodities, equities, etc.);
  - by major currency categories;
  - maturity (buckets) of contracts;
  - type of counterparty (bank, broker-dealer, corporation, government-sponsored enterprise, monoline, insurance firm, etc.); and
  - credit rating of counterparties.

- Size of exposures could be reported as:[5]
  - gross (maximum notional exposure);
  - in fair-value terms (to account for mark-to-market changes);
  - net (taking account of bilateral netting arrangements); and
  - uncollateralised net (recognising collateral posted by counterparties).

- Uncollateralised net exposures could be disclosed also as "potential exposures" based on stress tests[6] that take account of:
  - several notches of ratings downgrade of counterparty and its ability to post additional collateral; and
  - counterparty default and replacement risk for the exposures assuming severe market conditions such as replacement time of two to four weeks.[7]

To facilitate the understanding of contingent or potential exposures and for deriving implications for systemically risky exposures, all dealers as well as large swap players could also provide two important and novel reports:

- Margin call reports that list the additional collateral liabilities of the firm as:
  - total additional liability in case the firm was to experience one, two or more (say, up to six) notch downgrades; and
  - largest such liabilities aggregated by different counterparties (say, ten largest).

- Concentration reports that provide the above information for the entity's largest counterparty exposures (say, the largest ten) or accounting for at least a substantial proportion (say, 75%) of the total exposure.

When aggregated across firms, the standardised firm-level reports aggregate to a "map" of derivatives positions and their risks (mark-to-market risk, counterparty risk and liquidity risk) as shown in Table 1.

Table 1
Outcome of the proposed transparency standard for derivatives

Disclosure	Firm 1	Firm 2	...	Firm n
Exposures				
Product type				
Maturity bucket				
Counterparty type				
Counterparty credit rating				
Value				
Maximum loss ("potential exposure")				
Uncollateralised net				
Net of collateral				
By currency categories				
Collateral posted				
Margin Report: additional collateral to post				
One-notch downgrade				
Two-notch downgrade				
Multi-notch downgrade				
Concentration Report: firms, % exposure				

5 *The crucial item here is "uncollateralised" as without knowledge of collateral backing the contracts, there is the risk of over-stating the derivatives exposures, but more importantly, it would create the uncertainty about magnitude of risk in the first place.*

6 *The focus of such a possible standard is on stress tests based on counterparty risk. Nevertheless, stress tests based on macroeconomic scenarios, as proposed in Darrell Duffie's note ["Systemic risk exposures: a 10-by-10-by-10 approach"], could also be used in addition.*

7 *In particular, the current disclosure of Level-1, Level-2 and Level-3 of assets' underlying value should also be enhanced to report potential illiquidity and opacity of positions (not just for derivatives), so that an asset could be Level-1 in normal times, but the disclosure would also state whether it is likely to be Level-1, Level-2 or Level-3 in reasonable stress scenarios.*

Although such a transparency standard appears at first to involve a large amount of information gathering, the costs of such disclosure are not likely to be that onerous. Sophisticated investment banks already maintain such information for their internal risk management purposes, and they do publish some of it in their quarterly reports (though in a highly non-standardised and less granular manner, as explained below). Therefore, it is unlikely to be a significant additional burden for them to disclose such information to regulators in a standardised format at frequent intervals. Some aggregated versions that respect customer confidentiality can then be made transparent to markets at large, say on a monthly or at least quarterly basis, to help enhance market discipline against the build-up of uncollateralised exposures.

3| What do financial firms currently do and do not disclose?

The 10-Q filings of financial firms, as for any Securities and Exchange Commission-regulated firms in the United States, require disclosure of all materially relevant information. In case of financial firms, given their increasingly large presence in derivatives markets, these filings also contain information on positions – and on their risks – in these markets. A few examples below help illustrate what is useful in the current reports, and what changes would be necessary to adhere to a transparency standard such as the one outlined above.

Consider for example the reporting of credit protection sold by Citigroup and JPMorgan Chase, shown from their 10-Q filings for December 31, 2008 in Tables 2 and 3, respectively. Citigroup reports its positions by industry, product and credit rating of underlying reference entity, whereas JPMorgan reports them by maturity and credit rating of underlying entity. While it is possible to draw some relative conclusions about average credit rating of entities they write protection against (Citigroup wrote more risky protection than JPMorgan), other aspects of disclosures are not comparable. Nevertheless, the tables reveal that financial firms could report these data in a standardised manner if required to do so. Notably, no data on concentration of exposures in derivatives are currently revealed in any of the 10-Q filings. This creates a significant challenge in assessing systemic risk based on public disclosures of financial firms.

Table 2
Citigroup's reporting of credit derivatives as protection seller

(USD millions)

	Maximum potential amount of future payments	Fair value payable[1]
Total by industry/ counterparty	**1,315,106**	**76,581**
Bank	860,437	46,071
Broker-dealer	301,216	17,661
Monoline	–	–
Non-financial	2,127	96
Insurance and other financial institutions	151,326	12,753
Total by instrument	**1,315,106**	**76,581**
Credit default swaps and options	1,314,282	76,383
Total return swaps	824	198
Total by rating	**1,315,106**	**76,581**
Investment grade	759,845	23,362
Non-investment grade	422,865	33,231
Not rated	132,396	19,988

Note: The table summarises the key characteristics of the Company's credit derivative portfolio as protection seller (guarantor) as of September 30, 2009.
1) In addition, fair value amounts receivable under credit derivatives sold were USD 23,324.

Table 3
JPMorgan Chase's reporting of credit derivatives as protection seller

(USD millions)

	< 1 year	1-5 years	> 5 years	Total Notional Amount	Fair value[1]
Risk rating of reference entity					
Investment grade (AAA to BBB-)[2]	(177,404)	(1,767,004)	(713,555)	(2,657,963)	(215,217)
Noninvestment grade (BB+ and below)[2]	(121,040)	(992,098)	(428,895)	(1,542,033)	(244,975)
Total	**(298,444)**	**(2,759,102)**	**(1,142,450)**	**(4,199,996)**	**(460,192)**

Protection sold-credit derivatives and credit-linked notes (CLN) ratings/maturity profiles as of December 31, 2008. The contractual maturity for single-name CDS contract generally ranges from three months to ten years and the contractual maturity for index CDS is generally five years. The contractual maturity for CLNs typically ranges from three to five years.
1) Amounts are shown on a gross basis, before the benefit of legally enforceable master netting agreements and cash collateral held by the Firm.
2) Ratings scale is based upon the Firm's internal ratings, which generally correspond to ratings defined by Standard & Poor's and Moody's.

Table 4
Contingent collateral liabilities for JPMorgan and Goldman Sachs
Collateral – Credit-risk-related contingent features in derivatives

(USD billions for JPMorgan; USD millions for Goldman Sachs)

	JPMorgan			Goldman Sachs	
	Collateral posted	Additional collateral in case of downgrade AA to BBB: six-notch	Additional collateral in case of downgrade AA to AA-: one-notch	Additional collateral in case of one-notch downgrade	Additional collateral in case of two-notch downgrade
2006 Q4	26.6				NA
2007 Q1	27.0	2.6	0.1	607	NA
Q2	28.3	2.9	0.2	598	NA
Q3	32.8	3.2	0.3	752	NA
Q4	33.5	2.5	0.2	595	NA
2008 Q1	48.5	3.4	0.3	957	NA
Q2	58.2	3.5	0.6	785	NA
Q3	60.1	4.3	0.9	669	NA
Q4	99.1	6.4	2.2	897	2,140
2009 Q1	82.3	4.9	1.4	941	2,140
Q2	67.7	4.0	1.2	763	1,930
Q3	66.0	4.4	1.5	685	1,700

In contrast, there is some useful information on potential margin calls. Table 4 illustrates that during the first quarter of 2007 and the third quarter of 2009 different financial firms reported their margin liabilities in case of own downgrades with varying levels of granularity and "stress". JPMorgan's report historically appears the best in a relative sense in that it includes margin liabilities for one-notch downgrade and up to six-notch downgrade. Goldman Sachs, however, reports margin liabilities only up to two notches, and the second notch is disclosed only since the crisis. It is immediately apparent from this report that JPMorgan's liquidity risk from one to six-notch downgrade is far smaller in terms of multiplier on the required margin than it is for Goldman Sachs.

No discussion of contingent liquidity risk related to margin calls can be complete without a discussion of AIG. Table 5 shows that AIG reported only one-notch downgrade risk up until the third quarter of 2008, and in that last quarter, reported up to two notches. From one to two notches, its collateral liability increased by a factor of six, a valuable piece of information in assessing system's counterparty risk to AIG that was not available in their reports until the second quarter of 2008.[8] As it turned out, while Moody's and Fitch

Table 5
Contingent collateral liabilities of AIG

(USD millions)

	2007-1	2007-2	2007-3	2007-4
Marginal call Reports				
Additional collateral for one-notch downgrade rating	902	847	830	1,390
Additional collateral for two-notch downgrade rating				
Additional collateral for three-notch downgrade rating				
Additional collateral for multi-Notch downgrade rating				
	2008-1	**2008-2**	**2008-3**	**Actual**
Marginal call Reports				
Additional collateral for one-notch downgrade rating	1,800	1,200	1,800	
Additional collateral for two-notch downgrade rating			9,800	Moody's and Fitch downgrade
Additional collateral for three-notch downgrade rating			20,000	S&P downgrade
Additional collateral for multi-notch downgrade rating			32,000	Market risk adjustment

8 *This information too was available not in a well tabulated form in AIG's 10-Q of the third quarter of 2008 but in the body of the text: "Credit ratings are important to AIG's business, results of operations and liquidity. Downgrades in AIG's credit ratings could increase AIG's borrowing costs and could adversely affect its competitive position and liquidity. With respect to AIG's liquidity, it is estimated that, as of the close of business on April 30, 2008, based on AIGFP's outstanding municipal guaranteed investment agreements (GIAs) and financial derivative transactions at that date, a downgrade of AIG's longer – term senior debt ratings to "Aa3" by Moody's Investors Service (Moody's) or "–" by S&P, a division of the McGraw – Hill Companies, would permit counterparties to call for approximately USD 1.8 billion of collateral, while a downgrade to "A1" by Moody's or A + by S&P would permit counterparties to call for approximately USD 9.8 billion of additional collateral. Further downgrades could result in requirements for substantial additional collateral, which could have a material adverse effect on how AIGFP manages its liquidity. The actual amount of collateral that AIGFP would be required to post to counterparties in the event of such downgrades depends on market conditions, the fair value of outstanding affected transactions and other factors prevailing at the time of the downgrade. Additional obligations to post collateral would increase the demands on AIGFP's liquidity."*

downgraded it by two notches, Standard & Poor's did so by three notches, resulting in collateral liability of USD 20 billion which was compounded upwards eventually to USD 32 billion given mark-to-market or fair-value adjustments due to deteriorating market conditions.

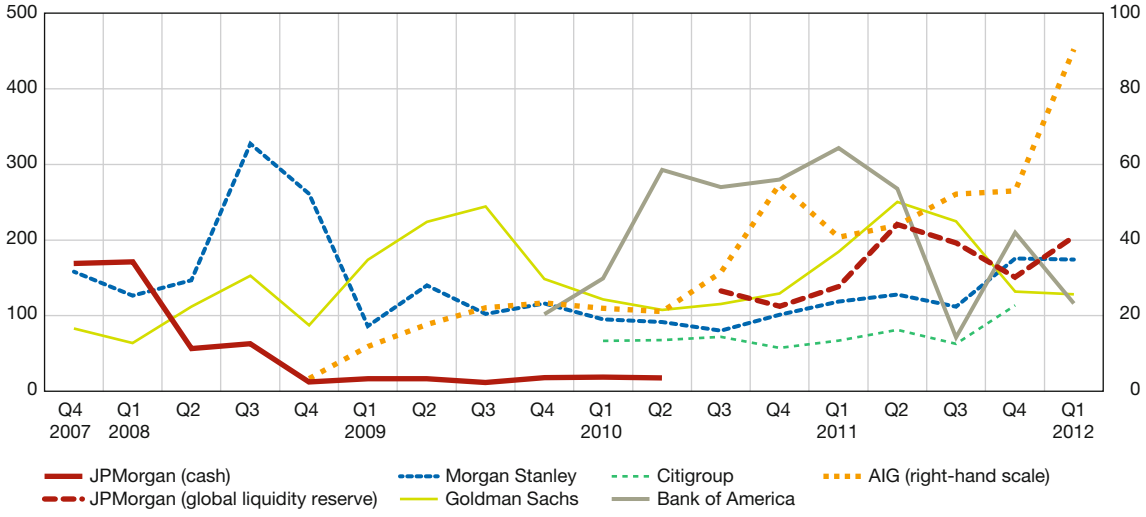
Finally, it is instructive to use these margin call reports in conjunction with the cash position of these firms to assess their MCR. In the fourth quarter of 2008, JPMorgan Chase had cash-equivalent assets of USD 26 billion, so that its MCR was over four, since its margin call for a six-notch downgrade is USD 6.3 billion. Goldman Sachs had cash assets (its "total global core excess") of over USD 100 billion, giving it an MCR of around 50 for a margin call of USD 2.14 billion at a two-notch downgrade. That is, while Goldman Sachs' liquidity risk due to collateral calls is substantial, it also holds a lot of unencumbered cash to deal with this risk. In contrast, AIG had cash assets of just around USD 2.5 billion in 2008, giving it an MCR of between one and two for its USD 1.8 billion margin call at one-notch downgrade. Once it revealed its two-notch downgrade risk in August 2008, its MCR for two-notch downgrade was just around 0.25 as its (hitherto un-disclosed) margin call exposure was up at USD 9.8 billion with a two-notch downgrade. AIG's margin risk was simply not well covered for a "stress" downgrade scenario by its holdings of cash assets. Importantly, for a multi-notch downgrade, this was not at all transparent based on it 10-Q's prior to August 2008.

The purpose behind reporting these data from 10-Q filings is two-fold. One, to make it clear that financial firms can, and do, report much of the possible standard discussed in this note for derivatives reporting. Second, to illustrate that standardised data can support and enhance the assessment of counterparty risk in derivatives markets using simple analytical tools such as the margin coverage ratio (that is analogous to interest coverage ratio employed by credit rating analysts in their assessment of non-financial corporations' liquidity risk).

4| Recent trends in derivatives net payables, collateral, and margin coverage ratios

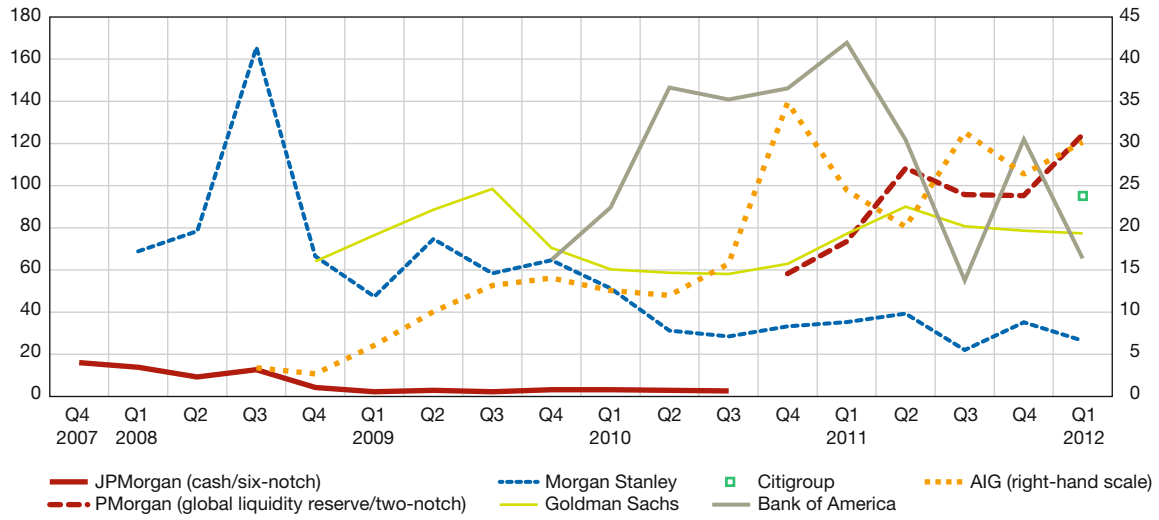
How has the reporting of derivatives-based liabilities of these large financial institutions evolved since the financial crisis? The next set of charts (Charts 1 and 2) illustrates some progress toward standardised margin call reporting for these dealer banks. During the first quarter of 2010 to the fourth quarter of 2011, all of these firms reported their additional collateral liability in the event of a one-notch downgrade in

Chart 1
Margin coverage ratio in case of one-notch long-term credit rating downgrade for JPMorgan, Goldman Sachs, Morgan Stanley, Bank of America, Citigroup and AIG



Note: The MCR for JPMorgan as plotted consists of two segments: the fourth quarter of 2007 to the second quarter of 2010 is calculated using the cash or cash equivalents, and the third quarter of 2010 to the first quarter of 2012 is calculated using global liquidity reserve.

Chart 2
Margin coverage ratio in case of two-notch long-term credit rating downgrade for JPMorgan, Goldman Sachs, Morgan Stanley, Bank of America, Citigroup and AIG



Note: The MCR for JPMorgan as plotted consists of two segments: the fourth quarter of 2007 to the third quarter 2010 is calculated using the cash or cash equivalents and collateral needed for six-notch downgrades, and the fourth quarter of 2010 to the first quarter of 2012 is calculated using global liquidity reserve and collateral needed for two-notch downgrades.

long-term credit rating (respectively to each of these firms). This facilitates a calculation of their MCR as shown in Chart 1 (calculated as the total global reserve divided by additional collateral needed, whenever global reserve is available, else as cash divided by additional collateral needed). The one-notch downgrade MCR is highest for JPMorgan and Morgan Stanley, but smaller for Citigroup (which has the highest one-notch downgrade collateral liability in absolute terms), Bank of America and Goldman Sachs. While AIG's MCR is smaller in value compared to these firms, it has the most significant improvement in terms of trend in MCR since the crisis. Chart 2 shows the MCR in case of two-notch downgrades. Now, it is Morgan Stanley and Bank of America that have the smallest two-notch downgrade MCR (along with AIG).

Notably, JPMorgan reports one-notch and six-notch downgrade collateral liabilities until the third quarter of 2010, but switches to reporting only one-notch and two-notch downgrade scenarios – like other firms – starting the fourth quarter of 2010. This suggests a "race to the bottom" in reporting standards. Furthermore, Citigroup reports two-notch downgrade liability only starting the first quarter of 2012. None of the stress scenarios provide any concentration reports in terms of lead counterparties exposed to these collateral liabilities. Nor do the scenarios take account of systemic risk in the form of correlated downgrades of these firms as witnessed in 2007-08. Interestingly, large European dealer banks by and large do not disclose much information about their potential derivatives liabilities and associated margin calls.[9] Private communication with the investor relations of these European banks suggests that they do not disclose such information as they are not required to do so.

All in all, this account of private disclosures of derivatives-linked collateral liabilities only highlights the importance of requiring a global transparency standard for derivatives reporting and associated collateral liabilities.

5| Conclusion

In summary, better market discipline and regulatory intelligence about counterparty risk in derivatives markets likely requires a new transparency standard.

9 *Exceptions to this statement are the Swiss dealer banks, Credit Suisse and UBS, which respectively provide quarterly and annual information on collateral requirements in case of downgrades; however, other large European dealer banks such as Deutsche Bank, BNP Paribas, Barclays and HSBC do not yet provide this information, to the best of our knowledge.*

This standard could be layered on top of the current quarterly disclosures of derivatives positions and risks by financial firms, but with a greater frequency for regulatory reports. Of particular importance is position-level transparency of large derivatives players, not just in a static sense, but also as potential exposure to stress scenarios, margin call exposure in case of their credit quality deterioration, and concentration exposure for assessment of systemic interconnections. Such transparency would facilitate tracking valuable counterparty risk indicators, most notably the MCR that compares a firm's cash position to its margin call exposure under stress scenarios. While large dealer banks in the United States provide some disclosure along these lines, their disclosure is not adequately standardised, precluding a ready comparison across banks, and the downgrade scenarios considered in the disclosure are not sufficiently stressed.

It is important to recognise the desired scope as well as the limitations of such a transparency standard.

One, the focus on derivatives should not be misconstrued as being the only contingent liabilities that are important. Contingent liabilities can materialise on balance-sheets of large financial firms due to correlated drawdowns of undrawn lines of credit, triggering of guarantees provided to special purpose vehicles such as conduits and special investment vehicles (as materialised in August 2007), and inability to roll over short-term debt in the form of commercial paper and sale and repurchase ("repo") agreements. Principles of the standard proposed here should extend to these liabilities.

Second, the transparency standard proposed assumes that disclosures provided by financial firms will be reliable, that is, can be verified by suitable auditing. To the extent incentives to misreport in such disclosures remain, especially so during weak conditions for financial firm balance-sheets, auditing of positions and model assumptions underlying the disclosures would also be important. One attractive possibility is to undertake such auditing as part of the regulatory stress tests, for instance, as are being required of systemically important financial institutions under the Dodd-Frank Act in the United States.

Finally, many derivatives-based liabilities have arisen when large financial firms' top management is itself caught off-guard in terms of the scale of the liabilities, as witnessed recently during the "London Whale" trading debacle at JPMorgan. A transparency standard such as the one proposed can work well only to the extent that decentralised data on trades and liabilities are being aggregated suitably inside the large financial firms. It is quite likely in fact that putting in place a transparency standard for derivatives and auditing their disclosures helps the top management of these firms to ensure high-quality and comprehensive aggregation of decentralised data. The resulting improvement in individual firm's risk management would be an added benefit of the transparency standard, besides its natural use as a regulatory tool and its role in enhancing market discipline.

New infrastructures for a sounder financial system

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In the current transactions-based financial system, systemic breakdowns associated with liquidity failures become more likely when market participants and regulators have imperfect information about the potential liquidity flows and risk distribution in the system. Trade repositories are designed, in part, to address this problem.

Dramatic improvements in information and communication technologies are the main factor behind the tremendous expansion of securities and derivatives markets since the 1980s, which has made financial intermediation more of a trade-based rather than a relationship-based activity. The result is that every systemically important financial institution (SIFI) has a globally distributed web of exposures to a multitude of other market participants in the system, which makes the identification of aggregate risk or systemic fragility a complex task. In addition, the availability and accessibility of data in financial markets has remained largely siloed within specific markets, infrastructures and jurisdictions. Indeed, without relevant data on all existing trades, the ability to accurately identify risk exposure in an interconnected global financial system has become all but impossible for both participants and regulatory authorities, especially with traditional risk management techniques such as "value at risk" being widely criticised after the 2008 crisis.

Over the past two decades, one could argue that the public and the regulatory authorities relied, to a certain degree, on the self-correcting abilities of financial markets. Officials, such as the Federal Reserve in the United States and the European Commission's Internal Market, have articulated on several occasions the importance of allowing self-correcting forces in financial markets to run their course. While there have been a number of disruptive events, they have had a limited impact in time and scope primarily because few markets and institutions appeared to suffer long-term negative impacts. Furthermore, the financial crises that had major impacts on developing countries in the 1990s were largely attributed to structural weaknesses in those economies rather than fundamental issues in the way contemporary financial markets and their associated risks were managed.

The 2008 crisis changed this mindset. Today, authorities explicitly recognise that financial markets do not always work predictably and can be systemically affected by remote market failures – that is, situations where markets break down and/or do not react in an expected way. As a result, policymakers and market participants have begun to develop or reshape markets to be better equipped to help identify, manage and absorb – or ideally prevent – systemic failure. This has led to an emphasis on the development of tools and resources that allow regulators and the public to detect potentially dangerous market activity and trends – in effect, to create a system to proactively detect conditions that could create financial instability, such as excessive risk-taking, risk concentration or market manipulation.

As this paper will demonstrate, trade repositories (TRs), which provide transparency into the over-the-counter (OTC) derivatives markets, are a critical component of these efforts and arguably the most significant risk management innovation to emerge from the financial crisis of 2008.

Section 1 of the paper turns back the clock to look at how and why TRs were created and the lessons that were learned from the bankruptcy of Lehman Brothers in 2008.

Section 2 describes the way in which the financial crisis drove regulators to establish new global data access guidelines and the development of an online regulators' portal for the global credit default swap (CDS) market, which has resulted in greater market transparency.

Section 3 focuses on an ideal model of how TRs should work in the new regulatory landscape, particularly the need for them to collect and maintain a complete data set per global asset class.

Section 4 addresses the operation of TRs as a "public good".

Section 5 highlights the ongoing concerns, challenges and threats that could undermine the value and utility of TRs, such as divergent national or regional regulations, commercialisation of the TR function, the absence of globally agreed upon data standards and the fear of data concentration. It also offers several mitigating solutions.

Section 6 contains a few concluding remarks on future challenges for operating TRs.

1| The history of trade repositories

While TRs are arguably one of the most significant innovations in the global market infrastructure space in recent years because of their ability to provide transparency into the opaque OTC derivatives market, they were originally created for an entirely different purpose.

The CDS market had grown significantly through the late 1990s and early 2000s, but only an estimated 15 percent[1] of trades were being captured electronically as of 2003. The trading process at that time was predominantly manual and error-prone and, in many cases, trades were taking up to a month to confirm – resulting in an accumulation of un-reconciled and unidentified risk in financial institutions and markets across the industry. Recognising the need to eliminate this risk, several national and trans-national authorities called for the development of an electronic matching and processing service for CDS trades.

Through the collaborative efforts of market participants and The Depository Trust and Clearing Corporation (DTCC), an industry utility providing post-trade services to global financial markets, an automated matching and confirmation system, known as Deriv/SERV was created in just nine months. Within a relatively short period of time from implementation, this new matching and confirmation service was being used to capture and process more than 95 percent of all global CDS trades.

With the confirmation problem resolved, regulators and market participants recognised that the downstream processing of CDS trades represented another area of concern. For example, the recordkeeping and reconciliation of modifications and amendments to CDS contracts, which could be resold or reassigned multiple times before their termination date, remained mostly manual. To address this, a new infrastructure was created in 2006, the DTCC Trade Information Warehouse (TIW), to provide an automated central warehouse to house and service all CDS contracts throughout their lifecycle.

By 2007, TIW held information constituting the legal books and records of over 2.2 million outstanding CDS contracts, representing an estimated 98 percent of the global inventory of CDS trades.

The Lehman bankruptcy

The 2008 financial crisis highlighted the ability of TIW to play a role that was different to that originally intended when it was created – to provide an unprecedented degree of transparency into the opaque CDS market through the development of what we now call TRs.

While there remains on-going debate about what led to the global financial crisis, among the most significant factors were:

- excessive one-way positions that American International Group (AIG) took in mortgage-related CDS trades, which threatened the continued viability of a systemically important firm and went unrecognised until too late; and

- a general lack of understanding of the value of the exposures and the interconnectedness of the counterparty community across the global derivatives market, which contributed to a lack of confidence in the creditworthiness of specific financial institutions during a time of market stress.

In the first instance, it is possible that if the current system for reporting and disclosure of CDS trade data, which was established by the OTC Derivatives Regulators' Forum (ODRF)[2] in 2009,[3] had existed during the crisis regulators would have had an early indication of AIG's position and may have been able to take action to address the situation.

The bankruptcy of Lehman represents a watershed moment that established what would become known as TRs as an essential tool to help regulators manage systemic risk and to give the public transparency into position and activity levels in the CDS market. In the aftermath of the Lehman bankruptcy in September 2008, rumors swept through the

1 http://www.dtcc.com/news/press/releases/2011/deriv_reg_portal.php.
2 http://www.otcdrf.org/index.htm.
3 http://www.otcdrf.org/documents/framework_sept2009.pdf.

global marketplace that potential liabilities for CDS trades on outstanding Lehman obligations could top USD 400 billion. These rumors reached a peak when markets closed on Friday October 10, 2008, and investors feared the worst.

In response, regulators worked closely with DTCC to analyse data from TIW to get a better understanding of actual market exposures to the Lehman bankruptcy. This data revealed that the actual net liabilities would be far less than the market anticipated – in fact, after netting, around USD 6 billion rather than USD 400 billion. This brought a moment of much needed respite to a market rapidly spiraling out of control. Markets calmed and, in the subsequent auction of obligations, the actual figure of USD 5.2 billion proved the accuracy of the data in TIW. The utility of the TR had been firmly established.

Since the end of 2009, this central infrastructure has processed more than 50 bankruptcies and other "credit" events, including the Greek sovereign debt restructuring last year, ensuring the accurate and timely distribution of hundreds of billions of dollars in CDS payouts automatically triggered by such events.

2| How markets have responded to the need for transparency

2|1 Lessons learned from the financial crisis

The crisis of 2008 provides significant lessons learned for all stakeholders, which can best be summarised in the management maxim: "If you can't measure it, you can't manage it."

• **Lesson 1: data transparency is critical.**[4] Transparency of trading data is critical for a) regulators to understand where market risk and potential financial instability is building in the system and b) trading entities to understand their total risk exposures to their counterparties. Transparency allows concentration and counterparty risks to be identified and managed. Since 2008, data has become more widely accessible to stakeholders in order to improve market transparency.

• **Lesson 2: data accuracy is vital.** Transparency is only useful if the underlying data is complete and accurate. In the absence of accuracy, regulators and/or the public may draw flawed conclusions from the data. The most effective way to ensure data accuracy is to establish a central global TR that aggregates data and maintains the appropriate safeguards to prevent duplication, omission and other data capture errors that can impact accuracy.

• **Lesson 3: incomplete data compromises accuracy and transparency.** The global nature of derivative markets requires global solutions that ensure all stakeholders have access to their complete global data set. Regional solutions, by definition, can only provide part of the picture and, therefore, can only offer stakeholders a limited degree of market transparency. From a regulatory perspective, aggregation of data from multiple sources is likely to be problematic due to technical and geo-political constraints that may exist during a crisis, as evidenced before 2008.

2|2 Regulatory response to the financial crisis

The most visible response to improving market safety since the 2008 crisis is the implementation of policies to address the three lessons mentioned above. Lawmakers and regulatory authorities around the world have focused on establishing a system of oversight that facilitates greater transparency of financial markets to protect the integrity of, and mitigate risk in, the global financial system. Let's look at two examples.

• **A global approach to data collection.** Regulators need timely access to detailed, accurate data on global derivatives activity, with a special focus on the traditionally opaque OTC derivatives market, so they can identify significant risk exposures and respond appropriately when the need arises. In recognition of this, the G20 made a series of recommendations at its September 2009 meeting in Pittsburgh to both harmonise global regulatory regimes and to increase the transparency of the world's financial markets.

In October 2010, the Financial Stability Board (FSB) established twenty-one recommendations[5] aimed at promoting consistency of derivative market reforms

4 http://dtcc.com/products/derivserv/data/index.php.
5 http://www.financialstabilityboard.org/publications/r_101025.pdf.

across jurisdictions, including several related to the role of TRs.

For example, the FSB's Recommendation No. 16 on access to data states:

"*Market regulators, central banks, prudential supervisors and resolution authorities must have effective and practical access to the data collected by TRs that they require to carry out their respective regulatory mandates. Access to TR information by official international financial institutions also should be permitted in appropriate form where consistent with their mandates.*"

These recommendations form part of a global package of reforms, including enhancements to electronic execution, mandatory clearing and trade reporting, which are being turned into legal and regulatory proposals in the United States, the European Union and Asia.

• **A global approach to data transparency.** The ODRF and DTCC sought to build further improvements in market transparency by developing a "regulatory portal" (Portal) to give supervisors worldwide the ability to access trade data via a secure web-based service. The Portal, which was launched in 2011, enables regulatory agencies that are members of the ODRF to access granular data from all major dealers and more than 1,800 buy-side firms and other market participants in more than seventy countries markets. This provides them with a complete view of activity relevant to their jurisdictional responsibilities at the counterparty level as well as the underlying instrument, even if neither of the trading parties is located within their jurisdiction. The ability to view reference entity data, which is typically not available in local repositories, has proven invaluable during the recent European sovereign debt crisis because CDS trades are seldom written locally on local sovereign debt.

The Portal is the first global regulatory service of its kind in the financial marketplace and is fully aligned with the current needs of regulators and authorities. The Portal provides accurate, reliable and complete relevant data to the regulators in a timely and seamless manner without imposing artificial barriers based on geographic jurisdictions and home borders, which have little or no meaning in modern derivatives markets.

The Portal, consistent with regulatory recommendations, strikes a balance between the level of data dissemination that is in the interest of both the public and regulators, while also maintaining appropriate levels of confidentiality to avoid market manipulation. While the public can access aggregate, anonymised data for free on the Internet,[6] regulators can obtain more granular information, including:

• counterparty exposure reports, which provide buy/sell positions for the regulated entity aggregated by counterparty;

• underlying, or reference entity, exposure reports, which provide buy/sell positions aggregated by underlying and counterparty;

• systemic reports, which provide aggregate positions where a large financial firm is the underlying entity together with positions of other large financial firms.

As a result of these regulatory responses and market action, the CDS market is now arguably more transparent than the traditional equity and bond markets.

3| How trade repositories would ideally work in the new regulatory landscape

Under new regulations in the United States, the European Union and parts of Asia, all OTC derivative trades (and exchange traded derivatives in the European Union), whether cleared or un-cleared, must be reported to a TR.

In an ideal world, the maximum benefit of trade reporting can best be achieved from the creation of a single, centralised TR per asset class. This global repository, acting as a utility, would collect and maintain data for all global derivative trades across asset classes. This centralised utility would also become the so-called "golden source" containing 100% of the legally binding contract data for all relevant derivative trades for that specific asset class.

There are significant benefits of establishing a single centralised TR, including:

• **reporting accuracy:** a single TR can implement global reporting templates, which would eliminate

6 http://www.dtcc.com.

potential errors associated with confusion arising from the existence of multiple templates even within single jurisdictions where there are multiple repositories;

- **reporting timeliness:** market participants have certainty where and when to report their trades;

- **reporting control:** a central TR can more easily assess the completeness and accuracy of the data through direct comparison of multiple reports. Internal reconciliation becomes a simpler activity than reconciliation between multiple entities and the chances of duplication or reporting error are greatly reduced;

- **data analysis:** a single TR can easily develop and share common data management and analysis tools among its user base, giving all regulatory authorities identical access to their complete relevant data set irrespective of where the derivatives trade was agreed upon and executed;

- **common best practice:** a central repository would allow best practices to be shared among the global regulatory community.

The CDS market offers the right model for establishing a single TR to bring data certainty and transparency to the other OTC derivatives asset classes. In the CDS space, a utility operating with virtually all of the relevant transaction data has best served the public good. Based on this experience, the existence of multiple commercial TRs would create new challenges and unintended consequences that could impact market transparency.

4| Trade repositories as a public good

Many definitions of a "public good" exist and they all include these basic characteristics:

- it is usually a commoditised service;

- it is provided without profit;

- it can be provided by public or private entities;

- it is a service designed to provide a service to the "public" (i.e. all stakeholders);

- its usage by one stakeholder does not preclude usage by any other;

- its usage by one stakeholder does not impact any other.

Access to and consumption of information critical to the public good, whether by private agents, public authorities, market participants or the public at large, should be championed.

Most developed nations, within the limits of national security, promote freedom of access to information. Financial markets should be no different because, as described earlier, market opacity during the Lehman bankruptcy had the potential to transform market stress into a financial crisis. The lack of a publicly available, accurate "real-time" picture of the overall size of market positions and exposures left participants prey to rumor and created market reactions that could have exacerbated the situation. The availability and accessibility of data is essential in helping regulators monitor risk in the marketplace and enabling them to take action to prevent the next crisis from occurring – thus protecting the public interest.

Global TRs are uniquely positioned to help support financial stability and the integrity of financial makers and provide this public good. First, they can model mark-to-market values and corresponding margin calls daily on *all* positions under multiple, regulator-specified stress scenarios. A single data repository can identify potentially large margin calls under market stress conditions that could be difficult for affected firms to satisfy.

Second, they can track related potential "chain reaction" payment failures across jurisdictions, which may not be visible to any single national or regional authority. For instance, in a currency shock, a US bank may owe several billion dollars in variation (mark-to-market) margin to a European bank, which in turn owes the same amount to a Japanese bank. In this scenario, the European bank may look flat but in reality is in the middle of a potential liquidity squeeze between two other countries.

Third, a centralised TR can ensure that both the public and relevant authorities have an accurate understanding at all times of the overall size of all derivative market positions ("open interest") and

exposure to the types of market participants that are driving the position taking, and for relevant authorities only the positions of particular market participants.

Fourth, the provision of a public good should not be subject to commercial pressures and sensitivities. The provision of this data is to safeguard the markets and ultimately protect the public interest, which are the investors in these markets. To have such a service provided as a for-profit activity is inconsistent with this mission.

5| Global policy debate: threats that undermine the potential value and utility of repositories

While the value of a single global TR has been demonstrated during the Lehman bankruptcy and other market events since 2008, multiple threats exist that could undermine this model and negatively impact the value of this public good. These threats include:

- divergent national or regional regulations;
- commercialisation of the TR function;
- the absence of globally agreed upon data standards;
- data concentration.

5|1 Divergent national or regional regulation

The enactment of national and/or regional regulations in the global derivatives market will inevitably lead to regulatory gaps and open the door to regulatory arbitrage. Regulatory gaps have the potential to create confusion for participants and can lead to the creation of process-associated risks. This is most evident in the significant differences in regulatory scope and reporting timing in the US and EU markets.

- *US scope and timing:* reporting is only for OTC derivatives with the differentiation of cleared versus un-cleared trades. Reporting is required within thirty minutes of the trade execution.

- *EU scope and timing:* here the scope is all derivatives with the essential differentiation of listed versus OTC contracts. Mandatory post-trade reporting must be completed by $T+1$.

Divergent regulation will encourage the creation of local and regional TRs to facilitate compliance with local regulation, which ignores the global nature of the derivatives markets. The indemnification provision in the Dodd-Frank Wall Street Reform and Consumer Protection Act, enacted in 2010, serves a classic example of this problem because it encourages non-US regulators to promote the creation of national repositories in order to avoid this part of the law.

5|2 Commercialisation of the trade repository function

Commercial organisations recognise the potential opportunity to create new profit centers by developing services to support industry compliance with regulatory mandates. This dynamic was seen very clearly in the immediate aftermath of the implementation of the Markets in Financial Instruments Directive in Europe, which spurred the creation of a large number of Multi-lateral Trading Facilities to capitalise on the new business opportunity presented by the regulation.

However, the immediate rush by providers to offer a service to support a new regulatory mandate often results in over-capacity. Over time, market forces reduce the number of providers to a number that the market can support. Most recently, we have seen this occur in the number of central counterparties that have been created in response to the G20 drive towards central clearing of derivatives.

In regard to TRs, application of this typical market evolutionary pattern suggests that in the short term, multiple TRs will emerge in the immediate wake of regulatory enactment in each of the global jurisdictions, creating non-centralised and non-harmonised local solutions to a global problem. This will likely be followed by a natural contraction in the number of TRs due to over-supply. As a result, this will create a second problem of consolidation and re-engineering among the remaining providers and regulators. We have already started to see this pattern begin to emerge with the proliferation of repositories in both the United States and the European Union.

5|3 Absence of globally agreed upon data standards

With the likelihood of multiple repositories serving the marketplace, data aggregation will be essential for regulators and the public to have an accurate picture of the marketplace. However, aggregation will be possible only if a global system of data identifiers is developed and agreed upon. At a bare minimum, this includes the establishment of a global legal entity identifier, and universal trade identifier.

5|4 Data fragmentation

The major hurdle to the establishment of a global utility appears to be political in nature. Policymakers and regulators aim to provide level playing fields for all market participants. However, in the case of TRs, where the provision of the service is clearly a public good, a proliferation of repositories would lead to data fragmentation between multiple national and international service providers who, for commercial reasons, would likely have little incentive to work collaboratively in support of market transparency and risk mitigation. With data fragmentation, regulators would find themselves hindered in their ability to quickly and efficiently collect, aggregate and reconstruct market positions across multiple repository providers, particularly in times of market stress when time is of the essence. Any solution that requires data aggregation in order to derive accurate risk information is a sub-optimal result for the policy makers, regulators, market participants and the general public.

5|5 Potential solutions to address issues of data fragmentation

Resolution of the data fragmentation issue requires addressing two key political issues – how to organise the governance of a global public good and where that public good should be located.

Governance. The governance model for a utilitised TR should include appropriate participation of public users, including relevant public institutions, central banks, securities and derivatives regulators and other governing bodies, whether in the form of a public-private partnership or some other structure. To achieve this, international agreements around data access and entitlements to ensure unfettered and unbiased access for all authorities would need to be established. In addition, issues of oversight, funding, cross-border data access for systemic risk data and stress testing methodologies would need to be resolved.

Location. The location of a utilitised repository could be addressed by establishing separate data centers and operating companies in the United States, Europe and Asia to ensure local input and output of data in each region and multiple redundancies. In addition, this would allow for distributing the ownership of the global utility.

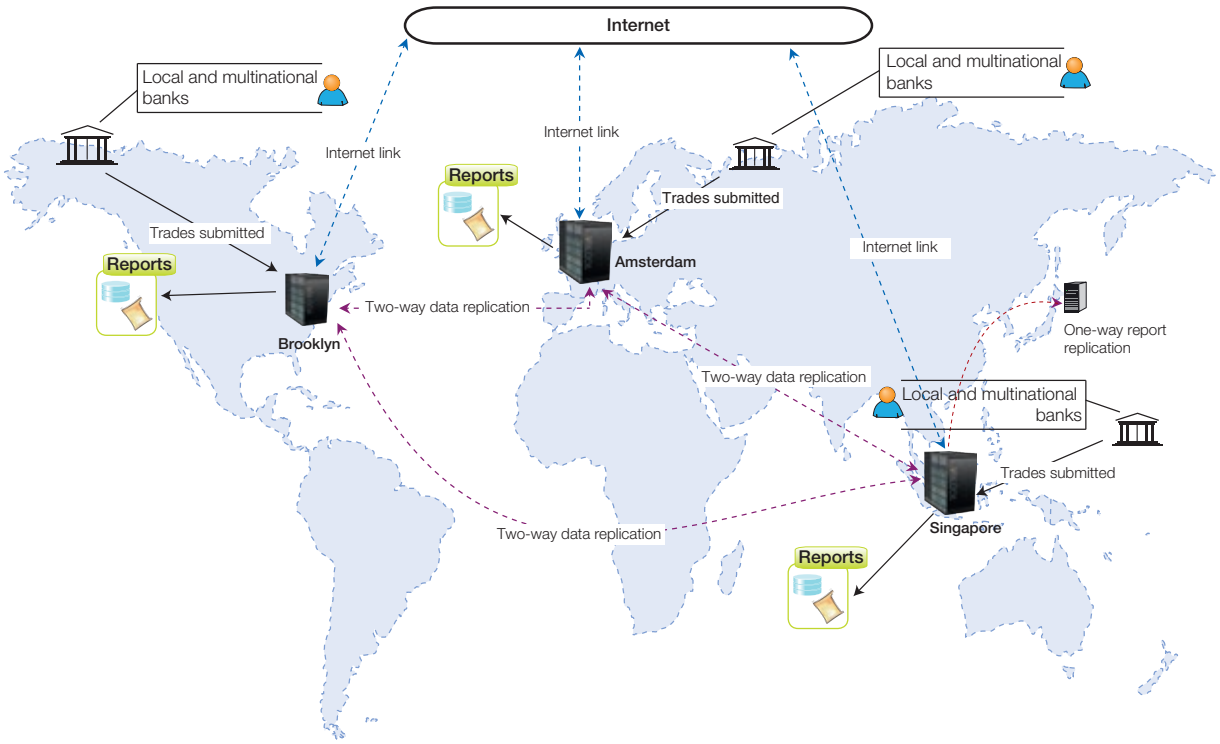
Alternative solutions. With the development of a single global TR likely to remain a challenge for the next several years, there are three potential structures that would ensure the function and some of the value of a central utility can be preserved in collecting and maintaining a global data set of all OTC derivatives transactions. They are:

- *agency model:* a central global utility works closely with a locally-established TR to ensure the local data set is completed, including data from outside the local jurisdiction. In return, the central utility receives the local data;

- *outsourced model:* a single central utility outsources its operations to other jurisdictions to provide a local TR that is aligned with the global hub;

- *TR of TRs:* a global repository collects and aggregates data from all national or regional repositories.

Figure
"A global trio"



Note: A single TR per asset class per region, operating as 3 faces of a single utility to which the global regulatory community could mandate that common data sets for all similar derivative trades should be reported.

6| Conclusion

The financial services industry is at a turning point in the development of appropriate safety measures for the financial markets. Within the derivatives market specifically, there is a need to recognise that these global markets must be supervised globally. This article has highlighted the challenge, history, function, value and the future of TRs in this new regulatory environment.

Since the 2008 crisis, TRs have evolved to provide many critical functions, including providing transparency into the opaque OTC derivatives market. The ongoing development of this infrastructure will lead to the creation of new tools for regulators and systemic risk managers to more effectively analyse market concentrations and risk distributions in the financial system. Concerns over data concentration or fragmentation and global utilities should not compromise the development of a solution that, at its heart, is a public good.

The importance of data quality for effective financial stability policies

Legal entity identifier: a first step towards necessary financial data reforms

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The success of any type of risk management activity, including financial stability monitoring and policy implementation, depends on the quality, completeness and timeliness of the data underpinning the analysis. The recent breakdown in some over-the-counter (OTC) derivatives markets is often attributed to the opaqueness of the markets and a lack of consistent, accurate data to support both internal (risk management) and external (regulatory supervision) analysis. The quality of data in the markets from which OTC derivatives "derive" is not generally perceived to be much better. In practice, the sharp increase in the global interconnectedness of financial markets has necessitated a shift in the analytical approach for financial stability monitoring and policy development from a historic institution by institution and sector based framework to a new framework that focuses on risks to the system as a whole and that analyses the financial system as a complex adaptive system. The new framework requires investment in new approaches to financial data based on the uniform representation and definition (standardisation) of the key elements, whether referencing an entity, a product, an instrument, a contract, etc. Such elements may be regarded as building blocks which together allow flexible data aggregation to support multiple policy objectives. While there has been substantial progress in the global initiative to standardise the identification of entities in a universally acceptable manner, through the legal entity identifier system, the broader and more complex question of the standardisation of the depiction of financial products/instruments/contracts across markets and geographies remains an important challenge for policy makers to address.

NB: This article represents the personal views of the authors and does not represent the views of the Financial Stability Board.

"Fuelled by rapid financial innovation, deregulation and capital market integration, in recent years we have witnessed a period of tremendous growth and structural change in financial market activity and in financial intermediation across the globe. These developments are profound, with major implications for the performance, risk and management of the global financial system."[1]

Global financial markets experienced pronounced changes in the years before the financial crisis as a result of rapid financial innovation, deregulation and capital market integration. Although the opening up of global capital markets provided an important catalyst, the impact and the speed of the change was, to a large degree, determined by advancements in data management and information technology. Financial markets, like everything else around us, have significantly changed as a result of the information technology revolution that has enabled the automation and computerisation of work processes and business functions, as well as the generation and rapid processing of large volumes of data that has in turn fuelled innovation in new financial products and strategies.

One may argue whether the globalisation and integration of markets was the cause or the effect of the associated changes in financial data infrastructure. However, regardless of the ultimate cause, what is clear is that the sharp increase in the global interconnectedness of financial markets (and of the major global systemically important financial institutions active in such markets) has necessitated a shift in the analytical approach for financial stability monitoring and policy development. The historic institution by institution and sector based framework has proved to be seriously deficient. Policy analysis has consequently and necessarily switched to a new framework that focuses on risks to the system as a whole and that analyses the financial system as a complex adaptive system. To this end, in 2004, the Bank of Japan published a working paper where it noted that:

"The 'network' of financial transactions between financial institutions possess fractal structure, similar to that observed in network structures in the natural world (such as river basins) or the structure of the Internet. We also find that financial institutions situated in the middle of the network structure hold more links than those institutions on the periphery of the network, implying that the formed structure is a result of the pursuance of 'efficiency' rather than 'stability'."[2]

Complex adaptive system analysis has been used in various disciplines notably physics, biology, etymology, computer science and sociology, to name a few. In terms of the use by economists, Doyne Farmer and colleagues note that:

"Techniques used in the analysis of complex systems are quite different from those used in conventional economic theory, with its emphasis on optimisation. They include data mining, network analysis, systems dynamics, agent based modelling, non-linear dynamics, catastrophe theory and the theory of critical phenomena. Much of our emphasis in extending economic theory is on agent based modelling, given that the economy is made up of interacting individual agents (people, firms, regulators, governments), each with the capacity to act with purpose and intent, each of which is acting in the context of networks in which the fundamental behaviour of the agent is not fixed, but which evolves in response to the behaviour of others."[3]

John Miller and Scott Page in their book "Complex Adaptive Systems" emphasise:

"the use of computational models as a primary means for exploring these worlds for a number of reasons. First, such tools are naturally suited to these problems, as they easily embrace systems characterised by dynamics, heterogeneity, and interacting components. Second, these tools are relatively new to the practice of social science, so we take this as an opportunity to help clarify their nature, to avoid misunderstanding, and generally, to advance their use. Finally, given various trends in terms of the speed and ease of use of computation and diminishing returns with other tools, we feel that computation will become a predominant means by which to explore the world, and ultimately it will become a hallmark of twenty-first-century science."[4]

The challenge financial regulators are facing now in adopting models and frameworks to improve the understanding of risks to the system as a whole is that traditional financial analysis has typically been based

1 *See Hamilton, Jenkinson and Penalver (2007).*
2 *See Inaoka, Ninomiya, Taniguchi, Shimizu and Takayasu (2004).*
3 *See Farmer, Gallegati, Hommes, Kirman, Ormerod, Cincotti, Sanchez and Helbing (2012).*
4 *See Miller and Page (2007).*

on a sector, geography or some other partial level. That has led to the development of definitions, tools, and approaches which were considered to provide the best analytical outcomes when studying that particular sector. But such a segmented approach does not support the ready aggregation of data and information across the system as a whole. As markets have become increasingly interconnected, such a segmented approach can become a barrier to the transition to a new paradigm where the principal focus is supporting analysis of financial markets as an integrated complex network system.[5] As noted by Andrew Haldane:

"At present, risk measurement in financial systems is atomistic. Risks are evaluated node by node. In a network, this approach gives little sense of risks to the nodes, much less to the overall system. It risks leaving policymakers navigating in dense fog when assessing the dynamics of the financial system following failure."[6]

The problem of current financial data is not that much focused on quality *per se* but in the fragmentation, incompleteness, and insufficient granularity of definitions and standards, that do not support the conduct of meaningful network analysis. Again, as Doyne Farmer and colleagues note:

"Most current data collection in economics is geared for econometric and DSGE[7] *models, which only require aggregate data such as GDP, unemployment, etc. Network modelling and agent-based modelling, in contrast, are best done with finer grained data…"*[8]

Farmer *et al.* continue:

"The data that one would like to obtain in order to get a realistic picture of the economy includes trades in financial markets with identity information, international trade, firm transactions (invoices and receipts), credit networks, transactions by individual consumers, and electronic text from the internet and other sources. While some of these data are already collected in piecemeal form, much of it is never collected or recorded…"

We are coming from the world where data collection has been tailored for a particular need or a function. While that is a reasonable approach when dealing with isolated markets, products, and geographies, it is not that useful in practice given the powerful interdependencies and interconnections between such elements and the need to consider the behaviour and risks to the financial network as a whole. While we can know the identity of each registered dealer, clearing member, execution agent, etc. in reality all those roles can be performed by the same party. Similar arguments apply to products: over-the-counter (OTC) derivatives derive their value from something. An attempt to capture developments in OTC derivatives products in isolation without linking them to the underlying position would not provide an analyst or risk manager with the full picture. A comprehensive analysis of derivative markets risks needs to take account of entities holding both derivatives and cash positions in order to evaluate the impact of potential shocks.

Increasing the focus on system-wide risks and macroprudential policy development consequently requires changes not only in the models, tools and framework utilised by regulators and financial stability authorities, but also crucially in the financial data infrastructure needed to support and implement analysis of the system-wide network.

To enable regulators to assess the interconnectedness, interdependencies, and risks from globally integrated financial markets, that requires investment in new approaches to financial data based on the uniform representation and definition (standardisation) of the key elements whether referencing an entity, a product, an instrument, a contract, etc. Such elements may be regarded as building blocks which together allow flexible data aggregation to support multiple objectives.

1| Data usage and requirements

Accurate and timely financial data is the lifeblood of well-functioning financial markets in any sector or geography, and serves both public and private sector needs. Recent experience provides multiple examples of failings in information systems and the consequences of those failings on the overall functioning and structure of financial markets.

5 *See Anand, Gai, Kapadia, Brennan and Willison (2012).*
6 *See Haldane (2009).*
7 *Dynamic stochastic general equilibrium* (Editor's note).
8 *See Farmer, Gallegati, Hommes, Kirman, Ormerod, Cincotti, Sanchez and Helbing (2012).*

Inadequate quality and standardisation of financial data led to an unacceptable high operational risk of trade processing; poor monitoring and management of financial risks at the individual firm and system-wide levels, by not allowing effective aggregation of positions at the entity and product level across markets; as well as providing obstacles to the effective execution of insolvency and resolution procedures. Such inadequacies ultimately fuelled and exacerbated the current financial crisis.

Developing a robust data framework that provides reliable, timely information on positions, exposures and risks across the whole financial group is essential to support effective internal risk management. That in turn entails the development and application of common financial data standards and definitions across business lines and entities that facilitates the aggregation of individual positions into various measures of risks. One of the key lessons of the financial crisis that was identified in the paper "Principles for effective risk data aggregation and risk reporting" recently published by the Basel Committee on Banking Supervision (BCBS)[9] was that banks' information technology and data architectures were inadequate to support the effective management of internal business risks. Many banks lacked the ability to aggregate risks quickly and accurately across different lines of business and across different entities within the banking group. That compromised their capability to manage financial risks across the bank as a whole, with severe consequences for the banks themselves and for the stability of the financial system as a whole.

Another important usage of financial data is to support straight-through processing (STP). The European Central Bank defines STP as the automated end-to-end processing of trades/payment transfers including the automated completion of generation, confirmation, clearing and settlement of instructions.[10] STP enables companies to lower operational risks associated with data entry and processing by eliminating multiple manual interventions during the process. The ultimate goal is to ensure that complete and accurate information on individual trades/payments, etc. is entered once at source in a standardised manner. If such an aim can be achieved, then firms and regulators can benefit substantially from STP, both in relation to the financial cycle linked to the particular individual transaction (of payment, settlement and clearing), and in terms of the impact of the transaction on internal risk management, management information, accounting, and regulatory reporting. Standardisation of financial data facilitates adoption of STP, consequently reducing operational risk and delivering substantial financial savings, as well as yielding significant benefits in terms of the quality of information.

The standardisation of data at a granular level also allows the public sector community to fulfill various regulatory functions drawing on a single source of normalised and standardised reported data. Regulators typically require standardised information of various kinds (for example, data on balance sheets and income, on capital and liquidity risks, on credit provided, cross-border positions, derivatives transactions, collateral, etc.) which is used by national financial regulators to assess risks in individual firms, as well as to underpin statistical aggregates of various kinds. Such regulatory data frameworks were found wanting during the financial crisis. In some cases, information was not available to regulators on a timely, consistent basis – reporting of liquidity risks is one example. In other cases, data were typically not available at all, such as information on some shadow banking activities. And in yet more, information was only available in a processed or interpreted form,[11] such as information on risks in OTC derivatives markets, where the lack of standardised data at a transaction level on the terms of contracts renders it very difficult to produce information on aggregate exposures, as the latter also requires information on underlying cash positions, as well as on collateral and other risk mitigants. While gap solutions to collect missing data were introduced as a result of the financial crisis,[12] the underlying principle of a universal and standardised representation of financial elements is essential to deliver a cost-efficient, flexible, accurate and comprehensive financial data infrastructure.

Insufficient attention was paid in advance of the financial crisis on the growing interconnectedness among the global financial network and the

9 *See Basel Committee on Banking Supervision (2013).*
10 *See European Central Bank (2003).*
11 *The article by Henry Hu (2012) offers a valuable analysis of the so called "intermediary depiction model" in comparison to "pure information".*
12 *See Financial Stability Board and International Monetary Fund (2009).*

implications for systemic risk. For example, a primary policy focus on the stability of individual financial institutions led to an under appreciation of the growing risks from concentrations of common exposures and the risks of crowded trades. As many agents tried to exit from particular positions in complex structured markets at the same time at the start of the crisis, market liquidity evaporated. Opacity on where risks were held amplified defensive behaviour and liquidity hoarding. And as it became clearer that there was a major solvency challenge, contagion in financial markets was very rapid, as market participants feared not simply spillovers through direct exposures and cross-holdings, but also indirect spillovers through channels such as fire sales of assets held in common by many firms.

A keystone of the international regulatory reform agenda is to introduce national and international policy regimes that, together with the establishment of firm-level recovery and resolution plans, enable the orderly resolution of all financial firms no matter how large. That is a necessary component of the package of reforms to address the "too big/complex/interconnected" to fail problem that distorts effective market functioning and burdens tax payers. Evidence from the crisis emphasises the importance of high quality data for effective recovery and resolution planning. An inability to identify which risk positions are held by which entity severely complicates the orderly resolution of complex firms, as demonstrated by the experience of Lehman Brothers. Moreover, the absence of such information also seriously reduces the opportunities to strengthen a weak financial firm in advance of resolution, as potential capital suppliers or firms wishing to purchase viable parts of the firm will not be able to undertake appropriate due diligence. The Financial Stability Board (FSB) "Key Attributes of Effective Resolution Regimes"[13] and the BCBS "Principles for effective risk data aggregation and risk reporting"[14] set out core principles and characteristics for high quality information to support this objective.

Finally, market integrity analysis depends on the regulatory community having available accurate and timely information on the activities and positions of counterparties in the markets. However, the availability of information on developments in individual markets, while critically important, is not sufficient for effective market integrity analysis. The ability to aggregate, compare and relate positions in different markets is necessary to identify and prevent market abuse. Here again, standardisation of data at the granular level would allow the market integrity functions to be executed more quickly, more accurately, and ultimately more cost-efficiently.

While the necessary financial data infrastructure changes may look substantial in aggregate when compared to current practices, the transition to a new paradigm provides an opportunity to invest in a unified (shared) financial data system that fulfills multiple private and public sector functions, while eliminating the costs currently incurred by firms of aggregating and reconciling data represented in different forms and standards.

The development of a more robust, granular financial data system to support financial stability analysis and policy implementation will require investment in a number of standardised "building blocks". There are three main blocks: an entity identification scheme that provides clarity on parties to financial transactions; a financial instrument/contract classification that provides clarity on the nature of the transaction; and a transaction identifier for each trade that enables each transaction to be traced. Each of the building blocks offers significant benefits in its own right. But introduced together (along with the identification of relationships/connections among entities), the elements would deliver the powerful, high quality, flexible and granular data architecture highlighted above.

2| Global legal entity identifier initiative

Considerable progress has been made over the past year in the development of a global legal entity identifier (LEI) system that sets out to provide a standardised unique identification system for parties to financial transactions.

13 *See Financial Stability Board (2011).*
14 *See Basel Committee on Banking Supervision (2013).*

The basic idea of the LEI is very simple. The aim is to uniquely identify all parties to financial transactions across the globe by assigning each of them a distinct code that conforms to an international standard (ISO 17442:2012). That code is tied to key reference data for the entity, which includes basic elements such as name and address. In a second phase, the reference data will be supplemented by more complex relationship data such as information on corporate hierarchical relationships, for example, addressing the question: is this party a member of a broader financial group? The reference data will be maintained to high quality standards. Along with the entity code, the reference data will be freely and continuously available to users in the global regulatory community and in the financial industry and beyond. The LEI will thus provide an essential "building block" that is necessary to deliver required improvements in data quality and in data aggregation capabilities. It offers multiple benefits to the regulatory community and to financial firms themselves in terms of the quality and efficiency of their internal systems and their capability to manage internal risks. Trades, financial contracts, and risk positions can be reliably assigned to legal entities, delivering precision and clarity that facilitates risk assessment and management.

Despite its simplicity and obvious benefits, the financial industry has not to date succeeded in overcoming the collective action and first mover problems that provide a challenge to the development of common identification networks of this type. Finance thus lags well behind many other industries that have successfully introduced high quality entity identification systems, such as the chemicals industry, consumer goods distribution industry and entertainment industry to name a few.

Given this background, the introduction of a global LEI system for the finance sector is viewed by many market participants as a pressing need. Regulatory support for the initiative is seen as essential to address the market failures that have bedeviled previous attempts to introduce a common identification scheme. Starting from the position in practice where individual firms use different entity identification systems, firm A would prefer firm B to switch to the existing identification scheme used by firm A in order to avoid any conversion costs. And *vice versa* for firm B. Moreover, as with other network goods such as the telephone, the benefits of introduction of a common system to each user increase the greater the overall usage of the system. It is hard for individual firms to capture the benefits from the common system as these accrue collectively. So left to the private market alone, there may be insufficient incentive for firms to introduce a common system despite the collective benefits. But regulatory intervention encouraging or mandating the use of a standardised identification system can help to overcome such hurdles and deliver the public good benefits to all users.

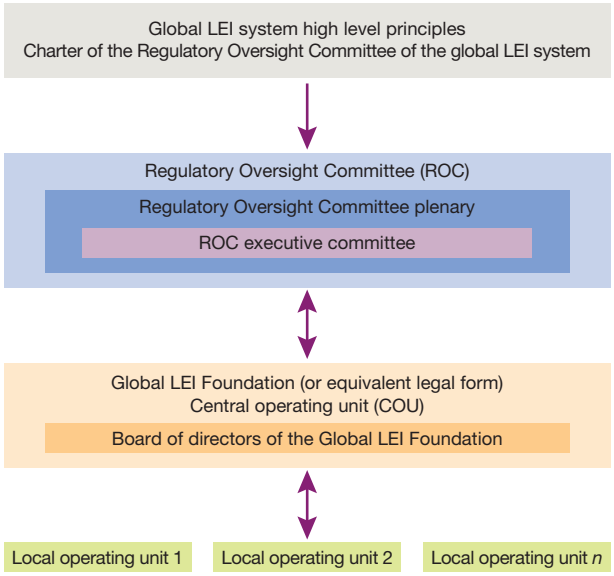
Given the benefits offered by the introduction of a common entity identification system, the G20 tasked the FSB at the Cannes Summit in November 2011 to lead the co-ordination of international regulatory work and to deliver concrete recommendations on the LEI system by June 2012.

As often the case, however, turning the simple concept and idea into a practical way forward is unfortunately not quite as simple as it might first appear. For example, although there are a number of strong, common interests between the public sector and the private sector in the introduction of a global LEI system, there are also a number of areas where interests and incentives are not fully aligned. Mandatory regulatory use of such a system would provide substantial power to the provider(s) of the system. This could work against the fundamental public interest. The mandate provided by the G20 to the FSB consequently emphasised the need to prepare recommendations for a governance framework that protects the public interest, such as preventing abuse of privileged "monopoly" positions by provisions that: emphasise that the global system is not-for-profit; ensure open access; and maintain high quality reference data.

The FSB set out such a framework in June, preparing high level principles, detailed proposals, and recommendations for the introduction of such a framework and development of a global LEI system.[15] The G20 endorsed the recommendations at the Los Cabos Summit in June and asked the FSB to take forward implementation of the system.

15 *See Financial Stability Board (2012).*

Figure
The global legal entity identifier system



The framework set out by the FSB for the global LEI system is based on a federated model. There are three tiers as illustrated in the Figure above:

The first tier is the Regulatory Oversight Committee (ROC) which has ultimate responsibility for the governance of the system in the broad public interest. The second element is the Global LEI Foundation operating the central operating unit (COU) that provides the operational arm of the system. It has responsibility for ensuring uniqueness of the LEI and that the system appears logically "seamless" to users as per the Internet, although again as for the Internet, in practice the system would actually comprise of a number of federated elements that are "plugged together" by technology. The third tier is provided by the federated local operating units (LOUs). These would undertake local registration and validation and would provide additional local flexibility to address issues such as local languages and character sets, as well as local privacy and confidentiality considerations. Where available and feasible, such LOUs would draw on existing local infrastructure.

Good progress has been made in recent months in taking the LEI initiative forward. An FSB implementation group (IG) from the global regulatory community worked closely with a private sector preparatory group (PSPG) of close to three hundred experts on the planning and development of the system in the second half of 2012. Following the preparation and subsequent endorsement of a charter for the ROC by the FSB and G20 which sets out the mission, objectives and responsibilities of members to uphold the governance principles of the global LEI system in the broad public interest,[16] the ROC was established in January 2013 with close to fifty member authorities from across the globe. There are members from each continent, representing a wide group of authorities from central banks, market and prudential regulators, and finance ministries. The committee has now taken over responsibility for the leadership and direction of the project from the FSB. As a key next step, the ROC decided at the inaugural meeting to establish the Global LEI Foundation as a foundation in Switzerland and to take forward the necessary planning and legal work. Plans for the operational framework and data on relationships between entities have been developed by the PSPG and IG and will now be taken forward by the ROC and the Board of directors of the Global LEI Foundation once that is established. And a number of potential LOUs are actively planning to join the global LEI system once it is established.

3 Product/instrument classification, contracts, and trade identifiers

While there has been substantial progress in the global initiative to standardise the identification of entities in a universally acceptable manner through the LEI, the broader and more complex question of the standardisation of the depiction of financial products/instruments/contracts across markets and geographies has not yet attracted the intensive attention of the regulatory community. However, as noted above, the application of network system analysis ultimately requires the standardisation

16 *See Charter of the Regulatory Oversight Committee for the global LEI system (2012).*

of financial data at the granular level not only for entities but also for other key elements. That is important to provide consistency and flexibility to the raw information, supporting granular analysis as well as facilitating the aggregation of information. Work towards the uniform representation and classification of financial contracts is an important and necessary step to be able to utilise computational techniques for complex financial system analysis.

There is an abundance of approaches and methods to represent financial products and contracts. Some are specific to particular sectors or geographies, others have been designed by specific vendors, regulators or firms for a particular narrow purpose within either the business or regulatory community. In the Committee on Payment and Settlement Systems (CPSS) and the International Organization of Securities Commissions (IOSCO) report "OTC derivatives recordkeeping and reporting requirements" the concept of product identification was introduced in the form of "a common system of product classification".

It is important to highlight that while the report was focused on the OTC derivatives markets, it emphasised the vital importance of taking a wider view, highlighting that:

"Derivative product data standards need to be organically integrated with the description of cash instruments, so that authorities can associate OTC derivatives with related cash instruments to be able to see the interactions between positions held in cash and OTC derivatives markets."[17]

By extension, such uniform representation of contract elements, regardless of whether they represent transactions belonging to the cash market, equities, fixed income, OTC derivatives or any other financial sector is also necessary to develop a clear picture of risks and for being able to analyse financial markets as complex adaptive networks.

The book of Willi Brammertz and colleagues[18] offers one approach to the integration of financial data in order to accomplish a broad systemic network analysis of both the risks and robustness of the individual elements of the financial network as well as of the network itself. They define four input elements: (1) financial contracts; (2) risk factors; (3) counterparties; (4) behavioural elements. The authors explain that the standardisation and uniform representation of those elements will allow both business and regulators to be able to assess and predict adverse events in the financial system. A similar idea was expressed in the recent paper by Flood, Mendelowitz and Nichols (2012):

"Collecting contractual terms and conditions is a prerequisite to forward-looking cash-flow and risk analysis; terms and conditions are not systematically collected by supervisors today. Contracts are also a key ingredient for mapping the network of contractual relationships for systemic modelling. Measuring the edges – i.e. financial contracts – in the counterparty network graph will require the capture of much more detail about those contracts than is the case under traditional firm-centric accounting systems."[19]

Other approaches regarding representation and standardisation of financial contracts are also suggested by a number of authors, such as Andrew Lo.[20]

4| Conclusion

The recent crisis revealed not only major deficiencies in the analytical framework for understanding and addressing risks to the financial system as a whole, but also in the data and information infrastructure supporting financial stability analysis. To successfully migrate from the paradigm of "atomistic" analysis of financial markets and institutions in isolation to an integrated analysis of the financial network as a "complex adaptive system", the standardisation of data at a granular level for all and across all financial markets is ultimately needed.

Considerable progress has been made over the past year in the development of one key element of such standardisation – the global LEI system, which aims to uniquely identify parties to financial transactions across the globe. While this is a necessary and

17 *See Committee on Payment and Settlement Systems (CPSS) and the International Organization of Securities Commissions (IOSCO) (2012).*
18 *See Brammertz, Akkizidis, Breymann, Entin and Rustmann (2009).*
19 *See Flood, Mendelowitz and Nichols (2012).*
20 *See Lo (2009).*

key first step, it is only one step towards a strong, flexible and adaptable global data infrastructure. The next step, likely to be more challenging not only in complexity but also in the duration of implementation, is the standardisation and global acceptance of a uniform representation of financial contacts across different financial markets. Progress in this area will not be easy. But such work is important to improve understanding of emerging system wide risks. The persistence of a sector by sector approach to the representation of products and instruments, be it in the cash market, OTC derivatives, fixed income, etc. tends to encourage analysis sector by sector, and thus supports a fragmented approach that may provide inaccurate and misleading signals on emerging risks to the system as a whole. Overcoming this barrier to the provision of high quality, granular and consistent data is an important objective to support the development and use of analytical and computational approaches needed to understand and evaluate the complex financial system of the 21st century.

References

Anand (K.), Gai (P.), Kapadia (S.), Brennan (S.) and Willison (M.) (2012)
"A network model of financial system resilience", *Working paper*, No. 458, Bank of England, *http://www.bankofengland.co.uk/publications/Documents/workingpapers/wp458.pdf*.

Basel Committee on Banking Supervision (BCBS) (2013)
"Principles for effective risk data aggregation and risk reporting", *http://www.bis.org/publ/bcbs239.pdf*.

Bier (W.) (2009)
"Data requirements and improvements necessary for assessing the health of systemically important financial institutions", ECB, *http://www.ieo-imf.org/external/np/seminars/eng/2009/usersconf/pdf/Bier.pdf*.

Brammertz (W.), Akkizidis (I.), Breymann (W.), Entin (R.) and Rustmann (M.) (2009)
"Unified financial analysis: the missing links of finance", *The Wiley Finance Series*.

Charter of the Regulatory Oversight Committee for the global LEI system (2012)
http: //www.financialstabilityboard.org/publications/r_121105c.pdf.

Committee on Payment and Settlement Systems (CPSS) and International Organization of Securities Commissions (IOSCO) (2012)
Report on OTC derivatives data reporting and aggregation requirements, *http://www.bis.org/publ/cpss100.pdf*.

European Central Bank (ECB) (2003)
Annual Report.

Farmer (J. D.), Gallegati (M.), Hommes (C.), Kirman (A.), Ormerod (P.), Cincotti (S.), Sanchez (A.) and Helbing (D.) (2012)
"A complex systems approach to constructing better models for managing financial markets and the economy", *http://www.paulormerod.com/wp-content/uploads/2012/06/EconFinancialFuturITCFinal.pdf*.

Financial Stability Board (FSB) (2011)
"Key attributes of effective resolution regimes for financial institutions", *http://www.financialstabilityboard.org/publications/r_111104cc.pdf*.

Financial Stability Board (2012)
"A global legal entity identifier for financial markets", *http://www.financialstabilityboard.org/publications/r_120608.pdf*.

Financial Stability Board and International Monetary Fund (IMF) (2009)
"The financial crisis and information gaps", *http://www.financialstabilityboard.org/publications/r_091107e.pdf*.

Flood (M.), Mendelowitz (A.) and Nichols (W.) (2012)
"Monitoring financial stability in a complex world", *http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1989033&download=yes*.

Haldane (A.) (2009)
"Rethinking the financial network", April, *http://194.61.178.65/publications/Documents/speeches/2009/speech386.pdf*.

Hamilton (R.), Jenkinson (N.) and Penalver (A.) (2007)
"Innovation and integration in financial markets and the implications for financial stability", *http://www.rba.gov.au/publications/confs/2007/hamilton-jenkinson-penalver.pdf*.

Hu (H.) (2012)
"Too complex to depict? Innovation, 'pure information', and the SEC disclosure paradigm", *http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2083708*.

Inaoka (H.), Ninomiya (T.), Taniguchi (K.), Shimizu (T.) and Takayasu (H.) (2004)
"Fractal network derived from banking transactions – an analysis of network structures formed by financial institutions", *Bank of Japan Working Paper Series, http://202.211.194.216/en/research/wps_rev/wps_2004/data/wp04e04.pdf*.

Lo (A.) (2009)
"The feasibility of systemic risk measurement", written testimony for the House Financial Services Committee Hearing On Systemic Risk Regulation, *http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1497682*.

Miller (J.) and Page (S.) (2007)
"Complex adaptive systems: an introduction to computational models of social life".

Sinha (S.), Thess (M.) and Markose (S.) (2013)
"How unstable are complex financial systems? Analyzing an inter-bank network of credit relations", *http://rd.springer.com/chapter/10.1007%2F978-88-470-2553-0_5?LI=true*.

Transparency and financial stability

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Insufficient transparency was one of the shortcomings that financial markets showed in the midst of the financial crisis. It affected not only derivatives, but also fixed income and structured products markets. A certain debate has arisen around regulatory initiatives to increase transparency on non-equities markets and especially on derivatives. The relation with liquidity is at the center of that debate and it is also linked to elements such as the level of central clearing of derivatives and the structure of the derivatives industry. In Europe, several initiatives are set to change the way derivatives are cleared and traded and financial stability is at the center of the logic behind them. We analyse in this article the main elements to consider when addressing the increased pre- and post-trade transparency on derivatives markets, its relation with liquidity and efficiency and its implications on market structure, financial stability and investor protection.

When the G20 leaders met in Pittsburgh in September 2009, they included a number of reforms of the over-the-counter (OTC) derivatives market that included as an objective to "improve transparency in the derivatives markets". The most closely related measure was the requirement that all standardised OTC derivative contracts should be traded on exchanges or electronic trading platforms, where appropriate. However, the developments in these three years have shown that regulators around the globe are fostering an agenda that goes beyond those objectives and that tackles market transparency as one of the cornerstones for having sound and stable financial markets.

1| Concepts of transparency

There are three main concepts of transparency that are applicable to financial markets: pre-trade transparency, post-trade transparency and transparency to regulators.

Pre-trade transparency is the disclosure of orders or trading interests to other market participants prior to their execution. Pre-trade transparency is the pre-requisite for the functioning of a central order book in its traditional concept. It typically entails the display of price and quantity of a given order when it is introduced in an order book. Pre-trade transparency, therefore, has an immediate use to allow trading in an organised venue but has a wider use: informing market participants of the supply, demand and price conditions on a specific financial instrument.

Post-trade transparency is the disclosure of the details of a transaction after it has been executed. It typically entails the publication of a limited number of attributes of a concluded transaction like its time of execution, its price and the quantity or notional. Its informational value is essential for a number of functions: it contributes to price formation since it informs market participants about the conditions of real transactions (not only orders or expressions of interest); it is an ingredient in the valuation of products and permits investors to assess the value of its holdings or portfolios and, finally, it allows evaluation and comparison of the quality of markets and execution policies. In particular, it allows the assessment of the best execution principle, that requires EU investment firms to provide the best possible results for their clients when executing their orders. The post-trade data is one key ingredient for that purpose, since it allows to compare different venues and check if the best possible results were or not obtained.

Transparency towards regulators is the disclosure of, or access to, the complete data of concluded transactions in financial instruments. This includes all information that is included in the post-trade transparency concept plus all other details of each transaction, including the identity of the counterparties and their clients or beneficial owners. It is the basic element to structure and run day-to-day market surveillance and supervisory systems on financial markets and it is also a fundamental element for supervisory investigations.

2| Links between transparency and stability

The links between transparency and stability may not be obvious. It is much more usual to put stability close to concepts like prudential requirements, credit risk management, central clearing or appropriate compensation practices, as the G20 statement does. And these are indeed key drivers for achieving financial stability.

Central clearing, for instance, plays a more important role in the quest towards more stable markets. The improvement in the credit and market risk management that central clearing brings adds to the financial stability goal more than many other regulatory measures being implemented in the current reform.

However, from the perspective of financial market regulators, transparency is at the forefront of the characteristics that markets should have in order to contribute to their stability, for a number of reasons.

Firstly, post-trade transparency allows monitoring of markets and allows proper market analysis by investors. An opaque market, where most trades are negotiated privately with no information flowing to other market participants cannot be properly analysed and understood.

The role of market analysis and research by private firms and also by macroprudential supervisors could be severely compromised by a lack of adequate

post-trade transparency. Without a complete picture of how a market is performing the possibility of missing important indicators or being misled by the limited or partial information available increases exponentially. There are several examples of these circumstances. We saw this clearly when the securitisation markets collapsed in 2007 and 2008, making it virtually impossible to assess the number or transactions that were being conducted, their prices and their frequency, making it impossible to figure out a market price for most of those assets.

Secondly, transparency of transactions (post-trade transparency) is a pre-requisite for avoiding informational advantages that run contrary to market fairness. It is true that a minority of dealers in such opaque markets hold a privileged position and also acquire clear informational advantages. Market fairness is obviously the first victim of such situations. However, opaque markets usually damage market confidence in a way that ultimately affects financial stability. When investors fear that market conditions are not sufficiently transparent, they perceive the risk of obtaining a sub-optimal result in their trading function, by not hitting the best prices or by being unable to assess fully market conditions before adopting trading decisions. This concern can diminish their willingness to participate in the market, which reduces the investor base and, subsequently, market liquidity. This reduced liquidity increases the fragility of the market when responding to external or internal shocks, making it less robust and stable. This chain (transparency, confidence, trading appetite, liquidity and stability) can be different for different types of participants (dealers, wholesale investors, retail investors) and the bonds between its links can be stronger or weaker depending on the market model (dealer based, central order book, request for quotes). However, below a certain level of transparency, the overall negative effect on liquidity and stability is in our view quite consistent across markets.

Thirdly, market monitoring by supervisors relies heavily in transaction data. In this case, we are referring to transparency to regulators, more than post-trade disclosure of trades to the market. In order to detect problems at an early stage, frequent and robust transaction data is a fundamental ingredient of market supervision. It is important that this data flow is comprehensive and covers a wide scope of financial instruments. One of the lessons of the crisis is that regulators were not aware of certain developments that produced unsustainable risks simply because transactions were not disclosed to the market nor reported to regulators. The risks associated with some major credit default swap (CDS) market participants or with secondary distribution of collateralised debt obligations (CDOs) and other securitisation assets are good examples of reporting rules that were focusing only on listed financial instruments instead of OTC traded derivatives. This helped the bubble grow undetected in some cases until it was too late.

3| The limits of transparency

Some could argue that if transparency has such important benefits, why should not regulations impose full transparency of pre- and post-trading data? There are a number of reasons why this is not desirable if we are to keep a balance between fairness, efficiency and liquidity.

Traditionally, equity markets have been quite transparent both pre- and post-trade. Central order books need pre-trade transparency to work and transactions in regulated markets and multilateral trading facilities (MTFs) are typically disseminated in almost real time to subscribers of their information services. However, there are relevant exceptions to the general principle of full transparency. First, many (though not all) markets hide the identity of the counterparties to each trade, so that other market participants cannot use this information to anticipate the relevant counterparties strategy and their possible next moves (to sell a large position that was recently acquired, for instance). If counterparty information was freely available it might damage the relevant market participant's interests and thus create disincentives to trade and provide liquidity to the market.

It is well known that transactions that are large in comparison with the average trading size in a particular market carry information that can be exploited by other trading parties, to the extent that they may be used to anticipate the trading pattern of one of the counterparties of the original trade. This risk of unfair usage of information is directly (or even exponentially) proportional to the size of the transaction and inversely proportional to the respective level of liquidity of each market or product.

All markets have created mechanisms to protect large in scale (sometimes called "block") trades

allowing delayed disclosure of their characteristics, capped information as to their size, anonymity of the counterparties or a combination of the above. Without these mechanisms, parties would be much less inclined to trading large sizes on the trading platform. This means that liquidity, understood as the likelihood to conclude a transaction at a price close to the last one, would be likely to suffer.

The big question to be addressed in this trade-off between transparency and liquidity is how much transparency is supported by each market or product before liquidity is severely damaged. There is no response to this, or at least none that is valid across all markets, time and products. In each market we find a particular balance between number of trading entities, frequency of transactions, size distribution, levels of supply and demand in what we ultimately call the "market structure". That market structure is by no means stable over time and is affected by a number of factors such as: product developments, market sentiment, the appearance of related products (derivatives or substitutes), regulatory changes, trading technology and standardisation to name but a few. A 50 million notional transaction can be tiny in a liquid pair of currencies in the FX market and huge in an off-the-run corporate subordinate bond. Even within a relatively compact asset class, like interest rate swaps, differences in tenor or currency can make a big difference in market structure and liquidity and can lead to very different understandings of what can be considered a large trade that would raise concerns if it were to be fully disclosed to the market in real time.

However, the fact that the concept of large trades cannot be resolved through a one-size-fits-all approach does not mean it cannot be resolved. On the contrary, as we will see in the next section, regulators around the globe are already setting concrete parameters for those limits above which some type of protection is considered justified.

4| Regulatory initiatives on transparency

The regulatory reform agenda is tackling the issue of increasing transparency in a variety of forms.

First, we have the extension of **post-trade transparency** obligations to a number of financial instruments that were previously outside the scope of required transparency. It does not affect only derivatives (which are in the realm of the G20 proposals) but it also covers fixed income instruments and securities financing transactions. This is, for instance, the case of OTC trading of bonds in the European Union or of non-listed derivatives in the European Union and the United States.

A relevant example is contained in the rules for real time reporting to the market by the US Commodity and Futures Trading Commission (CFTC). The final rules on real-time public reporting require reporting of all relevant swap transactions to registered trade repositories (TRs), which in turn publish the data. This covers both on-exchange and off-exchange (off facility) swaps and they contain rules for block or large trades, for which there are delays foreseen in the rules. Those delays go from 15 minutes to 48 business hours, depending on the type of execution, the swap type, the size of the trade or the existence of a mandatory clearing requirement. There are also measures to cap the size of the trade that gets published above certain levels and the rounding of the notional amount. All these measures are defined precisely to protect the trading parties in large transactions and avoid that other market participants profit from the full information to the disadvantage of the trading parties. This is an example of the need to balance transparency according to the characteristics of some trades and market models. Interestingly, all these measures have phase-in periods attached to them, so that the delays in the first year of application of the new rules are bigger than in the second year and so on. This shows, as we explained above, that market structure and market practice changes over time and with an increased level of central clearing and a bigger share of electronic trading, the concept of a large trade and the effects of post-trade transparency will also evolve, allowing counterparties to adapt over time to the new stricter rules.

Second, there is an initiative in many jurisdictions to impose or stimulate the use of trading platforms for instruments previously traded mainly OTC (this is specifically true for derivatives for which, in line with G20 requirements, a trading obligation, where appropriate, shall be imposed but to a lesser extent also for instruments like bonds which in Europe may be caught by the new organised trading facility (OTF) category). This is a much more far reaching measure, since it then may not only impose post- but also **pre-trade transparency**. It changes fundamentally

market structure, partially replacing OTC markets by organised trading facilities. There has been much discussion about the reasons and merits behind this move and to what extent, once some minimum requirements of post-trade transparency are in place, there is a real need to force platform (electronic) trading in a large number of products. Increasing organised trading is related to the degree of standardisation of each instrument class and the extent to which it can be included in the list of those to be compulsorily cleared.

In any case, there is a strong relation between central-book trading and central clearing since to be able to trade on an anonymous order book, counterparties need to be sure of the level of counterparty risk they will be holding before the transaction is settled (for securities markets) or while the contract is outstanding (for derivatives). Central counterparties (CCPs), by interposing themselves between buyers and sellers, provide this certainty and, hence electronic trading is associated with CCPs in the vast majority of markets. In that respect, by fostering transparent trading and transforming counterparty risk, some of these reforms go hand in hand with the pursuit of more stable financial markets, especially in respect of derivatives.

Third, there is a global move to expand the scope of **transparency towards supervisors**. This can be achieved by setting up or expanding reporting obligations to regulators on a periodic basis (like daily transaction reporting), granting full access for regulators to TR data or both plus granting access to position data in commodity derivatives markets. In one or another version, the goal is to ensure supervisors have at their disposal a robust and consistent set of data covering transactions on a wide range of financial instruments, irrespective of whether they were traded on electronic markets or OTC. It is essential in our view to include in that data set not only cash market transactions, but also derivatives and securities financing transactions. From a financial stability perspective, full transparency to regulators allows for proper market monitoring and risk assessment.

A number of regulatory initiatives have taken place recently at international level to ensure that access to TR data by overseers and regulators can allow them to fulfil properly their mandates and, at the same time, to protect the confidentiality of this data from undue use or access.

5| The reforms in the European Union

The European Union has adopted an ambitious regulatory agenda related partly to the G20 commitments and partly to the reinforcement of financial infrastructures and supervision structures. The main components of this agenda in the realm of transparency are related to the drivers outlined in the previous section and can be summarised as:

- the establishment of TRs for derivatives transactions,

- electronic trading obligations for certain centrally-clearable derivatives, and

- the application of pre- and post-trade transparency rules to bonds, emission allowances, structured finance products and derivatives.

The first measure is contained in the Regulation (EU) No. 648/2012 on OTC derivatives, CCPs and TRs (known as European Market Infrastructure Regulation – EMIR). The other two measures, however, are contained in a different legal instrument (Markets in Financial Instruments Directive – MiFID/Markets in Financial Instruments Regulation – MiFIR) that is still being negotiated through the legislative process. While EMIR is already in force, MiFID/MiFIR will not be applicable before 2014. Therefore, these reforms will come in two waves to the EU financial markets.

With respect to the most immediate measure, the **obligation to report derivatives transactions to TRs**, there are some elements worth underlining. All counterparties have to report transactions on derivatives to TRs that are either registered in or recognised by the European Union. This affects any type of counterparty, be it a financial or non-financial undertaking (but not to individuals). It covers all types of derivatives, including exchange-traded ones, and is not restricted only to swaps, but also extends to futures, forward rate agreements and options.

Apart from the extension to exchange-traded derivatives and the inclusion of non-financials in the reporting obligations, the EU rules on reporting also present some peculiarities in an international perspective. For instance, there is an obligation to report exposures to the TRs in the form of two elements: collateral and mark-to-market valuations. This is considered as an

important step from a mere repository of transactions towards a repository of transactions and exposures. The implications of this feature for financial stability supervision and oversight are in our view quite relevant. Derivatives transactions can contain a fair degree of complexity that makes it difficult to directly derive their value or their risk from their contractual details. This is not only because the terms of the contract can be complex and do not allow always to re-construct the stream of cash flows of a particular contract, but mainly because market movements affect exposures and change continuously the value of the contracts or the risk exposures attached to them.

Of course, there will be shortcomings in any information system that is crafted for such a wide variety of contracts and portfolios through a general provision like this one. There will be exposures collateralised according to master agreements that include portfolios wider than derivatives. Similarly, there will be difficulties in identifying net exposures or in solving possible differences in valuation assessments by the two counterparties of a trade. There will be also a lack of valuation data from non-financial counterparties that do not hold the obligation to conduct those valuations daily. However, all in all, we think that, without information on exposures between counterparties and without valuation of positions, the monitoring of risks to financial stability in the European Union would be a much harder task.

The second pillar of the current reform is the **trading obligation** for derivatives. This is a direct consequence of the G20 commitment and in our view it is not so much a goal in itself but an instrument to pursue transparency and central clearing. The aim is to put into organised trading venues as much trading activity as possible to achieve full transparency and central clearing, which are considered to increase financial stability. However, this requires two preconditions: the availability of sufficient trading venues, to avoid monopolistic situations, and the feasibility of central clearing for those products. The latter is particularly important, because centralised electronic systems rely on CCPs for managing counterparty risk so that trading is not affected by it. In other words, CCPs are the instruments that allow anonymous trading on derivatives.

The standard process envisaged in the MiFIR is to draw the set of derivatives that should be traded on organised venues as a subset of the instruments that are cleared in CCPs. Hence, the ordinary procedure will be that the trading obligation determination takes as the universe of possible products those that have become subject to the clearing obligation under the EMIR regime. This will reduce considerably the number of derivative products but will ensure, precisely, that financial stability is not damaged, since forcing trading (and therefore clearing) on derivative products that a CCP is not capable of managing adequately would only diminish the resilience of financial markets. Illiquidity is the main risk that a CCP faces when managing market risks due to the need to be able to unwind or hedge a position after a default of a clearing member, to be able to fulfil the CCP's obligations without incurring in financial losses that are bigger than the margins posted by the defaulting member. For that, the CCP needs to operate in a liquid market that can absorb the volume it needs to hedge in the shortest possible time.

The trading obligation is also related to the review of the categories of trading venues and to the appearance of the OTF concept. This type of venue will be on the same footing as regulated markets and MTFs when it comes to transparency but will allow a certain degree of discretion in the execution of orders, which is an element that could be especially relevant for derivatives markets, especially when they start to come into organised trading. In any case, this category is highly debated at the time of writing and could be subject to changes in the trialogue negotiations that could alter its substance or its scope.

The third essential element of the reforms that are being currently discussed in the Union is the application of **pre- and post-trade transparency to instruments other than equities**, mainly bonds and derivatives.

In terms of transparency of orders (pre-trade), MiFIR imposes obligations on trading venues and systematic internalisers that require making public (on reasonable commercial and non-discriminatory basis) orders or quotes depending on the market model applied. This will be however subject to a number of exemptions (waivers) and conditions to adapt this publication requirement to the peculiarity of some of these products, that show liquidity levels and market structures that cannot be fully compared to shares.

When it comes to post-trade transparency, this has been tackled in the European Union in a

different manner than in the United States, where transparency for derivatives is fulfilled through swap data repositories (TRs), that act as publication agents. In the European Union, this role does not rely on TRs but on the concept of authorised publication arrangement, their equivalent for public post-trade disclosure. In any case, trading venues executing bonds and derivatives transactions are obliged to make the results of the trades public, subject to certain conditions and delays to be defined in technical implementing rules. These rules will be quite relevant for the proper functioning of this regime, since they have to determine the balance between degree of transparency and impact on liquidity for each class of instruments.

6| The role of European Securities and Markets Authority

In this section we describe briefly what is the role of European Securities and Markets Authority (ESMA) with respect to the different initiatives that bring greater transparency to EU financial markets. It is well known that ESMA was born, in response to the crisis, as a piece of the European System of Financial Supervisors (ESFS) together with the other European Supervisory Authorities and the European Systemic Risk Board in an effort to reform the regulation and supervision of EU financial markets. Financial stability is at the core of the ESFS and, therefore of ESMA. ESMA contributes in a number of ways to the objective of strengthening financial stability in the European Union, but we will concentrate here on describing briefly the functions that relate strictly to the reform of market's transparency.

These functions are a consequence of both EMIR and MiFIR/MIFID. EMIR is already in force since August 2012, though the regime only started to apply in practice once the technical rules (delegated acts by the European Commission adopted in December 2012 based on ESMA technical standards) came into force on March 15th 2013. Of course, the main task by ESMA with regards to the EMIR implementation was the delivery of technical standards to the European Commission for their subsequent adoption, which was a very demanding project, but this is already behind us and the way ahead relates to implementation.

The status of MiFID/MiFIR is different and much less advanced. The legislative process is still open and an agreement between Council and Parliament will have to be reached during 2013, with the implementing rules being defined afterwards, probably during 2014.

In terms of time sequence, we will first have TR reporting, then the clearing obligation and only after MiFID/MiFIR become applicable, pre- and post-trade transparency for bonds and derivatives and ultimately the trading obligation for derivatives.

The first step, therefore, on the different regulatory initiatives that will be effective in the European Union is the regulatory **reporting to regulators, through TRs**. ESMA has the role of authorising and supervising them. Similarly, when EU entities wish to rely on non-EU repositories to discharge their reporting obligations, these have to be previously recognised by ESMA. This will be the second direct supervisory competence that ESMA will develop (the first was on credit rating agencies).

The second EMIR-related step will be to **determine the clearing obligation**. For this, as we have said repeatedly above, an absolute precondition is the availability of CCPs that comply with high standards. ESMA has a role of coordination of CCP colleges, to ensure supervisory convergence (also a core ESMA function) of CCPs. Once CCPs have been authorised according to EMIR standards, they will be able to receive the flow of derivatives clearing coming from the clearing obligation. This will take the form of Commission delegated regulations based on ESMA technical standards and the process will start with the notifications by CCPs and national competent authorities of products being cleared in European CCPs. Therefore, like any EU regulation, it will require full public consultation, careful cost benefit analysis and calibration and the full regulatory process. Even assuming that CCPs start to be (re) authorised under EMIR by the summer of 2013, it will be unlikely that the clearing obligation becomes enforceable to market participants before the end of 2014. In any case, there is an international dimension to this, since it is desirable to maximise coordination on the clearing determination across different international financial centres. There is an effort to coordinate this process to the extent possible. For instance, the clearing obligation was already introduced in Japan in November 2012 for certain products, has been mandated in the United States

for a first wave of derivatives (between March and September 2013, depending on types of counterparties) and will take a bit longer to have it in place in the European Union.

It will be for the European Commission to **develop a post-trade transparency regime for derivatives and bonds** under Titles III and IV of MiFIR. ESMA will be probably required to advise the Commission on a number of aspects and, most notably, on how to define deferred publication of trades based on their size and type of market. Under this possible mandate, ESMA will have to determine what is a large trade, for how long its publication will be delayed and what information of the size of the trade is published. ESMA is already conducting preparatory technical work for this task, ahead of the final agreement on the Level 1 Regulation.

Regarding **pre-trade transparency for non-equities**, ESMA should perform two relevant roles: advising the Commission about the specific requirements to waive pre-trade transparency obligations (such as the size of orders which should be considered as large in scale) and provide an opinion to national competent authorities about every application to grant a limitation of pre-trade transparency, in line with the work regularly performed by ESMA in the area of equity markets.

The next element that ESMA will have to tackle is the **determination of the trading obligation** for those derivatives that were previously subject to central clearing (Art 24, 25, 26 MiFIR). This will require a very similar process than for the clearing obligation (see above) and will concentrate again on the standardisation and, in particular, the liquidity of those products.

Both tasks require a careful calibration and are one of the most complex and delicate tasks arising from MiFIR. The reason for this is that liquidity of derivatives and bonds is more difficult to assess and, more importantly, changes over time with greater speed than that of shares. Bonds typically go through phases in their life (on the run, after emission and close to redemption) that attract very different levels of demand and supply. Derivatives face innovation and product substitution is much higher scale than that of shares. They also have lifecycle trends (like the series on index CDSs) that require re-assessment and calibration on a very frequent basis.

The EU legal framework requires that obligations that could attach responsibilities for market participants (in terms of breaches and attached enforcement actions) are enshrined in a piece of EU law (like a regulation). This involves a process, even in its streamlined form of technical standards plus delegated acts, that is measured in months or quarters, not in days or weeks. In terms of risk to financial stability, it is as dangerous to have too few products subject to the trading or clearing obligations or to full post trade transparency, than to have too many (or unsuitable ones). If a product loses liquidity in a way that compromises severely the feasibility of pre-trade transparency, it is necessary to have a mechanism to waive it, as already contained in MiFIR, where a competent authority can take a decision to grant a waiver. In the case of central clearing (and compulsory trading on trading venues), the way out to avoid forcing clearing of an illiquid product (as envisaged in EMIR) is to revert the obligation through new technical standards (which are EU regulations). This mechanism has been solved differently in other jurisdictions, through more agile instruments that are closer to supervisory than regulatory decisions.

Finally, ESMA will have to complete the definition of rules for **reporting transactions to regulators** (Art 23 MiFIR) which is a key element for market surveillance. This will complement the reporting of derivatives to TRs and will include, for the first time, a fully harmonised regime in the European Union, in terms of scope (inclusion of OTC derivatives) and client identification (which has proved essential in those Member States that collected it).

Overall, the tasks to increase transparency are among the most relevant ones that ESMA will have to develop in the coming two years and will determine a significant share of our regulatory and supervisory work programmes. The relevance of these mechanisms, as we have shown, go much further than the conduct of business rules sphere and enters deeply into the financial stability arena of European Union and international markets.

References

Comittee of European Securities Regulators (2010)
"Technical advice to the European Commission in the context of the MiFID review: non-equity markets transparency", CESR/10-799, July.

European Commission (2011)
Proposals for a directive on markets in financial instruments repealing *Directive 2004/39/EC* of the European Parliament and of the Council, and for a regulation on markets in financial instruments and amending regulation [EMIR] on OTC derivatives, central counterparties and trade repositories, October, *http://ec.europa.eu/internal_market/securities/isd/mifid_en.htm.*

European Securities and Markets Authority (ESMA) (2012)
Draft technical standards under the *Regulation (EU) No. 648/2012* of the European Parliament and of the Council of 4 July 2012 on OTC derivatives, CCPs and trade repositories, ESMA/2012/600, September, *http://www.esma.europa.eu/system/files/2012-600_0.pdf.*

Credit default swaps and financial stability

Assessing contagion risks in the CDS market

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The authors assess the risk of contagion stemming from credit default swap (CDS) exposures. Based on a unique dataset provided both by the Depository Trust and Clearing Corporation and the European Securities and Markets Authority, they analyse the main features of the CDS market for European reference entities. They find that activity in this market is concentrated on a group of bank-type global derivative dealers, which they refer to as "super-spreaders", given their high level of interconnectedness. The authors then carry out contagion analyses which tend to show that domino effects in the network of direct CDS exposures are unlikely to generate big disasters. Nevertheless significant contagion effects can arise from direct exposures to underlying assets, such as government bonds, or also from margin calls and collateral requirements generated by portfolios losses in correlated assets. Overall, contagion effects therefore arise more from indirect interconnectedness than from direct contractual links among market participants. The paper draws some tentative policy lessons for monitoring and mitigating contagion risks and raises some issues regarding on-going discussions on over-the-counter derivatives.

NB: This paper elaborates on the results of an Expert Group report realised for the European Systemic Risk Board. It draws heavily from Peltonen, Scheicher and Vuillemey (2013) and Clerc, Gabriel, Kern and El Omari (2013). The authors would like to thank Silvia Gabrieli, Tuomas Peltonen and Guillaume Vuillemey for extremely useful comments and outstanding contributions. The views expressed in the paper remain their own and do not necessarily reflect those of our respective institutions.

According to George Soros, credit default swaps (CDSs) are *"instruments of destruction that should be outlawed…some derivatives ought not to be allowed to be traded at all. I have in mind credit default swaps. The more I've heard about them, the more I've realised they're truly toxic…"*[1]

Many observers have pointed out the potential destabilising role played by CDSs in the unfolding of the financial crisis in July 2007. For instance, Geanakoplos and Fostel (2012) raise the possibility that the introduction of CDSs for mortgage products in 2005 and 2006 brought mortgage bonds and house prices down, being therefore one of the trigger of the worst financial crisis since 1929. Others insist on the fact that CDSs created a false sense of security and favoured leverage, enabling an unstable credit boom and excessive risk taking by financial institutions. Finally, a third strand of the literature relates to the role of CDSs in creating new forms of financial dependencies across financial institutions (see for instance Stulz, 2010, or Heise and Kühn, 2012). The potential for contagion through this large and complex network of CDS exposures stems from: (i) the outstanding notional amounts of CDS exposures, exceeding by far the loss absorption capacity of most financial institutions; (ii) the fact that writers of CDS insurance did not post enough collateral to cover their positions; (iii) the lack of transparency and the opaqueness characterising the CDS market, which is essentially an over-the-counter (OTC) market, and which opens the possibility for market manipulations. To a large extent, the dominance of a few big players in the CDS market and fear of contagion explain why some public authorities were forced to bail-out some of these "too interconnected to fail" institutions, as in the case of American International Group (AIG).

In this paper, we try to assess the scope for contagion stemming from bilateral and multilateral exposures in the CDS market. We particularly focus on the network risk and therefore rely on network analysis and metrics. Our analysis factors in and summarises some of the main results obtained by a European Systemic Risk Board (ESRB) Expert Group on CDSs (ESRB, 2013). In that context, we had access both to an anonymised snapshot (as of end 2011) of Depository Trust and Clearing Corporation (DTCC) data and to DTCC position data available to the European Securities and Market Authority (ESMA). While the first data set is composed of fourty-two sovereigns (European + G20) and all global financial reference entities, the second covers weekly bilateral CDS exposures between all (European and non-European) counterparties for each European reference entity.

Section 1 describes the main recent developments in the CDS market for European reference entities. Section 2 then presents the main contagion channels through which the CDS market can spread financial shocks and generate systemic risk. Section 3 presents the main features of the network of financial linkages through CDS exposures and assesses the scope for contagion. Section 4 presents the main policy implications.

1| Recent developments

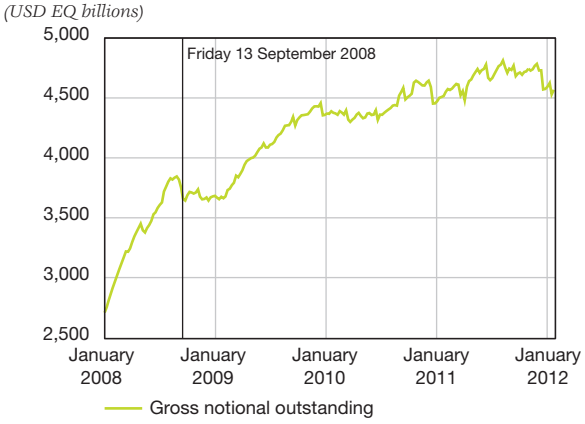
The fear of contagion from CDSs probably comes from the rapid expansion of the total outstanding notional amounts. Within three years, these amounts increased tenfold, from USD 6 trillion in 2004 to USD 60 trillion in 2007 according to the Bank for International Settlements (BIS) semi-annual statistics on OTC derivatives. Since then, the gross notional value of CDSs has contracted due to both the compression of CDS contracts with bilateral tears up and a decline of CDS issuance.[2] According to Vause (2010), trade compression eliminated contracts with a notional amount of more than USD 58 trillion between the end of 2007 and the first half of 2010.

The CDS market for European reference entities[3] behaved in a very different way in the wake of the financial crisis.[4] Total outstanding notional amounts continued to increase, though at a much smaller pace until the end of 2011, before witnessing a small decline in 2012 (see Chart 1). The unique break to this upward trend corresponds to the demise of Lehman Brothers in September 2008 (represented by the vertical line

1 *See Soros (2009).*
2 *"Statistical release: OTC derivatives statistics at end-June 2012", BIS.*
3 *In a CDS, a protection seller agrees to make a payment to the protection buyer in case of a credit event on a pre-specified reference entity. In exchange for the promised payment, the protection seller receives a periodic premium payment from the protection buyer. The protection seller and the protection buyer are the counterparties of the CDS contract. Banks, which buy or sell protection, can also be reference entities.*
4 *Data for 2007 should be considered with caution since they reflect a lack of coverage by DTCC.*

Charts 1
Evolution of the EU CDS market since 2008

(USD EQ billions)



Sources: ESMA, DTCC.

in Chart 1). Part of the increase in gross notional outstanding is due to the fact that market participants do not cancel out CDS contracts but, rather, add an offsetting CDS contract. With the exception of occasional compression trades, in which offsetting CDS positions are eliminated, the gross notional outstanding amount thus increases with every trade. The net notional outstanding amount adjusts the gross notional amount for offsetting positions. It is calculated as the sum of net protection bought by counterparties that are net buyers of protection for a particular reference entity. Net notional amounts followed quite a similar pattern than gross notional but have stabilised, if not slightly declined, since October 2009. This development is driven by the reduction of net CDS positions written against non-financial reference entities, which more than compensates the sustained increase in the amount of CDS protection sold against the risk of default of EU sovereigns.

It is instructive to put the size of the CDS market in perspective to other derivatives markets. For example, interest rate swaps amount to a gross notional of USD 379.40 trillion and by far exceed the notional values of CDSs, which amount to USD 26.9 trillion according to the BIS June 2012 global derivatives statistics. The total size of the global bond market is around USD 98.4 trillion.

The CDS market for European reference entities is highly concentrated on the level of counterparties but less so on the level of reference entities. The top-ten most active traders account for more than 70% of gross protection bought or sold and are active in more than half of sovereign and financial reference entities. The top-ten names account for less than half of the aggregate exposure. In aggregate terms, there are indications that major traders sell and smaller traders buy (net) CDS protection, which parallels the finding that smaller banks tend to lend to bigger, "money-centre" banks.

The data provided by DTCC allows seeing which categories of market participants buy/sell CDS protection on EU reference entities. Hedge funds represent 40% of the total number of buyers at the start of 2012, asset managers slightly more than 33% and banks about 18%. However, asset managers and hedge funds account (on average) for only 2.1% of the total notional outstanding over the sample period. By contrast, banks represent more than 96% of gross CDS sales until the end of 2009, and about 88% at the start of 2012. Therefore, banks are the most prominent players in this market. It is interesting to note that the decline in banks' share follows the regulatory move to centralised clearing for standardised OTC derivatives. In effect, over this period, the percentage of contracts sold by central clearing counterparties (CCPs) has rapidly risen from less than 1% in January 2010 up to almost 10% at the start of 2012.

In Europe, fear of contagion appeared in the context of the euro area sovereign debt crisis and the perspective of the default of Greece. Lack of transparency regarding banks' exposures raised three main concerns:

- the capacity of the CDS market to settle the failure of a major reference entity, and for the first time that of a EU sovereign;

• its ability to cope with the consequences of the default of a major CDS dealer, due in particular to complex financial linkages and the concentration of the CDS market;

• the major role played by banks as protection sellers and consequently their potential vulnerability given some evidence of under-collateralisation of CDS positions.

The interplay between banks and sovereigns highlighted in particular the scope for contagion through the pricing of CDSs (see for instance Alter and Schüler, 2012 for a recent contribution), due in particular to their feature to jump to default, and their impact not only on sovereign bond prices but also on private bonds issued in threatened countries like Spain and Italy.

However, the fear of contagion due to the Greek default did not materialise, illustrating that, under certain specific conditions, a credit event in the CDS market can proceed smoothly. One reason is the role of communication in preparing market participants to the credit event and of transparency to help the market to figure out the extent of interlinkages and counterparty risks. The European Banking Authority's exercise played in this context a significant role in reducing uncertainty surrounding euro area banks' exposures to the Greek sovereign.[5]

2| Contagion channels and network risk

CDSs are ambivalent financial products: on the one hand, they are designed as instruments for hedging and managing credit risk; on the other, they have been blamed for fomenting financial instability and generating systemic risk. There are at least four main contagion channels in connection with CDSs.

First, contagion might arise through direct counterparty risks generated by either the default of the reference entity or that of large protection sellers. The occurrence of a credit event may result in large payouts, whose magnitude is difficult to anticipate as it is linked to the recovery rate. In addition, in a context where the CDS network is highly concentrated, the failure of a major dealer can affect many participants via domino effects and default contagion. In effect, the default of an entity generates losses not only for its direct counterparties but also for the protection sellers of CDSs on this reference entity. Should the protection sellers lack sufficient reserves to cover CDS liabilities, they are in turn exposed to default. In circumstances where both the reference entity and the protection sellers default, exposure to counterparty risk can be particularly large. A new strand of the literature has recently focused on the role of CDSs as transmitters of contagion through the large and complex networks of financial linkages they create across financial institutions (see for instance Markose *et al.*, 2012; Markose, 2012 or Heise and Kühn, 2012). This channel of contagion relates in particular to network risk (see below).

Second, contagion might also occur through indirect spillover effects due to price effects. In particular, CDS prices usually jump-to-default. These potentially large movements in CDS prices or spreads may be exacerbated by the relative illiquidity of many CDS single name contracts. To cover these risks, financial institutions which are parties to a CDS contract usually post collateral. However, large swings in CDS spreads can lead to huge margin calls. The amount of collateral posted might then not be sufficient to protect protection buyers in the event of a counterparty default.

A third channel of contagion may arise through liquidity risks and fire-sale effects in asset markets, when distressed institutions are forced into asset sales to obtain liquidity, which further depresses asset prices. These price movements may translate to the price of correlated assets, generating big portfolio losses, which in turn may trigger higher collateral requirements or additional margin calls due to credit derivative exposures. In their analysis of sovereign default and its spillover to the European banking system, Vuillemey and Peltonen (2013) evidence that the main risk for protection sellers is the sudden increase in collateral requirements on multiple correlated exposures.

A fourth channel is due to information spillovers. CDS spreads play an important informational role in credit markets. These spreads are widely regarded by market

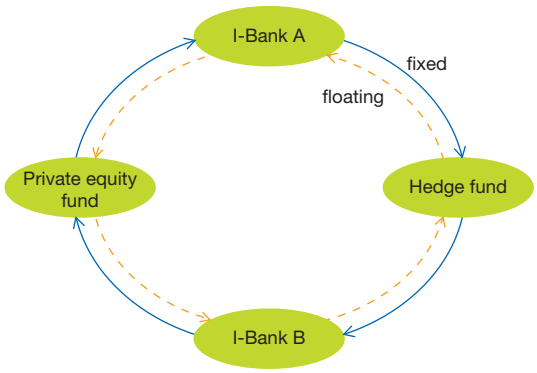
5 *On the Greek credit event, please refer to Coudert and Gex in this issue of the Banque de France* Financial Stability Review.

participants and analysts as reflecting the market consensus of the credit worthiness of the underlying reference entity. Implied default probability directly derived from CDS spreads are also used for the pricing of credit derivatives. As an illustration, in the context of the euro area crisis, CDS spreads have been used as forward-looking indicators of the potential default of banking reference entities, impacting the pricing of their respective sovereign bonds and fueling the negative feedback loop between bank and sovereign risks. A related scenario is the unwinding of "basis" arbitrage positions where CDSs are traded against the underlying bonds. The links between CDS and bond spreads could then through a "tail-wagging the dog" effect lead to the propagation of shocks from the derivatives to the cash markets, thereby raising funding costs.

Network risk can be illustrated by a simple example borrowed from Brunnermeier (2009). Consider a hedge fund that has an interest rate swap agreement with investment bank A. That is, both parties have agreed to swap the difference between a floating interest rate and a fixed interest rate. Now suppose that the hedge fund offsets its obligation through another swap with a different investment bank. In the absence of counterparty credit risk, the two swap agreements can be viewed as a single contract between investment bank A and investment bank B; the hedge fund could simply step out of the contract. However, this is not the case in the presence of counterparty risk. In particular, it would be unwise for investment bank A to accept replacing the original contract with a contract with investment bank B if it fears that investment bank B might default on its commitment.

This example can be extended to see how an increase in perceived counterparty credit risk might be self-fulfilling and create additional funding needs. Suppose that investment bank B had an offsetting swap agreement with a private equity fund, which in turn offsets its exposure with investment bank A. In this hypothetical example, illustrated in Chart 2, all parties are fully hedged and, hence, multilateral netting could eliminate all exposures. However, because all parties are aware only of their own contractual agreements, they may not know the full situation and therefore become concerned about counterparty credit risk even though there is none. If the investment banks refuse to let the hedge fund and private equity fund net out their offsetting positions, both funds have to either put up additional collateral and commit funds, or insure each other against counterparty credit risk by buying credit default swaps. Anecdotally, this happened in the week after Lehman's bankruptcy in September 2008. All major investment banks were worried that their counterparties might default, such that they all bought CDS protection against each other. As a result of deteriorated credit conditions and the resulting buying pressure in the CDS market, the already high prices of CDSs written on the major investment banks almost doubled. This example also illustrates that CDSs should not be taken in isolation to analyse network or systemic risks but with respect to other derivatives' positions and more generally the overall portfolio of financial institutions.

Chart 2
Network risk



Source: Brunnermeier (2009).

3| SUPER-SPREADERS AND FINANCIAL STABILITY

Following Haldane (2009), economists, market analysts, and policymakers[6] have recognised the similarity between the potential of high-risk, high-infection individuals for the spread of epidemics and that of the most interconnected financial institutions for the spread of financial contagion. With reference to this similarity, we refer to the most central CDS participants as "super-spreaders".

6 *See for instance Markose* et al. *(2012) or Yellen (2013).*

In order to identify these financial institutions which have the "super-spreader" potential, we first relied on the topology of the network structure of the CDS market. Chart 3 below provides an illustration of this network structure. For this purpose, we apply Duffie (2013)'s proposal to measure systemic risk exposures in a ten-by-ten-by-ten approach to an anonymised data set of global CDS exposures on sovereign and financial reference entities.

The chart is constructed as follows: in order to isolate the net behaviour of systemically important institutions in the network we focus on the top-fifteen counterparties and their top-ten exposures. Hence, the coloured nodes in the centre are the fifteen largest counterparties in the CDS market, when counterparties are ranked by total notional exposure. Among them, red nodes are net sellers and green nodes are overall net buyers. For each of these fifteen traders, we show their ten largest bilateral net sell exposures. The size of each node is proportional to the log of the underlying gross exposure. The size of each link is proportional to the log of the net exposure it represents. Large net exposures between top-fifteen traders are in blue.

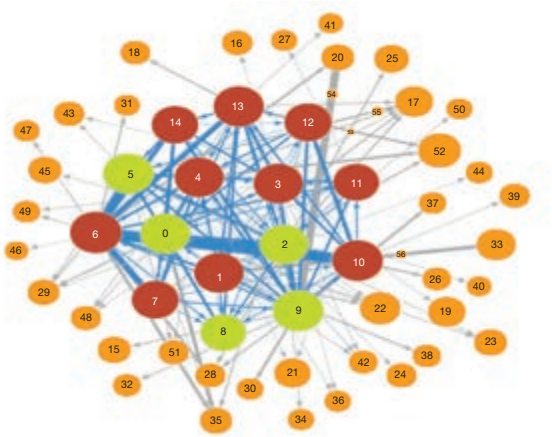
Overall, the chart gives a concise description of the network structure, indicating that the network is quite concentrated. Among the core traders, a large majority (ten) has in aggregate a net selling position. Many of the second-tier counterparties have links to several of the top-fifteen entities. Furthermore, the top-fifteen have large net exposures between themselves (multi-lateral netting is considered on a reference entity level).

This finding is confirmed by Clerc *et al.* (2013), who carry out the network analysis of the CDS market for European reference entities based on the anonymised dataset provided by ESMA. This analysis reveals that the network structure presents the characteristics of a scale-free network (see Chart 4 below).

In a scale-free network (b), by contrast with random network (a), high degree nodes or "hubs" (highlighted in Chart 4) tend to be followed by smaller ones, which in turn are followed by other nodes with even smaller degree and so on.[7] A scale-free structure strongly correlates with the network robustness to default contagion. The intuition is that if failures occur randomly and the vast majority of nodes is of small degree, then the likelihood of a major hub being affected is almost negligible. In addition, such a structure can maintain the connectedness of the network even in the case of the failure of a large hub. By contrast, the failure of some major hubs could also break down the connectedness of the system.

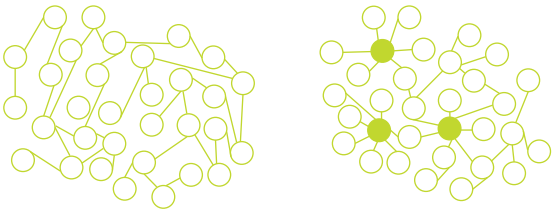
In addition to aggregate net selling and buying positions and multilateral net exposures, network centrality measures are also computed to characterise "super-spreaders" (see Box for the definition of the centrality measures). The main results are

Chart 3
A "15x10" approach to identify systemic players



Source: DTCC; computation ESRB.

Chart 4
Random and scale-free networks



(a) Random network (b) Scale-free network

Source: Network Workbench – Indiana University.

7 *The term "scale-free" is derived from Barabasi and Albert (1999). Scale-free networks models have been successfully applied to many complex real-world networks (world wide web; co-authorship networks of scientists; unstoppable viruses; banking networks…).*

Box

Network centrality measures to assess contagion risks

In order to assess the scope from contagion through the networks of CDS exposures, several metrics are computed and presented in Table 1 below. Besides aggregate net selling and buying positions based on bilateral positions and aggregate net multilateral exposures, Table 1 reports three additional measures: net strength; eigenvector centrality and betweeness centrality. In each network, net bilateral sellers or buyers of CDS protection represent the nodes of the networks; a link is defined if an institution is a net buyer of protection from another.

Net strength

In-strength is defined by the sum of the net bilateral selling *positions of node* i *(i.e. the sum of the bilateral positions where node* i *is a net seller),*

$$\text{in\_strength}_i = \sum_j w_{ji}^{\text{netsold}}$$

Out-strength represents the sum of the net bilateral buying *positions of node* i *(i.e. the sum of the bilateral positions where node* i *is a net buyer),*

$$\text{out\_strength}_i = \sum_j w_{ij}^{\text{netbought}}$$

Net-strength is then the difference between its in-strength and out-strength,

$$\text{Net\_strength}_i = \sum_j w_{ji}^{\text{netsold}} - \sum_j w_{ij}^{\text{netbought}}$$

Net strength represents the net multilateral position of institution (or node) i.

Betweenness centrality

This measure provides an indication of the "exclusivity" of the position of a node i *in the overall network by counting the number of paths between any originating and any terminating node that pass through node* i*. It could be important for identifying the nodes whose removal could affect the most network resilience. Normalised betweenness is computed as follows:*

$$btw_i^* = \frac{\sum_{j,l} \frac{a_{jl,i}}{a_{jl}}}{(n-1)(n-2)}$$

Where $a_{jl,i}$ *denotes the number of paths between* j *and* l *through* i *,* a_{jl} *is the total number of shortest paths between* j *and* l*, and* n *is the number of nodes.*

Eigenvector centrality

In the context of assessing contagion due to CDS exposures, this measure could provide an indication of which nodes would be more important in the propagation of a shock if one could take into account the knock-on effects that may follow a shock. Mathematically, eigenvector centrality is defined as the principal eigenvector of the adjacency matrix that represents the (internally connected) network, i.e. which indicates whether there is a link or not between two nodes. The defining equation of an eigenvector is

$$\lambda v = Gv$$

where G *is the adjacency matrix of the graph,* λ *is a constant (the eigenvalue), and* v *is the eigenvector. The equation lends itself to the interpretation that a node has a high eigenvector score if it is adjacent to nodes that are themselves high scorers. This measure correlates best with the capacity of a financial institution to cause the largest contagion losses on the others.*

Table 1
Top 20 market participants in the CDS market for European reference entities in 2011
(net-multilateral exposure/CET in %)

Rank 2011	Aggregate net bilateral selling position	Aggregate net bilateral buying position	Net-multilateral exposure	Net-multilateral exposure/CET	Net strength	Eigenvector centrality	Between-ness centrality
1	Bank 312 *	Bank 497 *	Bank 312 *	44	Bank 312 *	Bank 497 *	Bank 148 *
2	Bank 622 *	Bank 356 *	AM 860	n.a.	AM 860	Bank 356 *	Bank 1,172 *
3	Bank 765 *	Bank 317 *	Bank 821	66	Bank 821	Bank 1,045 *	Bank 622 *
4	Bank 497 *	Bank 765 *	Bank 186 *	17	Bank 186 *	Bank 276 *	Bank 497 *
5	Bank 1,045 *	Bank 622 *	Bank 622 *	8	Bank 622 *	Bank 148 *	AM 538
6	Bank 1,172 *	Bank 148 *	HF 508	n.a.	HF 508	Bank 954 *	Bank 765 *
7	Bank 186 *	Bank 276 *	Bank 656	65	Bank 656	Bank 317 *	Bank 356 *
8	Bank 148 *	Bank 136 *	Bank 389	90	Bank 389	HF 304	Bank 317 *
9	Bank 317 *	Bank 1,172 *	Bank 1,045 *	12	Bank 1,045 *	Bank 136 *	Bank 276 *
10	Bank 136 *	Bank 1,045 *	Bank 627	n.a.	Bank 627	Bank 1,172 *	HF 673
11	AM 860	Bank 954 *	AM 104	n.a.	AM 104	Bank 765 *	Bank 136 *
12	Bank 356 *	CCP 565	Bank 1,176 *	12	Bank 1,176 *	Bank 782	Bank 186 *
13	Bank 821	Bank 553 *	Bank 412	18	Bank 412	Bank 289	AM 937
14	Bank 553 *	Bank 289	Bank 553 *	1	Bank 553 *	AM 873	Bank 954 *
15	Bank 276 *	Bank 186 *	Bank 804	8	Bank 804	Bank 622 *	FS 373
16	CCP 565	Bank 1,176 *	FS 920	n.a.	FS 920	CCP 565	AM 541
17	Bank 954 *	Bank 782	Bank 1,075	n.a.	FS 1,075	Bank 804	Bank 553 *
18	HF 508	Bank 804	Bank 765 *	3	Bank 765 *	HF 509	Bank 1,045 *
19	Bank 1,176 *	Bank 304	Bank 1,172 *	3	Bank 1,172 *	HF 401	AM 621
20	Bank 656	AM 873	Bank 628	n.a.	Bank 628	Bank 553 *	AM 467

*Note: AM stands for asset manager (in red in the table); HF for hedge fund (in blue); FS for financial service company (in orange); CCP for central clearing counterparty (in green); n.a. for not available; * signals that the bank belongs to the G-SIB identified by the Financial Stability Board.*
Source: Clerc et al. *(2013).*

presented in Table 1, where the first top-twenty institutions are ranked according to different metrics. In addition, multilateral net exposure is compared, for banks, to their core common equity.

Table 1 shows that banks, which are mostly global systemic banks (G-SIBs), as identified by the Financial Stability Board (FSB), play a pivotal role in the CDS market. In particular, columns 1 and 2 show that these large global banks tend to act primarily as dealers. As a result, they tend to perform more netting along their short and long contracts. With a few exceptions, their net multilateral exposure tend to be relatively lower (column 3), especially when compared to their common equity (column 4). Some non-bank institutions tend by contrast to hold large net exposures (in particular some asset managers and hedge funds). Column 4 also reveals the very high multilateral net exposure of some other banks relative to their capital. While network metrics (columns 5 to 7) confirm the potential of bank-type dealers as "super-spreaders" of financial contagion in CDS networks, a significant variety of other non-bank/non-dealer market participants with "super-spreader" potential also emerge.

In order to understand the potential for contagion in the CDS market, the methods and results from the literature on interbank markets offers a useful starting point. As the survey by Upper (2011) discusses in detail, a domino-type model is frequently applied to investigate the impact of default cascades on the system's risk-bearing capacity. Hence, this approach aims to investigate the extent to which the failure of one bank spreads to other banks, i.e. the direct contagion effect stemming from bilateral exposures. The algorithm therefore works as follows: one bank is assumed to get into distress due to an exogenous shock. Each bank, which has direct exposures to this bank, suffers losses and – in the event that its capital cushion is not sufficient – may fail as well, thereby spreading and amplifying the original shock. This process comes to an end when a new equilibrium is reached, i.e. when no additional failures occur.

Such an algorithm has been implemented in the context of the ESRB report on CDSs (2013). Tentative results tend to show that direct contagion through direct contractual links may happen in the CDS market, but should be a rather rare phenomenon. The feature mostly stems from the scale-free structure of CDS exposures, which is characterised by a core-periphery setup where a number of large and complex banking groups dominate market activity.

Importantly, domino contagion effects that are captured by these mechanic network models only capture direct contagion channels. Indirect

contagion channels that work through price effects and funding effects are arguably more important but difficult to measure empirically. Market participants that have no contractual relationship are exposed to each other through liquidity spirals. An adverse shock leads to losses which lead to more fire-sales. The resulting price-drops lead to larger losses amplifying the initial shock even further (loss spiral). In addition, price volatility increases, which leads to higher margins and haircuts, forcing market participants to delever, which in turn leads to a larger price drop and higher price volatility.[8] The severity of these spirals depends to a large extent on the liquidity mismatch of key market participants. Market participants with large liquidity mismatch amplify the initial shock as their response to a negative shock is to fire-sell assets. On the other hand, market participants with low liquidity mismatch hold on to their assets and hence absorb shocks. In order to better deal with the complexity of the channels of contagion in the CDS market it is therefore important to extend the analysis along the lines of risk topography outlined in Brunnermeier, Gorton and Krishnamurthy (2012). Two key analytical issues are the definition of the network and the analysis of common or correlated exposures.

4| Policy implications

The main policy lessons we draw from this exercise are the following.

From a systemic risk perspective, the analysis of the CDS market in isolation faces a number of limits. First, the multi-faceted nature of interconnectedness is difficult to capture in existing analytical frameworks. To better understand risk transfer and risk bearing capacity, it would be necessary to know whether CDS exposures serve for proprietary trading, market making or hedging. In the latter case, positions in other assets with opposite risk profiles could be off-setting the risk incurred in the CDS positions. Second, a variety of potential contagion channels (e.g., direct exposures to the underlying asset, collateral mechanisms or margin calls on correlated assets) are of material relevance and cannot be disentangled from the CDS channel.

Overall, monitoring and mitigating indirect channels of contagion deserves at least as much attention as dealing with channels based on direct contractual links because the latter type underestimates the potential for systemic risk. In particular, material contagion purely through domino effects as captured in mechanic network models in or from the CDS market seems unlikely, given the usually low level of net exposures relative to capital. However, the potential for contagion effects should not be underestimated as (i) some institutions are heavily exposed to counterparty risk and the size of their net exposures exceeds by far their core capital; (ii) some non-bank/non-dealer market participants, which are not regulated and may not hold sufficient capital, reserves or liquidity, have a "super-spreader" potential; and (iii) all counterparties in the CDS market are linked by a complex liability structure.

The network analysis carried out in the context of this paper shows that the EU CDS market is centred on fifteen bank-type "super-spreaders", most of which are banks from the FSB G-SIBs list. In contrast, the smaller counterparties are typically only active in a few reference entities and trade with a few major counterparties. On the one hand, one might argue that the G-SIB surcharge which will be applied to these super-spreaders will factor in interconnectedness and exposures; on the other, as these G-SIBs represent the bulk of capital in the system, these banks cannot be allowed to fail. The high amount of net (and even more so gross) exposures for some of these market participants relative to their capital implies the significant risks incurred by their CDS trading. The analysis also shows the existence of potentially significant non-bank "super-spreaders", e.g., asset managers or hedge funds.

The current policy agenda of the FSB and of the Basel Committee on Banking Supervision (BCBS) addresses some of the main concerns stemming for the CDS market: in particular additional capital surcharges, new liquidity buffers, increased monitoring/supervision of G-SIFIs and limits to large exposure may reduce the scope for contagion. In addition, the widespread use of CCPs should reduce complexity, network risk and mitigate counterparty credit risk to the extent that most of CDSs are centrally clearable and CCPs

8 *The liquidity spirals are developed in Brunnermeier and Pedersen (2009) and Brunnermeier and Sannikov (2010) provide a macroeconomic framework for analysing financial instability.*

are linked to allow for cross-product netting. Such links should however be closely monitored in turn since they may provide some scope for contagion amongst these new systemic players.

Regulators currently try to strike the right balance between providing incentives to use, when feasible, CCPs, and not condemning those operations, which are essential for the financing of the economy but cannot be standardised or will remain unfit to central clearing. This is the case for some categories of CDSs. Regulators also face another trade-off between reducing the leverage of the financial sector and enhancing market liquidity.

Moving to central clearing also raises additional financial stability issues. In this regard, most of the concerns raised by Cont (2010) in a previous issue of the *Financial Stability Review* on derivatives remain valid.

Concerning more specifically CDSs, many authors insist on the role of risk mitigating mechanisms such as collateralisation and close out netting (see for instance Vuillemey and Peltonen, 2013). In both cases, there will however remain some sources of fragility, which are worth monitoring.

First, regarding collateralisation, the latest International Swaps and Derivatives Association (ISDA) Margin Survey (see Table 2) shows that credit derivatives transactions are almost fully collateralised compared to other derivatives. However, new regulatory constraints on collateral re-use or re-hypothecation as well as collateral segregation in a context of collateral shortage may add to the shortfall.

Table 2
Percent of trades subject to collateral agreements, by OTC derivative product type

(%)

	All (average)		Large dealers (average)	
	2012	2011	2012	2011
All OTC derivatives	**71.4**	69.8	**83.7**	80.2
Fixed income derivatives	**78.1**	78.6	**89.9**	87.9
Credit derivatives	**93.4**	93.2	**96.1**	95.8
FX derivatives	**55.6**	58.2	**70.6**	65.2
Equity derivatives	**72.7**	72.1	**85.3**	73.2
Commodities, including precious metals	**56.3**	59.6	**63.9**	62.9

Source: ISDA Margin Survey 2012.

This shortfall in collateralisation may increase considerably in times of stress as market stress usually leads to a rapid increase of exposures, especially with credit derivatives where sudden jumps in creditworthiness are common.

Segregation of collateral may also add to the shortfall in collateral. After the Lehman default and the freezing of Lehman's assets in the United Kingdom, market participants have looked for ways to secure their collateral posting with dealers. They found these ways through segregated accounts and tri-party custodian arrangements. This reduces the extent of re-hypothecation and also increases the shortfall of collateral, transforming the collateral space.[9]

Second, despite close-out netting, there will always be asymmetry near default. When some market participants are in distress, their counterparties have the tendency to try to terminate contracts that are in their favour and leave the other contracts in place. This implies that when there is a significant decrease of creditworthiness of a single party, derivatives payable may underestimate the true risks.

9 *On this point see Singh's contribution to this issue of the* Financial Stability Review.

References

Alter (A.) and Schüler (Y.) (2012)
"Credit spread interdependencies of European states and banks during the financial crisis", *Journal of Banking and Finance*, Vol. 36, No. 12, pp. 3444-3468.

Brunnermeier (M.) (2009)
"Deciphering the liquidity and credit crunch 2007-08", *Journal of Economic Perspectives*, Vol. 23, No. 1, pp. 77-100.

Brunnermeier (M.), Gorton (G.) and Krishnamurthy (A.) (2012)
"Risk topography", *NBER Macroeconomics Annual 2011*, Vol. 26, pp. 149-183.

Brunnermeier (M.) and Oehmke (M.) (2012)
"Bubbles, financial crises, and systemic risk", *NBER Working Paper*, No. 18398, September.

Brunnermeier (M.) and Sannikov (Y.) (2010)
"A macroeconomic model with a financial sector", *Working Paper*, Princeton University.

Clerc (L.), Gabrieli (S.), Kern (S.) and El Omari (Y.) (2013)
"Assessing contagion risk through the network structure of CDS exposures on European reference entities", *mimeo*, Banque de France.

Cont (R.) (2010)
"Credit default swaps and financial stability", Banque de France, *Financial Stability Review*, No. 14, July.

Duffie (D.) (2013)
"Systemic risk exposure: a 10-by-10-by-10 approach", in "Risk topography: systemic risk and macro modelling", editors: Markus K. Brunnermeier and Arvind Krishnamurthy, *NBER Book*, University of Chicago Press, Chicago.

European Central Bank (ECB) (2009)
Credit default swaps and counterparty risks, *Report*.

European Systemic Risk Board (ESRB) (2013)
Final Report of the ASC-ATC Expert Group on CDSs, *forthcoming*.

Geanakoplos (J.) and Fostel (A.) (2012)
"Tranching, CDS, and asset prices: how financial innovation can cause bubbles and crashes", *American Economic Journal: macroeconomics*, Vol. 4, No. 1, pp. 190-225, January.

Haldane (A.) (2009)
"Rethinking the financial network", *Speech* at the National Student Association, Amsterdam.

Heise (S.) and Kühn (R.) (2012)
"Derivatives and credit contagion in interconnected networks", *The European Physical Journal*, Vol. 85, No. 4, Article 115, April.

International Swaps and Derivatives Association (ISDA) (2012)
ISDA *Margin Survey*, May.

Markose (S.) (2012)
"Systemic risk from global financial derivatives: a network analysis of contagion and its mitigation with super-spreader tax", *IMF Working Paper*, WP/12/282.

Markose (S.), Giansante (S.) and Shaghaghi (A. R.) (2012)
"Too interconnected to fail financial network of US CDS market: topological fragility and systemic risk", *Journal of Economic Behavior & Organization*, Vol. 83, No. 3, pp. 627-646.

Peltonen (T.), Scheicher (M.) and Vuillemey (G.) (2013)
"The network structure of the CDS market and its determinants", European Central Bank, *mimeo*.

Soetaert (K.) and Kones (J. K.) (2011)
"Package NetIndices, network indices and food web descriptors in R", companion to Kones (J. K.), Soetaert (K.), van Oevelen (D.) and Owino (J.) (2009): "Are network indices robust indicators of food web functioning? A Monte Carlo approach", *Ecological Modelling*, Vol. 220, No. 3, pp. 370-382.

Soros (G.) (2009)
"One way to stop bear raids credit default swaps need much stricter regulation", *Wall Street Journal*, March 24.

Stulz (R. M.) (2010)
"Credit default swaps and the credit crisis", *Journal of Economic Perspectives*, Vol. 24, No. 1, pp. 73-92, Winter.

Upper (C.) (2011),
Simulation methods to assess the danger of contagion in interbank markets, *Journal of Financial Stability*, Vol. 7, pp. 111-125.

Vause (N.) (2010)
"Counterparty risk and contract volumes in credit default swap market", Bank for International Settlements, *Quarterly Review*.

Vuillemey (G.) and Peltonen (T.) (2013)
"Sovereign credit events and their spillovers to the European banking system – the interplay between sovereign bonds and CDS holdings", European Central Bank, *Working Paper*.

Yellen (J.) (2013)
"Interconnectedness and systemic risk: lessons from the financial crisis and policy implications", *Speech* at the American Economic Association/American Financial Association Joint Luncheon, San Diego, California, January, 4.

Why the Greek CDS settlement did not lead to the feared meltdown

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Prospects for a restructuring of Greek debt gave rise to: 1/ strong fears of an amplification of systemic risk associated with doubts as to whether the European financial system would be able to cope with a sovereign default; 2/ discussions about whether the credit default swaps (CDSs) would be triggered, which raised questions concerning the role of CDSs as instruments for hedging sovereign risk. However, CDSs on Greek sovereign bonds were indeed settled without precipitating a crisis. Like in the previous settlements, three main factors explain this smooth functioning: first, the fact that settlement only involved participants' net positions, which greatly reduced the amounts at stake. Second, protection sellers had set aside provisions to cover the amounts required for settlement through regular margin calls, especially in the case of Greece as the default had long been expected. Third, the usual auction procedure that determines the recovery rate ensured that the amounts paid out by protection sellers offset the bond-holders' shortfall vis-à-vis the face value of their bonds.

Although credit default swaps (CDSs) are instruments that are intended to cover the risk of loss generated by a borrower default, many commentators seem to doubt the capacity of markets to handle the settlements in the event of a major default. When Lehman Brothers failed in September 2008, rumours of a CDS market collapse abounded. These doubts resurfaced over the restructuring of Greek debt, owing to the specific nature of sovereign CDSs. Sovereign CDSs differ from corporate CDSs in the following regards: (i) the trigger clauses are different; since it is impossible for States to go bankrupt, they are based on the binding nature of the restructuring; (ii) very substantial amounts may be involved; (iii) the volume of the underlying debt usually exceeds the notional value of the protection.

In the case of Greek debt, concerns centred on the first two points. First, CDS holders feared that private creditors would accept restructuring on a "voluntary" basis, in which case CDSs would not be triggered. In this case, the sovereign CDSs would have offered no protection against losses on the Greek debt, and all the sovereign CDSs would have been considered useless. Second, the restructuring was substantial – around EUR 100 billion – and there was little information about the exposures of the different participants to the CDS market, which gave rise to pessimistic estimates. These two areas of concern turned out to be unfounded: restructuring was not conducted on a voluntary basis, so CDSs were triggered in March 2012, and CDS exposures turned out to be moderate.

CDSs were triggered against a very specific backdrop as Greek government bonds had already been exchanged. Indeed, on 21 February 2012, the Greek government and its private creditors had come to an agreement on an exchange offer comprising a 53.5% haircut on the face value of the bonds along with other restructuring arrangements. On 9 March 2012, a qualified majority of creditors accepted the offer, and a retroactive collective action clause (CAC) voted on 23 February by the Greek Parliament was activated, forcing all creditors to accept the exchange decision. On that day, since the CAC had been activated, restructuring could no longer be considered "voluntary", which had two immediate consequences: (i) the credit rating agencies Moody's and Fitch defined Greek government as being in default;[1] and (ii) Greek sovereign CDSs were triggered. This unusual situation, in which the securities had already been exchanged, made the payout procedure trickier, raising fears of distortions. In fact, the payout rate applied to CDS holders was consistent with the losses on the face value of the securities at the time of the exchange.

As with previous events, Hellenic Republic CDSs were settled in an orderly fashion without creating systemic risk. Three factors chiefly explain the market's resilience. First, participants' net positions were settled, after netting gross positions, which greatly reduced the amounts in play. Second, protection sellers set aside provisions for the amounts required for settlement through regular – generally daily – margin calls; these margin calls worked especially well in the Greek case because participants had long expected the default. Third, the recovery rate was set by an auction procedure, as has been the case for most corporate CDSs since 2005 and for Ecuador's sovereign default in 2008. This auction is designed to ensure that the amounts paid out by protection sellers offset the losses observed on the bond market.

The aim of this article is to understand how the CDS market worked at the time of this default both in terms of the auction procedure that determined payouts to protection holders, and in terms of links with the bond market. The remainder of the paper is organised as follows. Part 1 describes the specific situation of Greek debt at the moment when CDSs were triggered, along with investor losses and bank CDS exposures. Part 2 examines the auction procedure used to establish the final CDS payout price. Part 3 explores the possible biases that this procedure may generate. Part 4 compares the recovery rate determined by the auction with the price of the securities in default. Part 5 concludes.

1| Greek securities covered by credit default swaps

After the European Union (EU) and International Monetary Fund (IMF) initially bailed out the Greek government to the tune of EUR 110 billion in May 2010

1 *Standard and Poor's had already downgraded Greece's rating to selective default a few days earlier, on 27 February, after the vote on the retroactive CAC.*

and drastic adjustment programmes were introduced to cut the public deficit, it became clear fairly quickly that these measures would be insufficient to maintain the country's solvency and that Greece would have to swiftly reduce its debt burden to avoid a collapse. The EU/IMF provided another EUR 130 billion bailout in June 2011 and asked private creditors to negotiate with the Greek government to restructure the debt. This private sector involvement (PSI) programme consisted in exchanging bonds held by the private sector against new securities issued under more favourable terms by the Greek government. CDSs on Greece were triggered following this exchange and therefore covered the new securities.

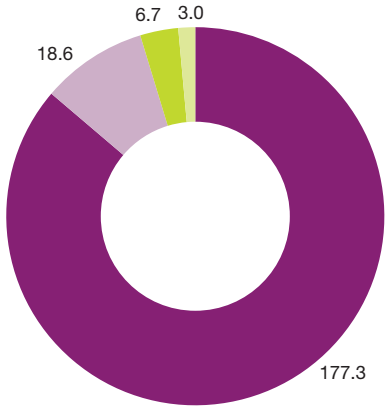
1|1 Private debt exchange

Private creditors accepted the principle of restructuring in June 2011, including a haircut on the face value, longer maturities and reduced interest rates. Financial institutions, under the aegis of International Institute of Finance (IIF), conducted the negotiations with the Greek government on the restructuring arrangements. The reduction was aimed to be sufficient to bring Greek debt back on a sustainable trajectory. Negotiations lasted until February 2012 to determine the exact details of the agreement, and notably the loss on the face value, or haircut, which was ultimately set at 53.5%. To mitigate the impact of the PSI programme on bank balance sheets, the Eurogroup decided to contribute through a EUR 30 billion loan from the European Financial Stability Facility (EFSF). At the same time, the Eurosystem had just launched an ambitious programme of long-term lending to the banking sector, the three-year LTRO, to the tune of EUR 1,000 billion.

On 23 February 2012, private holders were given the possibility to exchange their original securities for a package containing (i) EFSF securities with a face value equal to 15% of the exchanged securities and a maturity of up to two years along with (ii) new Greek securities with a face value equal to 31.5% of the original securities, with maturities ranging from 2023 to 2042, and bearing a lower coupon of 2% until 2016, 3% until 2020 and 4.3% thereafter. These new securities were backed by a EUR 30 billion loan from the EFSF. The package also included GDP-linked bonds from 2015 and short-term EFSF securities to cover accrued interest at the time of the exchange.

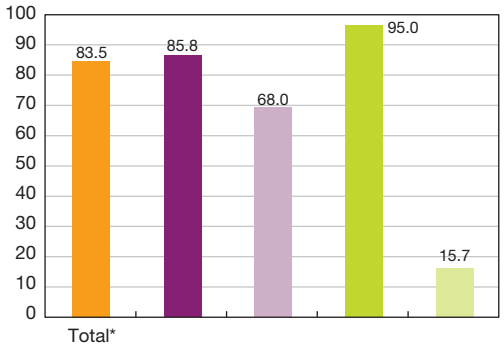
Charts 1
Hellenic Republic debt exchange offer
March 2012

(EUR billions)
a) Debt proposed for exchange



Total debt: EUR 205.6 billion

(%)
b) Results of offer, % of debt whose holders voted in favour



* Total debt agreed to the exchange: EUR 171.6 billion

Sovereign debt
Greek law
Foreign law

State owned entreprises
Greek law
Foreign law

Source: European Commission (2012).

The exchange covered government securities (EUR 195.9 billion) as well as government-backed bonds issued by State-owned enterprises (EUR 9.7 billion) for a total face value of EUR 205.6 billion (see Chart 1a), making this the largest restructuring in history. Some forty bonds were involved in the exchange, with maturities ranging from short to long-term, mostly in EUR, but also some in JPY and CHF. Most of the securities were subject to Greek law (90% approximately).

On the other hand, the Greek government issued twenty new bonds on 23 February 2012, with maturities ranging from 11 to 30 years. All these new bonds could be used to settle CDSs, the cheapest-to-deliver being that with the longest maturity, i.e. 2042.

1|2 Market discount on old and new bonds

By accepting this exchange, a private holder owning a Greek bond with a face value of EUR 100 would receive: (i) an EFSF security with a face value of EUR 15 and (ii) a new Greek bond with a face value of EUR 31.5. The total comes down to EUR 46.5, which means a haircut of 53.5%.

If all participants had accepted the exchange, Greece would have been able to reduce its debt by EUR 110 billion, or 53.5% of EUR 205.7 billion, while benefiting from much longer maturities through to 2042 and lower interest rates. This goal was almost achieved in the end.

In reality, bondholders suffered much bigger losses on the face value than this 53.5% haircut, because the new securities received were already heavily discounted on the market on the day of the exchange.[2] The bonds with the longest maturity – 2042 – had the lowest market value, trading at around 22% of their face value, i.e. a discount of 78%. Thus, the market value of the package received by a holder of Greek debt with a face value of EUR 100 was around EUR 31.5*22% + EUR 15 = EUR 21.93, or roughly equal to the market value of an old Greek bond on that same day.

This implies two approximate equalities between market prices on the day of the exchange. First, the market price of the package received was more or less equal to that of the old bond, preventing any opportunities for arbitrage, since selling an old bond on the market or accepting the exchange yielded the same value. Second, the new Greek bond received in exchange, quoted at around 22% of par, had roughly the same market price as the old bond. It may seem strange that the new Greek bonds, that are now partly backed by the EFSF, have the same discount on the market as the old ones. The extended maturity to 2042, lower coupon and persistent uncertainty over the outlook for Greece explain this heavy discount.

Thanks to this equality between the market prices of new and old bonds CDSs were able to play their protection role. The original Greek securities were subject to a discount of about 78% on their face value. Therefore, under normal CDS protection, CDS holders should recover about 78% of the par. But at the time of CDS settlement, most of the old securities had already been exchanged and withdrawn from the market, which implies that the new bonds had to be delivered to activate CDS protection. The amount received by CDS holders therefore had to match the loss on the face value of these new bonds. Because the discount was the same – 78% – for both categories of securities, old and new, the CDS market was able to properly cover the losses.

Another solution would have been to keep some of the old securities out of the exchange so that they could be used to settle CDSs. The Greek authorities rejected this solution because they wanted to exchange all the debt held by the private sector to maximise the reduction in the country's debt.

1|3 Triggering CDSs

The decision of triggering CDSs is down to the International Swaps and Derivatives Association (ISDA) through its regional Determination Committees. This decision is taken on the basis of reported credit events such as restructuring (or a debt exchange) that is forced on creditors, but not if it is accepted voluntarily. This principle is consistent with

2 *Here, we assess the loss for an investor who had bought the old bond at its face value. In fact, many bondholders had purchased their bonds on the secondary market, at already discounted prices, i.e. below the face value. Also, the loss differed across issues, as shown by Zettlemeyer* et al. *(2012).*

that of the credit rating agencies, which recognise default only in the event of mandatory restructuring.

At the beginning of the negotiations that started in summer 2011 between the Greek government and its private creditors, many observers believed that the exchange could be conducted voluntarily and hence that CDSs would not be triggered. But the magnitude of the recession in Greece and the bad news on the country's public finances gradually made it necessary to force creditors to bear increasingly heavy losses. When negotiations were completed in February 2012, the proposed exchange offer entailed a face value loss of 78%. If all investors had accepted the loss voluntarily, Greek CDSs would not have been triggered. This would have been a blow to the sovereign CDS market, because it would have been unable to protect holders against sizeable losses.

The Greek government needed to exchange at least 90% of the securities held by the private sector to reduce its debt sufficiently. Despite the previous talks with creditors, there was no guarantee that 90% of holders would voluntarily accept the exchange offer at such an unfavourable price. The Greek government therefore asked Parliament to vote on a law to introduce a retroactive CAC on Greek securities. Only securities issued under Greek law were concerned, or about 90% of the total (see Chart 1a), but not those issued under foreign law. The law, which was passed on 23 February 2012, provided that decisions adopted by a qualified majority of holders (75%) would apply to all holders. The CAC would not have been triggered if at least 90% of the holders had accepted the exchange, since the debt reduction would then have been deemed sufficient. The passing of this law led Standard & Poor's to downgrade Greece to selective default on 27 February 2012.

In reality, 85.8% of holders agreed to exchange sovereign debt issued under Greek law on 9 March 2012 (see Chart 1b). This was over the qualified majority of 75%, but below the 90% deemed sufficient by the Greek authorities. Therefore, the CAC was activated, making the exchange binding on all holders. Consequently, the restructuring could no longer be considered to be voluntary, prompting Moody's and Fitch to immediately declare Greece to be in default. On the same day, the ISDA, acting through its Europe-Middle-East-Africa Determination Committee, announced that CDSs would be triggered. Holders of CDS protection on Greek debt would therefore receive a payout to cover losses on the face value of their securities.

1|4 CDS amounts outstanding and bank exposures

When the markets started to acknowledge the risk of a Greek default, the amount of CDS outstanding on Greece increased dramatically. The gross notional amount virtually doubled in 2009, rising from USD 37 billion to USD 70 billion, while the number of contracts more than doubled that year. Then, as default became increasingly likely, from February 2010 onwards, the price of protection became prohibitive and the market dried up, as shown in Chart 2a (see below) by the fact that gross notional plateaued after that point. At the same time, to mitigate their risks, participants sharply curtailed their net positions, which fell from USD 9 billion in February 2010 to USD 3.2 billion on 9 March 2012 (see Chart 2b below).

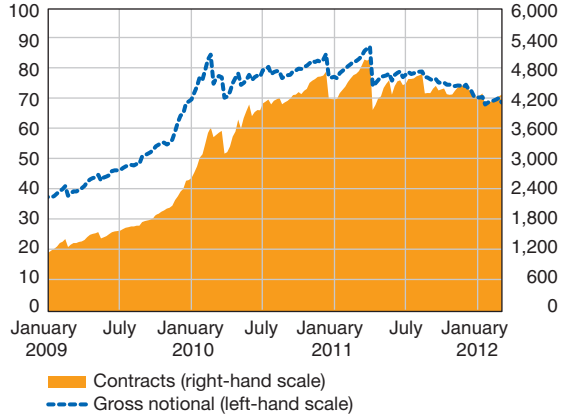
The gross notional amount is far higher than the net notional amount (USD 69.3 billion vs. USD 3.2 billion in March 2012) because most market participants are both on the buyer and seller side. This is particularly true of dealers, i.e. large international banks such as Barclays, Deutsche Bank, BNP Paribas and Société Générale, which are market makers and act as counterparties in both directions, quoting bid/offer spreads.[3] For instance, Deutsche Bank and Barclays had sold more than EUR 4.4 billion in protection on Greece, but their net exposure was less than EUR 100 million in September 2011; similarly, Société Générale had sold EUR 2.5 billion in CDSs, but had purchased exactly the same amount, giving it a net position of zero (see Table 1). Other than the dealers, most CDS market participants also buy protection at some point to then sell it later, as shown in Table 1, since the way to make a profit on CDS is to buy when the premium is low and sell once it has gone up.

3 *Table 2 gives the list of dealers in Greek CDS.*

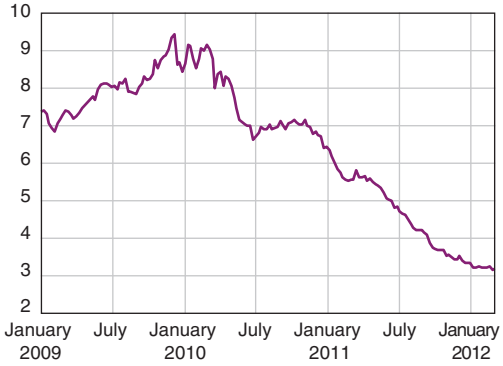
Charts 2
CDS notional on the Hellenic Republic
Between 2 January 2009 and 9 March 2012

(USD billions)

a) Gross notional and number of contracts



b) Net notional



Source: Depository Trust and Clearing Corporation (DTCC).

When it comes to settling CDSs, what counts is net exposure, since settlement takes place after netting agents' positions. When CDSs were triggered on 9 March 2012, net exposure to Greek CDS was relatively small, standing at USD 3.2 billion. With a loss of 78% on the face value, CDS sellers had to pay USD 2.5 billion to protection holders (78% of USD 3.2 billion), which seems small when compared with the losses sustained by investors on the face value of their securities, i.e. 78% of EUR 200 billion.

Furthermore, the systemic risk associated with triggering CDSs is limited by regular – usually daily – margin calls that force sellers to set aside

Table 1
European banks selling and holding protection on Greece
At 30 September 2011

(notional amount in EUR millions)

	Net long positions				Net short positions		
	Seller	Buyer	Net		Seller	Buyer	Net
Unicredit	1,116	817	299	Bayerische LB	4	4	0
DZ Bank	806	636	170	LB Berlin	37	37	0
BPCE	353	212	140	WGZ Bank	31	31	0
Deutsche Bank	4,420	4,324	96	Santander	214	214	0
Nord LB	92	0	92	Rabobank	19	19	0
BNP Paribas	306	214	92	ESFG	9	9	0
Barclays	4,451	4,372	79	Commerzbank	825	825	0
West LB	403	326	77	Erste Bank	110	111	-1
Crédit Agricole	48	9	39	BFA-Bankia	0	3	-3
Dexia	19	0	19	Intesa Sanpaolo	142	167	-25
BBVA	46	33	13	Volksbank Ost	35	81	-46
Monte dei Paschi	275	264	11	LBBW	216	271	-55
DekaBank	20	10	10	RBS group	3,152	3,375	-223
Société Générale	2,457	2,454	3	HSBC	1,482	1,725	-243
Total net long positions			**1,141**	**Total net short positions**			**-596**

Source: European Banking Authority.

the provisions needed for settlement. Since the Greek default was widely expected, at least since June 2011, when negotiations with private creditors got underway, CDS settlement did not create a market shock.

In total, European banks had net long exposure of EUR 1.141 billion to Greek sovereign CDSs in September 2011. An examination of individual positions reveals that no institution was massively exposed in net terms and that most banks were dealing with manageable net amounts. Unicredit was most exposed as a net seller of EUR 299 million (see Table 1).

2| Credit default swap auction settlement procedure

In theory, the holder of a CDS has two options in the event of a default: (i) physical settlement, where the holder delivers the underlying security to the CDS seller, which pays the holder the full face value; or (ii) cash settlement, where the seller pays the holder an amount equivalent to the face value less the recovery value of the security in default. In both cases, a CDS holder that holds a bond is entirely covered against the loss from default. This is obvious in the case of physical settlement. It is also true for cash settlement if the CDS market is in step with the bond market. The auction procedure makes it possible to ensure the same level of protection for all participants, whether settlement is physical or cash.

2|1 Origins of the auction system

Physical settlement is possible only if a large number of CDS holders have the underlying securities; other holders may then buy them on the secondary market without causing an abrupt price surge. But most holders of corporate CDSs do not hold the underlying security. As with other derivative products designed to hedge risk, such as futures, options and swaps, CDSs are also used for speculative purposes. A participant may hold a "naked" CDS on a borrower,[4] i.e. without holding the underlying debt, because it expects to make a gain in the event of default. It may also buy CDS because it expects the probability of default of the underlying entity to increase and hopes to make a gain by unwinding its position later. As a result, CDS notional outstandings far exceed the stock of underlying bonds. For example, in the Delphi failure of 2005, the CDS notional outstanding was 5.6 times greater than the debt, at USD 28 billion in CDSs compared with USD 5 billion in bonds and loans. This ratio was even higher in the case of Collins & Aikman, Delta Airlines and Northwest Airlines.

In a situation where protection amounts exceed the those of the underlying assets, if the CDS holder has to deliver the bond at the time of default, he would have to buy it on the secondary market, causing an artificial price increase and hence a downward bias in the recovery rate. This squeeze effect was observed during the default settlement process in Argentina, when demand for underlying bonds relative to the existing stock was such that some protection holders were unable to deliver securities. Moreover, since some CDSs for entities in default belong to indices, it is necessary to have a single recovery rate to ensure that all investors are treated in the same way, whether they hold a position on the CDS of the defaulting entity or on an index. This is why an auction system was introduced in 2005 to ensure equal treatment of protection holders, irrespective of whether or not they are able to deliver securities.

2|2 Auction procedure

The auction procedure set up by the ISDA combines (i) physical settlement, where the protection holder is able to deliver the security at the price set by the auction, and (ii) cash settlement, where the protection holder (whether or not it possesses the security) receives an amount corresponding to the difference between the face value of the security and the final price determined by auction. This system makes it possible to physically exchange the underlying securities and to establish the recovery rate that will be used for cash settlement. One of the advantages of this approach is that it allows securities to be exchanged without increasing their price if there

4 *The European Union has restricted the use of naked sovereign CDSs since November 2012.*

is a shortfall of securities relative to the CDS notional amounts.

The auction comprises two stages that successively determine: (i) the inside market midpoint (IMM) and the net open interest (NOI); (ii) the final recovery rate or the final price to be used in cash settlement.

First stage

The first stage in the auction process involves a small number of participants, namely the dealers or market makers that provide quotes and that act as counterparties on the CDS market of the entity in question. These players are very large international investment banks. There were fourteen in the Greek case, as Table 2 shows. Dealers provide information on:

- a bid-offer spread as a percentage of the par, at which they agree to buy and sell securities (see Table 2). For example, the first line of Table 2 shows that Bank of America undertook to buy the security at 21.625% of the face value and to sell at 23.625%. The difference

Table 2
Initial bid-offer spreads in the Hellenic Republic auction

(%)

Dealer	Bid	Offer	Dealer
Bank of America N.A.	21.625	23.625	Bank of America N.A.
Barclays Bank PLC	21.0	23.0	Barclays Bank PLC
BNP Paribas	20.75	22.75	BNP Paribas
Citigroup Global Markets Limited	20.5	22.5	Citigroup Global Markets Limited
Credit Suisse International	20.25	22.25	Credit Suisse International
Deutsche Bank AG	20.25	22.25	Deutsche Bank AG
Goldman Sachs International	21.125	23.125	Goldman Sachs International
HSBC Bank PLC	20.25	22.25	HSBC Bank PLC
JPMorgan Chase Bank N.A.	21.25	23.25	JPMorgan Chase Bank N.A.
Morgan Stanley & Co. International PLC	21.0	23.0	Morgan Stanley & Co. International PLC
Nomura International PLC	20.0	22.0	Nomura International PLC
Société Générale	21.0	23.0	Société Générale
The Royal Bank of Scotland PLC	22.0	24.0	The Royal Bank of Scotland PLC
UBS AG	20.5	22.5	UBS AG

Sources: Creditex, Markit.

Table 3
Initial bids/offers in the Hellenic Republic auction sorted by descending/ascending order of price

(%)

Dealer	Bid	Offer	Dealer
The Royal Bank of Scotland PLC	22.0	22.0	Nomura International PLC
Bank of America N.A.	21.625	22.25	Credit Suisse International
JPMorgan Chase Bank N.A.	21.25	22.25	Deutsche Bank AG
Goldman Sachs International	21.125	22.25	HSBC Bank PLC
Barclays Bank PLC	21.0	22.5	Citigroup Global Markets Limited
Morgan Stanley & Co. International PLC	21.0	22.5	UBS AG
Société Générale	21.0	22.75	BNP Paribas
BNP Paribas	20.75	23.0	Barclays Bank PLC
Citigroup Global Markets Limited	20.5	23.0	Morgan Stanley & Co. International PLC
UBS AG	20.5	23.0	Société Générale
Credit Suisse International	20.25	23.125	Goldman Sachs International
Deutsche Bank AG	20.25	23.25	JPMorgan Chase Bank N.A.
HSBC Bank PLC	20.25	23.625	Bank of America N.A.
Nomura International PLC	20.0	24.0	The Royal Bank of Scotland PLC

Sources: Creditex, Markit.

between the bid and offer prices for each dealer is 2% of the par;

• physical settlement requests (PSRs) from dealers and their customers, bearing in mind that a dealer that is a net protection holder may only sell securities as in a physical settlement (while a dealer that is a net protection seller may only buy). The minimum physical settlement request is usually USD 5 million (or EUR 5 million in the case of the Greek auction) and may not exceed dealers' net positions. Customers of dealers are subject to the same requirements for their physical offers. Dealers then aggregate customers' PSRs with their own.

Bids are then sorted by descending order of price while offers are sorted by ascending order (see Table 3). If bids match offers, the corresponding prices are eliminated from the IMM. This was the case for the Royal Bank of Scotland (RBS)'s offer to buy at 22% of face value, which crossed with Nomura's offer to sell at the same price (see Table 3). These offers were eliminated, leading n offers in the list (here $n = 13$). The IMM is then computed as the average of the prices of the $n/2$ highest bids and of the $n/2$ lowest offers. Here, since $n = 13$ is an uneven number we take $(n + 1)/2 = 7$. The IMM is thus equal to the average of the figures in the framed area of Table 3, i.e. 21.75%.

Each dealer simultaneously indicates the amount of securities (and hence CDSs) that it wants to settle at the IMM and the direction, i.e. buy or sell (Table 4). This information is used to calculate the NOI, which is equal to the sum of bids and offers. In the Hellenic Republic auction, the amount of securities that dealers wanted to sell exceeded purchases by EUR 291.6 million. This suggests that the price should decline in the second stage of the auction. The fact that there was an NOI to sell in the first stage was not a peculiarity of the Greek auction; this happens in most auctions. It is in the interest of CDS holders to sell the security during the auction if they have it, because they are then assured of recovering the full face value.

Table 4
Physical settlement requests in the Hellenic Republic auction

(EUR millions)

Dealer	Buy or sell	Size
BNP Paribas	Sell	158.00
Citigroup Global Markets Limited	Sell	111.10
Credit Suisse International	Sell	0.00
Deutsche Bank AG	Sell	12.55
Goldman Sachs International	Sell	18.00
HSBC Bank PLC	Sell	332.00
Nomura International PLC	Sell	6.30
Société Générale	Sell	5.00
The Royal Bank of Scotland PLC	Sell	5.00
Bank of America N.A.	Buy	17.00
Barclays Bank PLC	Buy	24.30
JPMorgan Chase Bank N.A.	Buy	17.85
Morgan Stanley & Co. International PLC	Buy	236.55
UBS AG	Buy	60.65
Total physical buy orders	356.35	
Total physical sell orders	647.95	
NOI to sell	**291.6**	

Sources: Creditex, Markit.

Second stage

Once the results of the first stage are published on the Creditex site, market participants determine their limit orders[5] for the second part of the auction. If the first stage results in an NOI to sell (buy), only limit buy (sell) orders are accepted in the second stage. All participants that want to physically settle may take part in this stage by sending limit orders to the dealers.

The orders submitted by the dealers in the first part of the auction are entered in an order book. Orders that cross in the first stage, such as RBS and Nomura go through at the IMM, typically in an amount of EUR 5 million. Next, if there is an NOI to sell in the first stage, buy orders are filled in descending order of price: the highest buy order is filled in the amount requested, then the next highest order is filled and so on until the NOI is exhausted. The final recovery rate is equal to the price of the last order to be executed.[6] In the case of the Greek auction, the first twelve buy orders exhausted the NOI, the last orders to be filled being those of HSBC and Barclays at 21.5% of face value (see Table 5). The final recovery rate was thus 21.5%. This means that holders of CDSs on Greece received (100 – 21.5)%, or 78.5% of the face value.

5 *A limit buy (sell) order indicates a buy (sell) price and will be executed only if there is an equivalent or better counterparty.*
6 *If the order book runs out before the net open interest to sell (buy) is exhausted, the final price is 0 (1).*

Table 5
Buy orders in the second stage and final price in the Hellenic Republic auction

(EUR millions)

Dealer	Price	Buy order	Total amount of orders
JPMorgan Chase Bank N.A.	22.75*	50.0	50.0
Deutsche Bank AG	22.75*	19.5	69.5
Citigroup Global Markets Limited	22.75*	10.0	79.5
Credit Suisse International	22.75*	5.0	84.5
Credit Suisse International	22.125*	5.0	89.5
Citigroup Global Markets Limited	21.75*	50.0	139.5
Barclays Bank PLC	21.75*	10.0	149.5
The Royal Bank of Scotland PLC**	21.75*	5.0	154.5
Barclays Bank PLC	21.625*	30.0	184.5
Bank of America N.A.**	21.625*	5.0	189.5
HSBC Bank PLC	21.5**	60.0	249.5
Barclays	21.5**	60.0	309.5 ←
JPMorgan Chase Bank N.A.	21.375	20.0	329.5
Credit Suisse International	21.375	5.0	334.5

Note: (*) filled order, (**) partly filled order and (←) final auction price.
Sources: Creditex, Markit.

3| Possible manipulation and biases

The advantage of the auction system is to find a single recovery rate that applies to all participants. The system also seeks to ensure that payment to a CDS holder matches the loss borne on the face value of the security in default. However, any auction procedure can generate biases or attempts at price manipulation. For example, one of the best known biases is the winner's curse: it happens in auctions where the item goes to the highest bidder, as in auction rooms, since the winner of the auction pays a price higher than that offered by all the other participants. Turning to the possibilities for price manipulation, they range from agreements between participants to avoid raising (or lowering) prices, to the submission of offers at deliberately under- or overvalued prices to skew results.

3|1 Biases corrected by the procedure

Although imperfect, the auction system set up for CDS settlement prevents some biases, as a study of previous settlements reveals.

First, as dealers could submit off-market quotes to deliberately skew the results, penalties called adjustment amounts have been put in place to prevent this type of manipulation. If a dealer is on the "wrong side" of the auction, i.e. quotes a bid price that is too high when the NOI is to sell, he has to pay a penalty equal to the bid volume requested multiplied by the difference between its price and the IMM. The penalty is paid only if the bid crosses with an offer in the first stage. For example, in the Greek auction, RBS's bid (22%) was higher than the IMM (21.75%), as shown in Table 3. Since the NOI was to sell, the bid was on the wrong side of the market. RBS was thus subject to a penalty equal to EUR 5 million x (22% – 21.75%) = EUR 12,500. This exactly compensated for the fact that in the second stage RBS would have bought at a lower price (IMM of 21.75%) than the one it offered in the first stage (22%). This is tantamount to making it buy the security at the overly high price that it quoted in the first stage. Penalties are paid to the ISDA, which uses them to defray the costs of holding the auction or redistributes them to dealers if they are too large. According to Gupta and Sundaram (2011), these adjustment amounts have a deterrent effect that goes beyond their financial impact, and dealers seek to avoid them to preserve their reputation.

Second, the CDS auction system guarantees that the final price will not deviate too much from the IMM in the "wrong direction". If the last limit order used deviates from the initial recovery rate by more than a certain percentage of the face value (typically 1%), the final price may be set at the recovery rate plus or minus this percentage. This procedure applies only if the final price is on the "wrong side" of the recovery rate, i.e. is higher if the NOI is to sell or lower if the NOI is to buy. The procedure was not activated in the case of the Greek auction because the difference between the final price of 21.5% and the IMM of 21.75% was not only less than 1% but also on the "right side" since

the lower price in the second stage was consistent with the NOI to the sell in the first stage. The small amount of NOI (EUR 291.6 million) relative to the amount of deliverable bonds (particularly relative to the notional amount of the cheapest-to-deliver, which exceeded EUR 3 billion), probably explains the small difference between the IMM and the final price.

3|2 Biases relative to bond prices during the days surrounding the auction

If the price set by the auction is far off that of the deliverable bonds observed on the secondary market, it is possible that the auction price has been skewed or manipulated by market participants. If the bias appears repeatedly in the same direction for all auctions, it may be that the auction process itself generates a bias or is not sufficiently robust to resist attempted manipulations by participants.

Theoretical models of the auction process set up for CDS settlement show that the process may lead to biases, but do not agree on the direction of the biases. If there is an NOI to sell in the first stage, which is the most common case, as in the Greek example, the auction gives an overvalued price according to the model offered by Du and Zu (2011) but an undervalued price according to Chernov *et al.* (2011). In reality, the price given by the auction tends to be undervalued relative to the price of the security during the days preceding and following the auction. This finding comes from empirical analyses of a sample of twenty-three auctions from 2008 to 2010 by Gupta and Sundaram (2011), who attribute this bias to a kind of winner's curse.

What are the effects of this bias? For physical settlement participants, the consequences seem small: (i) sellers of securities during the auction are in theory indifferent, because they are by definition net holders of protection who will thus obtain the final auction price R on their security and exactly 100–R on their CDS; (ii) similarly, buyers of securities in the auction are by definition net sellers of CDS; if R is undervalued they will lose on the settlement by paying a high price 100–R for the CDS, but they will be able to recoup this loss by selling the security at a higher price on the market. Only agents who participate solely in cash settlement without possessing the security may see their gain affected in the case of an auction bias, with holders (sellers) of CDS winning (losing) if the security is undervalued.

4| Bond price and CDS final recovery rate

To estimate the effectiveness of the auction process and possible biases, we compare the price of securities deliverable on the secondary market with the final price determined through the auction.

4|1 Movement in bond prices between the credit event and the auction

We begin by examining the change in the market prices of deliverable securities between the day when it is announced that CDSs are triggered, and the auction day in orderto verify convergence with the final price obtained.

To do this, we collect data on bond prices (source: Bloomberg) and final prices for one hundred and thirty-nine auctions that took place between 2005 and 2012 (source: Creditex). We exclude thirty-six auctions caused by the triggering of loan CDSs as well as auctions involving subordinated bond debt, since these types of securities are generally less liquid, meaning that there is typically a lack of available Bloomberg data. We also take out the six credit events for restructuring that resulted in multiple auctions.[7] We then select only those auctions for which we had deliverable bonds offering a sufficient level of liquidity, i.e. with few missing values in the period between the credit event date used by the ISDA to trigger CDS and the settlement date. In the end, we are left with thirty-three auctions, of which twenty-two had an NOI to sell and 11 had an NOI to buy.[8]

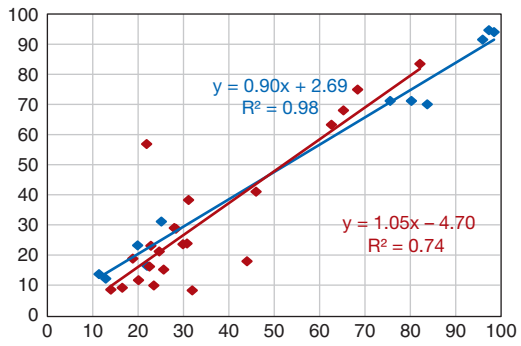
7 *As explained in the following point, in this case the list of deliverable bonds is common to all the auctions for a given restructuring, with each auction arriving at a different final price.*

8 *Auctions with net open interest to sell: 2005: Delphi; 2006: Calpine, Dana, Dura; 2008: Quebecor, Lehman Brothers, Washington Mutual; 2009: Lyondell, Nortel, Smurfit-Stone, Great Lakes, Rouse, Capmark, JSC BTA Bank, Lear Corp, CIT, NJSC Naftogaz of Ukraine; 2010: Ambac Financial Group; 2011: PMI Group; 2012: Eastman Kodak, Hellenic Republic, Sino Forest Corp. Auctions with net open interest to buy: 2008: Fannie Mae, Freddie Mac; 2009: Ecuador, General Motors, JCS Alliance Bank, Six Flags, Bradford & Bingley; 2010: Anglo Irish Bank; 2011: Allied Irish Banks, Dynegy Holdings; AMR Corp.*

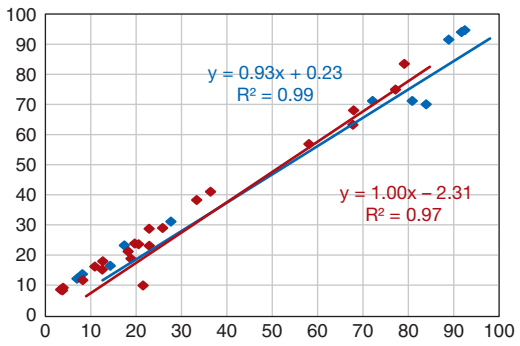
Charts 3
Final auction price compared with average closing price of deliverable bonds, for thirty-two reference entities

(Y-axis: final price, X-axis: average closing price, %)

a) Credit event date



b) Auction date



◆ Buy (number of observations = 11) ◆ Sell (number of observations = 22)

Sources: Bloomberg, Creditex, ISDA, Markit.

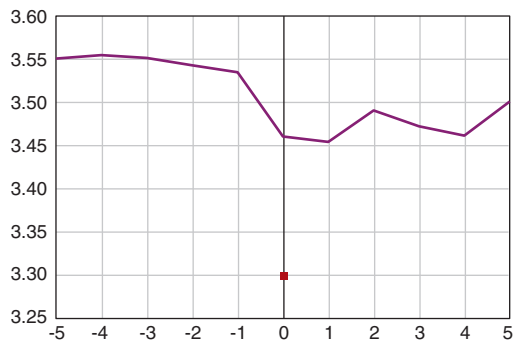
Chart 3 compares the final price to the average price of deliverable bonds for each of the thirty-two auctions. Chart 3a uses the price of bonds on the day of the credit event. As expected, the observations are close to the bisector. However, these values are much closer on the day of the auction, as Chart 3b shows. This convergence process is observed irrespective of the direction of the NOI. Arbitrage opportunities are thus reduced between the date of the credit event and the auction.

However, Chart 3b shows that bond prices on the secondary market on the day of the auction are not exactly equal to the final prices determined by the auction, which could point to bias or manipulation in the auction. To check this, we look at price behaviour on the secondary market in the ten-day window covering the five days before and after the auction. We consider only auctions with no missing values during this window, which leaves sixteen auctions

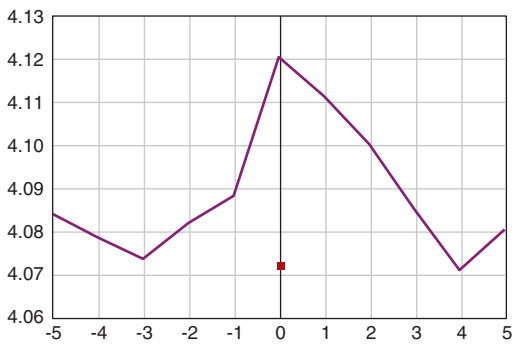
Charts 4
Average price of deliverable bonds on the secondary market on the days around the auction compared against average final price

(logs)

a) Auctions with an NOI to sell (sixteen auctions)



b) Auctions with an NOI to buy (nine auctions)



Market price ■ Auction price

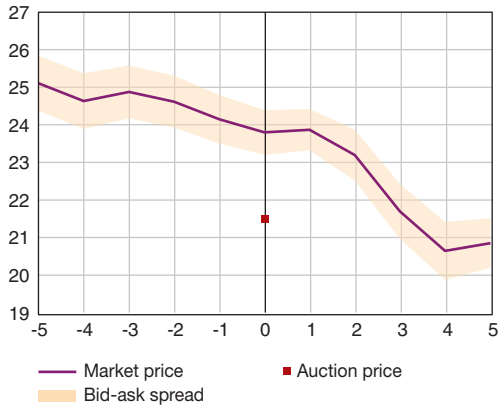
Sources: Bloomberg, Creditex, ISDA, Markit.

with an NOI to sell and nine with an NOI to buy.[9] On average, we find a price decline on the secondary market in the run-up to auctions with an NOI to sell, which is partly offset by an increase in the days following (see Chart 4a). This is consistent with the findings of Gupta and Sundaram (2011). Symmetrical price behaviour is observed for auctions with an NOI to buy (see Chart 4b).

An observation of prices around the auction date reveals two characteristics. First, the results are very heterogeneous: a bias is observed on average but does not appear in all auctions; for example, in the case of the Lehman Brothers default in 2008, although the NOI was to sell, the auction price was higher than the price of the bonds in the days before and after the auction. In the case of Greece, the average price of deliverable bonds fell almost constantly during the ten-day window (see Chart 5).

We also consider whether the secondary market price on auction day is equal to the final price. Our data indicate that the final price is almost always lower, irrespective of the direction of the auction.[10] The Greek auction is consistent with this finding.

Chart 5
Average price of bonds deliverable on the secondary market on the days around the auction compared with the final price, in the case of the Greek auction



Sources: Bloomberg, Creditex, ISDA, Markit.

4|2 Deliverable bonds and "cheapest-to-deliver"

The fact that the final auction price is always lower than the market price on auction day, irrespective of the direction of the NOI, cannot stem from a form of winner's curse. If this were the case, the price would have to be higher, not lower, when the NOI is to buy. Other factors must therefore be at work, linked to the characteristics of CDSs and their settlement.

One factor is probably the lack of uniformity in the pool of deliverable bonds, one of which is the cheapest-to-deliver (CTD) for the CDS buyer. The CDS buyer can choose which bond to deliver in a physical settlement, and this choice is imposed on the protection seller. It is therefore in the former's interest to provide the CTD bond and thus take advantage of an optional characteristic of the deliverable bonds. The option's presence will therefore drive down the recovery rate set by the auction.[11]

This effect may come into play particularly in the case of a restructuring. In the case of a failure, all deliverable bonds can be expected to trade at a relatively uniform price on the secondary market. In the case of a restructuring, the prices of the original bonds may differ markedly from those of the restructured bonds. When Conseco, a US firm, was restructured in 2000, purchasers of bonds were given the choice between delivering restructured debt with high coupons and a small haircut, or non-restructured debt with a long residual maturity and a substantial haircut. They therefore had a strong incentive to deliver the non-restructured debt – a highly unfavourable outcome for protection sellers. This credit event prompted a revision of the definitions for deliverable bonds and the introduction of limits on remaining maturity through modified-restructuring (MR) and

9 *We considered the following auctions: Ambac Financial Group, Capmark, CIT, Dana, Delphi, Dura, Eastman Kodak, Hellenic Republic, JSC BTA Bank, Lear Corp, Lehman Brothers, NJSC Naftogaz of Ukraine, Nortel, PMI Group, Sino Forest, Washington Mutual; Allied Irish Banks, AMR Group, Anglo Irish Bank, Bradford & Bingley, Dynegy Holdings, Fannie Mae, Freddie Mac, General Motors. We added the Cemex auction (NOI to buy), for which we did not have data for the credit event date but data meeting our criteria in the ten-day window around the auction.*

10 *In twenty-one out of twenty-six auctions. Two auctions with an NOI to sell show a difference of zero; three other auctions (one with an NOI to buy, two with an NOI to sell), displayed a final price that was higher than the average price of deliverable bonds on auction day.*

11 *This factor also explains the difference between the bond spread on a given reference entity and its CDS premium, or basis. Protection sellers take into account the existence of a CTD in CDS pricing, which contributes to the existence of a negative basis.*

modified-modified-restructuring (MMR) clauses.[12] To take account of this, auctions for restructurings with MR or MMR clauses are multiple auctions. They form buckets that hold CDSs and deliverable bonds by maturity (2.5 years, 5 years, 7.5 years, 10 years, 12.5 years, 15 years, 20 years and 30 years). Rules have been set to ensure that each bucket contains a sufficient quantity of deliverable bonds.[13]

These restructuring clauses do not apply to developed sovereigns, whose CDSs continue to be treated with an old-restructuring (Old-R or OR) clause, which does not place maturity limitations on deliverable bonds. In the case of Greece, restructured bonds were traded from issuance at a price close to that of non-restructured bonds. The CTD was a 30-year restructured bond, which traded at between EUR 21 and EUR 22 on auction day.

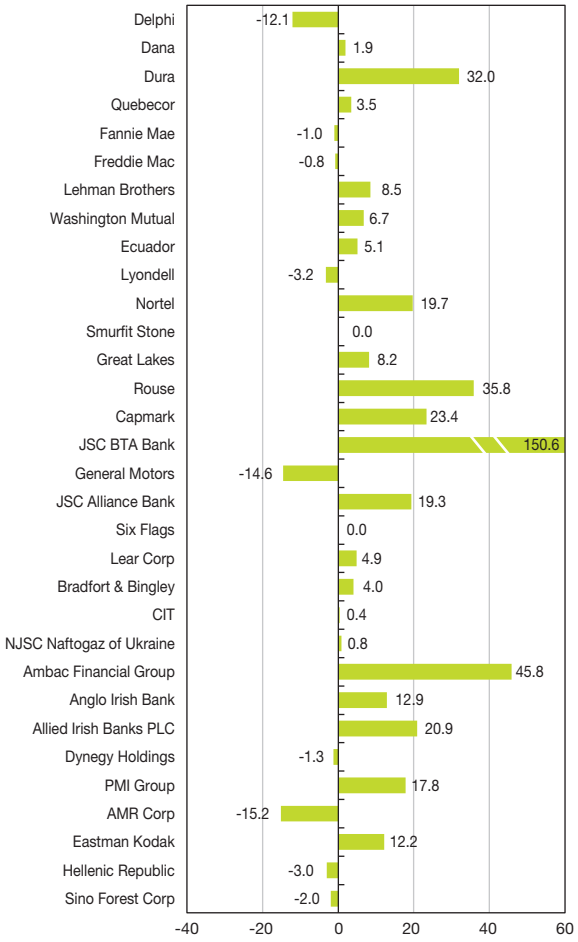
CDSs are settled several days after the auction. During that period, bond prices may change, entailing a gap between the price on the secondary market and the auction price at which protection buyers have agreed to deliver bonds.

In the thirty-two auctions studied, the observed gap varied considerably from one auction to the next (see Chart 6). However, the price on the secondary market was higher than the auction price in most cases, i.e. twenty-two out of thirty-two. The average difference between the market price on the settlement day and the final auction price was around 12%, and remains positive even after separating auctions with an NOI to sell from those with an NOI to buy (17% and 3%, respectively). This means that the price of bonds issued by the defaulting entity tends to rebound after the auction.

Greece is one of the minorities of reference entities where the difference is negative (-3.3%). The price of the restructured bonds fell steadily after issuance. At end-May 2012, Greek debt was trading at around 11% of par, as the Greek situation continued to worsen despite the exchange programme. Prices did not return to levels comparable with the final auction price until October 2012.

Chart 6
Difference between bond price on the settlement date and the final price, thrity-two auctions

(%)



Sources: Bloomberg, Creditex, ISDA, Markit.

4|3 Comparison with recovery rates on sovereign markets

The recovery rate of 22% for Greek debt seems low compared with rates for companies. The average rate for US firms was 41.3% over 1982-2010 in the Moody's database (2011a). If we calculate the average price obtained in the one hundred and three CDS auctions since 2005 and reported by Creditex, the average

12 *Under an MR clause, the maturity of deliverable bonds must be smaller than the minimum between: (i) the latest maturity of the restructured security and (ii) 30 months after the restructuring date. Under an MMR clause, they are limited to the minimum between : (i) the CDS maturity date and (ii) 60 months after the restructuring date for restructured securities or 30 months for other deliverable obligations.*

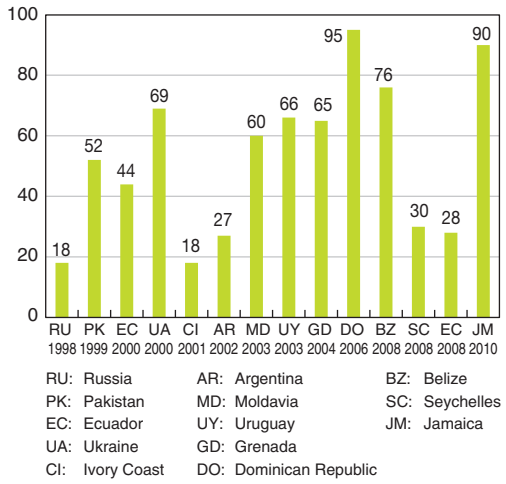
13 *For more details, see Casey (2009).*

recovery rate is 38.1%. This figure, which is slightly lower than that of Moody's, may be attributable to the fact that most auctions took place during the crisis, and crises typically feature lower recovery rates. In addition, an examination of CDS auctions reveals that recovery rates are usually higher in the case of restructurings (61.5% on average) compared with failures or defaults (21.1% and 25.0% respectively on average).

The recovery rate for Greek debt also looks low compared with other sovereign defaults, although the rare occurrence and unusualness of these events make it hard to draw comparisons. This is what emerges from estimates provided by Moody's (2011b) on the thirteen sovereign defaults observed between 1998 and 2010 for which data are available (see Chart 7).

Chart 7
Recovery rates in sovereign defaults

(%)



Source: Moody's (2011b).

Only Russia in 1998 and Ivory Coast in 2001 appear to have had lower recovery rates than Greece. However, these estimates vary considerably depending on the bonds in question, as highlighted by Sturzenegger and Zettlemeyer (2005) and Zettlemeyer *et al.* (2012).

5| Conclusion

Since the 2007 crisis, the CDS market has had to contend with many credit events, with some settlements involving huge amounts. In each event, settlement took place in an orderly fashion through an auction procedure, ensuring that agents holding CDSs and delivering a security recovered the face value of the security. The market's resilience in the face of major defaults may seem surprising. This stems partly from the netting of positions prior to settlement, which eliminated the bulk of transactions and made it possible to concentrate on net positions. In the case of Greece, for example, the gross notional amount of CDSs stood at USD 69.3 billion in March 2012, but net notional was only USD 3.2 billion.

The auction process includes mechanisms that prevent certain biases, although a small difference may persist between the recovery rate established by the auction and the price of the security on the secondary market. In the case of Greek sovereign CDSs, the situation was particular because settlement was triggered after the bonds had been exchanged with private holders for new bonds. Even so, the recovery rate of 21.5% obtained by the auction was roughly consistent with market prices for Greek sovereign bonds at the time, a fact that held true for the restructured original bonds and the new newly-issued securities.

References

Casey (O.) (2009)
"Small bang for the buckets", Markit Magazine, No. 5, pp. 61-69.

Chernov (M.), Gorbenko (A. S.) and Makarov (I.) (2011)
"CDS auctions", the Paul Woolley Centre, *Working Paper Series*, No. 26, Financial Markets Group, *Discussion Paper*, No. 688, July.

Coudert (V.) and Gex (M.) (2011)
"The credit default swap market and the settlement of large defaults", *Économie Internationale*, CEPII Research Center, No. 123, pp. 91-120.

Du (S.) and Zhu (H.) (2011)
"Are CDS auctions biased?", *mimeo*, Graduate School of Business, Stanford University.

European Commission (2012)
"The second economic adjustment programme for Greece", *Occasional Papers*, No. 94, March.

Gupta (S.) and Sundaram (R. K.) (2011)
"CDS credit event auctions", *mimeo*, September.

Hampden-Turner (M.) (2012)
"Greek CDS auction and settlement: big noise on stairs, nobody coming down", Citi Credit Europe, Citigroup Global Markets, March 16.

Helwege (J.), Maurer (S.), Sarkar (A.) and Wang (Y.) (2009)
"Credit default swap auctions", Staff Report, No. 372, Federal Reserve Bank of New York.

Moody's Investor Service (2011a)
"Corporate default and recovery rates, 1920-2010". Special Comment, February 28.

Moody's Investor Service (2011b)
"Sovereign default and recovery rates, 1983-2010", Special Comment, May 10.

Sturzenegger (F.) and Zettlemeyer (J.) (2005)
"Haircuts: estimating investor loses in sovereign debt restructurings, 1998-2005", *IMF Working Paper*, WP/05/137.

Zettlemeyer (J.), Trebesch (C.) and Gualti (M.) (2012)
"The Greek debt exchange: an Autopsy", *mimeo*.

Central counterparties

CCPs as instruments of stability and risk mitigation

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The Lehman Brothers insolvency and LCH.Clearnet's successful management of its default in 2008 were a major driver for the G20's decision to mandate clearing of over-the-counter derivatives. The benefits to systemic stability of central clearing was further proven by the successful wind-down of MF Global's positions following its bankruptcy in 2011.

Central counterparties (CCPs) are being further strengthened under regulation coming into effect in Europe and around the world. However, as national authorities have to work within their existing mandates and structures, differences of detail have arisen. It is important that work on ensuring equivalence between jurisdictions comes to fruition.

Work remains to be completed in related areas including CCP recovery and resolution and the treatment of uncleared derivatives, and it will only be as these develop that the full impact can be assessed.

Market structures will evolve and adapt to the new framework which will be further affected by the incoming regulations concerning access and interoperability. While any developments that might threaten systemic stability should be avoided, competition and efficiency driven by user choice should bring significant benefits to market users.

The failure of the Lehman Brothers group in 2008 was a major driver for the G20's decision to reform the world's derivative markets, increase regulation and improve stability. Having stared into the abyss, never again will public authorities – the G20 hopes and intends – be faced with a choice between using public funds to support failed financial institutions or to let a failed institution go, with all the potential consequences.

One of the major planks of the regulatory reform is to standardise and bring to mandatory central clearing a large part of the over-the-counter (OTC) derivatives market. Indeed it was recognised that the benefits central counterparties (CCPs) bring to markets – the discipline of independent valuation of market positions, rigorous full collateralisation, and clear default rules and procedures – can and should be extended to an even wider universe of financial instruments than are currently cleared. Such a discipline will not in itself insure against poor risk management by market participants, but should, together with other elements of the reform package such as the use of trade repositories, mean that the extent and location of systemically-significant exposures are known and can be managed in the event of a failure in the future.

In 2008, for example, Lehman Brothers had a position of approximately USD 9 trillion in notional value of interest rate swaps in LCH.Clearnet's SwapClear service. Although much of the concern at the time of Lehman's failure was the effect on its credit default swaps (CDSs) – which at the time were not cleared – the financial markets' eyes were also on LCH.Clearnet and how it would manage the resolution of Lehman's interest rate swaps and other market positions.

In the event, LCH.Clearnet's successful management of the default, for which it only needed to resort to a small portion of the initial margin held, gave global policymakers a clear demonstration that greater use of CCP clearing should form a major part of their agenda to bring greater stability to the world's markets and, in particular, to the use of derivatives.

At the time of Lehman's default the SwapClear service had twenty direct users (clearing members) and approximately USD 129 trillion in notional value of interest rate swaps. By January 2013 that had grown to seventy-two members and 340 trillion – all this before any jurisdiction had imposed a clearing obligation for any class of OTC derivatives. The benefits of CCP clearing were later further proven by the successful wind-down of MF Global's positions following its bankruptcy in 2011, although most of MF Global's challenges arose from government bond repos.

Although work done by the G20, the Financial Stability Board (FSB), the Committee on Payment and Settlement Systems (CPSS) and the International Organization of Securities Commissions (IOSCO) as well as other multi-jurisdictional bodies over many years shows that market supervisors have long been concerned with globalisation, these recent events brought home to a wider audience the interconnectedness of global financial markets. As key infrastructures destined to play a primary role in ensuring the stability of markets, CCPs should therefore have international market interests at heart to mitigate systemic risk. This presents challenges for supervisors – which tend to prioritise domestic or regional considerations – when developing regulatory and supervisory structures for CCPs, which work across borders to provide services to global markets. EMIR, a European Regulation, and the Dodd-Frank Act in the United States are the outcomes of international cooperative regulatory work which try to address these challenges by promoting global financial stability through better supervision of OTC derivatives trading and central clearing through CCPs.

Since 2008, CPSS-IOSCO and major jurisdictions have introduced legislation not only to require the clearing of standardised OTC derivatives, but also to put a spotlight on CCPs and their activities. This focus is on rules for margin, collateral, investment policies, and liquidity management, as well as on CCPs' organisation and governance.

These are welcome initiatives and will make financial markets safer. However, the ultimate impact these legislations will have on the efficiency of global markets is as yet unclear – costs seem likely to rise for end-users and there may be far-reaching impacts on market dynamics. For example, the requirement for all financial institutions, and some non-financial institutions, to clear OTC derivatives that they undertake, and the related obligations that are contemplated to promote the use of organised trading venues for the transaction of derivatives could possibly lead some entities to enter into hedges that are less perfect in relation to the underlying risks or possibly not to hedge them at all.

1| The role of central counterparties

CCPs stand as a counterparty of unquestioned quality for market users – as Andrew Haldane of the Bank of England said in 2009, a CCP must be "bullet-proof". [1] Therefore, they must be totally dedicated to risk management and the protection of the markets they serve. Their governance and policies must place the highest priority on robustness and integrity, even more so in the future as there is increasing legal obligation to use their services.

CCPs are, however, organised as commercial entities and have certain obligations to their shareholders. They also operate in an increasingly competitive market. The development of new CCPs in Europe in recent years to serve the new trading venues spawned by Markets in Financial Instruments Directive 1 (MiFID 1), and the establishment of European subsidiaries of the major US CCPs, bear witness to this. The pressures and incentives these developments give rise to have led CCPs to focus ever more sharply on those areas where they can gain competitive advantage: these include expanding the range of instruments they clear, enhancing their client offerings and working more closely with other infrastructures, members and clients. In the end, commercial and competitive considerations must be subordinated to the primary focus on risk management, and CCPs' organisational and reward structures must be designed to reflect this priority.

A key element of a CCP's defences, well understood by regulators but in the wider community one that often does not receive the attention it deserves, is its default management process. In the case of OTC derivatives, LCH.Clearnet has established rigorous procedures that require clearing members to play a full part in the hedging and liquidation of a defaulting member's positions. These include the obligation to provide trading staff to LCH.Clearnet to execute hedging transactions and also to bid in the auctions of positions. These procedures – which are regularly tested – worked successfully for the Lehman default. Such provisions are much easier to describe than to prove as fit for purpose, and supervisors will need to probe very deeply to ensure that they are adequate.

Some commentators[2] have expressed concern over the danger of CCPs becoming concentrators of risk and becoming "too big to fail" – even harbingers of the next financial crisis. Nevertheless it is important to underline the fact that CCPs across the world performed in an exemplary fashion at the height of the financial crisis in 2008, providing safe harbours at a time of extreme uncertainty. As LCH.Clearnet has expanded its OTC derivatives clearing services, it has taken major steps to strengthen the protections it provides to markets by separating and increasing its default funds – with EUR 5.8 billion total in its default funds as of 31 December 2012 – and putting in place loss allocation and service closure provisions. LCH.Clearnet is not alone in doing so as it is a clear issue reflected in the CPSS-IOSCO "Principles" and recognised by national regulators. These enhancements are intended to allow the continuation of other key services in the event that a series of catastrophic events – far more serious than the protection only against multiple failures of clearing members that the margin and default funds held by the CCP – consumes the entire default "waterfall" for a specific service.

Every European CCP, as part of the EMIR package of regulation, will have to maintain sufficient capital to meet requirements to cover operational, legal, credit, counterparty, market and business risks. The LCH.Clearnet Group has always had to adhere to the Basel requirements for capital adequacy, and is presently addressing capital raising to comply with the European Banking Authority (EBA) requirements. These will also require a CCP to ensure, including in stressed market conditions, that it can conduct an orderly winding down or restructuring of its activities, reorganise its operations, liquidate its clearing portfolio or transfer its clearing activities to another CCP. Meanwhile, CPSS-IOSCO and the European Commission have both conducted consultations on the subject of recovery and resolution of CCPs and other financial market infrastructures.

1 http://www.bankofengland.co.uk/publications/Documents/speeches/2009/speech397.pdf.
2 *See for example "CCPs: big success... and a big risk",* http://fw.ifslearning.ac.uk/Libraries/May_2011/44-46_FWBookReviews.sflb.ashx.

2| Differences in international regulation

LCH.Clearnet fully understands and supports the move for CCPs to be subject to ever more rigorous regulation, but urges that international regulators continue their efforts to reach harmonisation. There is of course a political dimension: to put it starkly, regulation and supervision of markets, infrastructures and market participants is, notwithstanding recent developments in Europe, a matter for national authorities who are ultimately responsible to a state's democratic mandate and who bear the final responsibility for the stability of their domestic systems and the protection of their taxpayers. Nevertheless while regional regulations are designed to focus on the risks in their specific regions, issues facing CCPs, particularly those clearing OTC derivatives, are global and should be managed accordingly under agreed and harmonised regulation. This is well understood both by the relevant regulators and the CCPs themselves.

As we have seen with the lengthy gestation of legislation and regulation in the United States and European Union, the Dodd-Frank Act and the EMIR regulation are major jurisdictions working in same general direction, under a monitoring process established by the FSB, but at different speeds and with inevitable variations given the nature of individual markets and specific legal and regulatory structures. A prime example is the difference in detail between the United States and the European Union requirements for a CCP's protection of clients' positions and related assets. As other jurisdictions follow suit, further variations can be expected. It is important that, over time, these differences are resolved so that national authorities can allow market participants the freedom to use infrastructures based in other jurisdictions, provided they ensure at least the same level of security as local providers. Without such equivalence, i.e. one regulator accepting that another's rules and supervision provide adequate protection for markets and clients, there will be higher costs for users and service providers will have difficulty in developing and supporting both local and global services. And there may even be the danger of regulatory arbitrage to the detriment of developed markets.

3| Potential impact of Dodd-Frank Act/EMIR, Basel III/Capital Requirements Regulation, and recovery and resolution framework

The drive to make financial markets safer is not confined to encouraging greater use of CCPs for OTC derivatives. There will always be instruments that cannot be cleared: in particular the more "tailored" instruments that may only be relevant to a small number of end-users, who are likely to be limited to the counterparty who has negotiated it with a dealer. These will be subject to more onerous collateralisation and/or capital requirements. This could be a particular issue of concern for some hedge funds and asset management firms who will both be caught by the clearing mandate in EMIR but whose level of activity does not lead them to become attractive customers of the larger banks, and face higher costs for transacting the more bespoke derivatives. Therefore, it remains to be seen whether end-users will cease to hedge some of the risks that they run – thereby potentially incurring significantly greater costs in the long run.

Further inefficiencies are likely to arise for the sell-side, because more complex derivatives will remain non-cleared. As the major dealing banks will have positions outstanding both with the CCP and with each other, they may not be able to net these exposures; hitherto there is the possibility of managing their exposure to the CCP, and, therefore, the cost of collateral, by leaving some clearable business out of the system and retaining it with bilateral counterparties to hedge more complex instruments.

Separately, the Basel Committee is introducing a new provision that will require banks to hold capital against their exposures to CCPs. Until now, it has been possible for banks to allow a zero capital treatment for these exposures. Exposures in relation to the trades themselves – largely the collateral held by the CCP as initial margin – and the exposures arising from default fund contributions, where the counterparty credit risk is not that of the CCP but of the other clearing members, are handled separately. The current arrangements, which will be implemented via the

Capital Requirements Regulation (CRR), are interim measures that are subject to revision over the coming year or so.

A key aspect of this regime is the differing capital treatments available to banks who are clients of clearing members depending on whether or not there are arrangements in place to transfer their positions and assets to another firm in the event of their clearing member's failure. This in turn will depend *inter alia* in the form of segregation that they request is provided at the CCP – whether this is an individual or an omnibus account.

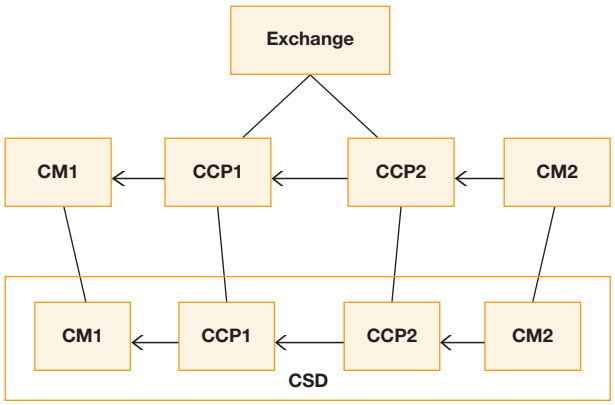
While legally-segregated, operationally-commingled accounts ("LSOC") are already mandatory in the United States, the EMIR segregation rules are not exactly similar. Unlike in Europe, here are differing requirements as between OTC and exchange-traded in the United States. The United States specifically requires physical segregation of customers' assets while the European text is not as prescriptive; the requirement under EMIR to offer all clients individual segregated accounts for all asset classes (not just OTC derivatives) is another difference from the United States. It is not yet clear how many clients in Europe will elect to have individual segregated accounts and what segregation services over and above the minimum regulatory requirements CCPs will choose to provide. Nevertheless, it seems that the protections afforded to clients will be significantly improved, but in doing so CCPs and clearing firms will incur significant extra costs, which they are likely to seek to recover.

Finally, the financial crisis and the bankruptcy of Lehman Brothers highlighted the consequences of the failure of a large financial institution. To promote financial stability and guard against losses for taxpayers, authorities around the world are putting in place recovery and resolution regimes for both CCPs and banks. LCH.Clearnet fully supports the objectives of such regimes but urges the authorities to take into account the specificities of CCPs when developing these requirements. In particular, the tools available to the authorities when resolving a bank should take into account the fact that these institutions could be members of CCPs and therefore subject to their operating rules. In addition, authorities should recognise that it could be more appropriate for CCPs that hold a banking licence to be subject to a CCP specific regime rather than a bank regime. Indeed, the objectives of a resolution regime for CCPs give more weight to continuity of critical services, particularly in the case of OTC derivatives clearing, and some aspects of the resolution framework for banks are not suitable for CCPs. In particular, the proposed bank recovery and resolution directive provides for Member States to require banks in their jurisdictions to hold an aggregate amount of debt (expressed as a percentage of total liabilities) that can be "bailed-in" (i.e. where debt is exchanged for equity). Such a power would be inappropriate and ineffectual in relation to CCPs because they do not tend to issue such debt instruments. Additionally, it requires resolution authorities to write down capital before it can apply any of the other resolution tools such as transfer to a bridge institution. EMIR however requires CCPs to hold 25% of its capital at the beginning of the default waterfall. However, it could not be anticipated that CCPs would have to write down their entire capital before recovery/resolution tools could be used. Member States must also put in place resolution financing arrangements. The level of the fund should be proportional to the amount of deposits held. Since CCPs do not hold deposits, the resolution financing arrangements would not cover the risks/costs associated with the resolution of CCPs that hold a banking licence.

4| Interoperability

One of the major changes that has occurred in the world of clearing in recent years has been the development of "interoperability" – i.e. arrangements where clearing members are able to choose which CCP they use when trading on a particular venue. So, for example, a member buying securities may have his order anonymously matched with a seller who uses another CCP: the buyer has his chosen CCP as counterparty, and the seller has a different CCP as counterparty. This is only possible when the CCPs have established arrangements between themselves under which the CCPs become counterparties to each other, broadly speaking in the same way as they are counterparties to their members. The contractual relationships, however, generate the same kinds of risks as a CCP assumes from its relationships with members, and CCPs that are interoperable have to call margins from each other, similar to the margining of their own members.

Figure



Note: In this example, CM1, the buyer uses CCP1 and CM2, the seller, uses CCP2. In order to clear and settle a trade the CCPs must link and must also access the same central securities depository (or linked CSDs).

Such arrangements have operated successfully for cash equities in Europe for some years, in particular for the London and Swiss stock exchanges and for many of the multilateral trading facilities (MTFs). It should be noted however that the first "wave" of interoperable links had to be overhauled to provide sufficient assurance that the additional risks that an interoperable network of CCPs introduces are adequately managed through the provision of additional collateral. Any extension in the equity market will have to proceed cautiously. Although it has served to intensify competition between CCPs and the trading venues that they serve, it is important to note that competition between certain trading venues and CCPs in this market was and remains healthy in the absence of interoperability.

More relevant than interoperability among CCPs is freedom of clearing. Exchanges should link to multiple CCPs so members and clients can access and use the CCP of their choice across exchanges and exchange-listed products. While interoperability among CCPs introduces some additional risk, access to multiple CCPs does not; interoperability introduces counterparty risk between the CCPs while a simpler structure where a trading venue is connected to separate CCPs does not. There are limited examples of interoperability of CCPs in other asset classes, but these are less common for two main reasons: the increased risk of clearing bond (including repo) and derivatives markets and the commercial incentives of the infrastructures themselves.

The initial margin requirements arising from the major derivatives and bond markets – whether exchange-traded or OTC – are orders of magnitude greater than those for cash equities. This arises as a result of the much greater tenor (in the case of derivatives) and value (in the case of bonds) than for cash equities. LCH.Clearnet has established interoperable links in both of these asset classes,[3] and operates specific processes in order to manage the risks, involving considerable harmonisation of rules and processes. However, there would be an even greater complication in any potential interoperable link for OTC derivatives, particularly when it comes to establishing the kinds of default management processes described above. Could a CCP play the role of a clearing member in managing a default? Or should one CCP's member assume default management obligations on the default of a member of a different CCP? These are not easy questions to answer in the affirmative.

In the recent debate on how to protect taxpayers by ensuring that institutions – whether banks or financial infrastructures – are no longer "too big to fail", it has been recognised that they might also be "too interconnected to fail". Systemic importance is therefore a function of interconnectivity as well as size. CCPs by definition concentrate and mutualise exposures, but only amongst those who have elected to assume that liability: the CCP's shareholders and its users. To link CCPs means to further spread that liability, in this case to entities – the owners and users of another CCP – who, implicitly, have chosen not to assume such a liability. There is, therefore, a danger of increasing systemic risk, particularly if there were to be links between CCPs clearing OTC derivatives.

The introduction of EMIR and similar initiatives under the umbrella of the CPSS-IOSCO "Principles for financial market infrastructures" (PFMIs), such as the Dodd-Frank Act, represents a major step forward for financial stability. Nevertheless, we have yet to see the impact on CCPs, and their direct and indirect users, of the clearing and trading obligations that are gradually being introduced. There remain important related initiatives that will also have profound

3 *Between LCH.Clearnet SA and Cassa di Compensazione e Garanzia for Italian bonds & repos; and between LCH.Clearnet Ltd and Oslo Clearing for equity derivatives.*

effects on the structure of markets – including those on recovery and resolution (of both banks and non-banks), securities law, and the regulation of trading and settlement. LCH.Clearnet will continue to develop its clearing services for interest rates, foreign exchange, CDSs and commodities derivatives so as to enable European and global market participants to benefit from our services to fulfil their clearing obligations.

It may be that in certain limited cases CCPs will eventually establish new links. However this can only be done voluntarily and in a spirit of co-operation between all relevant stakeholders. To grant interoperability rights to competing CCPs for OTC derivatives will undermine the business cases for CCPs to invest in extending services, attracting the best quality staff and ensure their own sustainability.

Interoperability is often mentioned as a way for participants in different jurisdictions to trade with each other and clear domestically. However, our firm belief is that barriers that interfere with the ability for a CCP to offer services to customers in foreign locations should be dismantled. There are various avenues open to CCPs to serve international markets; depending on the regulatory framework in place it may seek authorisation to provide services remotely or it may establish a domestic presence (or both). Regulation should enable both options so that CCPs can make the choice that suits their users, as is already the case in Australia and Canada. Particularly in the case of global markets such as OTC derivatives, market users will want to be able to achieve the maximum efficiency from the clearing process, and so will want to have access to CCPs with the scale and expertise to handle a wide range of instruments. These considerations lead to the conclusion that an interoperable network of multiple CCPs is not the best structure for these markets.

5| Impact on market structure

EMIR is placing great demands on CCPs in terms of their internal organisation, governance, risk management and transparency. We fully support these requirements and believe that once all CCPs respect them fully, direct participants and their clients will have full confidence in their security and stability. These new regulations, including harmonised capital requirements for European financial institutions, will however most certainly increase the operating costs for CCPs.

In addition, increased demand for collateral – for both cleared and uncleared business – is currently in Europe meeting a shortage of supply as government debt is downgraded. We can hope that this is only temporary. Nevertheless we can expect to see further developments in collateral management, improving its mobility and its security, as a result of initiatives from both the public and private sectors. The European Commission continues its work on Securities Law, and the International Central Securities Depositories (ICSDs), CSDs and custodians are all enhancing their collateral services. CCPs for their part will continue to explore the possibilities of enabling members and clients to obtain efficiencies, both in the way they accept collateral and in the calculation of collateral requirements. The European Securities and Markets Authority (ESMA) rules set clear guidelines for portfolio margining, and within these prudent limits CCPs will seek to establish regimes that properly reflect the risks of the exposures they assume. We may even eventually see cross-margining between CCPs provided that supervisors can be assured that all risks are fully managed.

Title V of EMIR provides limited rights of access between CCPs and trading venues for OTC derivatives. It also provides some rights of CCPs to establish interoperability arrangements with each other, and to access trading and settlement services, for transferable securities and money market instruments. Requests for interoperability can only be refused on risk grounds. It is our belief that these arrangements are neither necessary nor desirable for OTC derivatives.

It is possible however that the rights now in EMIR will be further extended. EMIR requires ESMA to report to the European Commission in 2014 on a range of issues including whether the interoperability rights should be extended to other asset classes, including derivatives. However the proposed Markets in Financial Instruments Regulation ("MiFIR"), currently under political negotiation, includes the extension of access rights, but not interoperability, to all asset classes. It remains to be seen what the final text of MiFIR will contain and whether Title V of EMIR will

in fact enable the development of more interoperable links. Nevertheless the long-term direction of travel has been clear for some years: to encourage greater choice at all levels of financial infrastructure, thereby encouraging competition and efficiency.

In recent years the relative balance between ensuring the integrity of CCPs and encouraging competition between them has shifted towards prudential concerns. Nevertheless, once policymakers have confidence that European CCPs are all operating successfully under the enhanced rules put in place pursuant to EMIR, there will be a renewed drive towards enabling more user choice – at least in some market sectors – and hopefully reducing the market power of the vertical silos. This will result in a limited number of multi-asset class CCPs, each serving trading venues, competing with each other to provide the most robust risk management and efficiency. It is however impossible to predict how, and how fast, this will happen.

Beyond the technical issues of interoperability and risk management in general, the long term trend toward vertical market infrastructures versus horizontal ones might be modified by the regulatory developments. Over the past ten years, the benefits, commercially and in terms of net margins, of a vertical set up between the trading platform and the clearing one (potentially extended also to settlement) have clearly dominated the industry trend. However, the new set of regulations is imposing materially reinforced independence of the clearing activities from a governance and capital perspective. Associated to a latent demand for alternative trading offerings in the listed derivatives activities, there might be a balancing force in favour of horizontal clearing operators, open to all venues and users. Obviously, should the MiFIR rules open the door to free choice of clearing providers (as mentioned above), the horizontal venues will have a further ability to succeed. However the long term structural market infrastructure development remains uncertain, as is illustrated by the recently announced wishes of LME to set up its own vertical silo or the potential acquisition of NYSE Euronext by ICE Inc with its related "verticalisation" of some clearing activities.

6| Conclusion

The waves of global regulation that have been generated by the G20 agenda and EMIR in particular, represent a revolution in the regulation for European CCPs and the markets they serve. In general LCH.Clearnet supports the thrust of the new rules, and welcomes the new standards for CCPs which in many cases raise the bar to a level of prudence and security that LCH.Clearnet has respected for many years.

We believe that the rigorous enforcement of these standards, both for risk management and client protection, will in large measure meet policymakers' objectives in helping to restore faith in the financial markets, especially those for derivatives. However we also recognise that the rules and principles set at national, European and global levels will be subject to continual review and revision and look forward to working with the market and regulators to further refine and enhance risk management in the future.

Various regulatory initiatives will, however, also have a significant impact on the structure and organisation of CCPs. As there was with banks, there will be a renewed focus on efficiency and core competencies, which may over time lead to a degree of consolidation. This welcome trend will however be frustrated unless there is unfettered access to CCPs to enable users to choose their clearing location and obtain the fullest possible netting benefits underpinned by bulletproof risk management. This is not possible where a trading venue sits atop a closed vertical silo. Policymakers must continue their efforts to break these open and to prevent the emergence of any more.

As these themes play out over the coming years it will require enhanced vigilance by regulators and supervisors to ensure the stability and integrity of the system. Finally, the financial crisis brought home the fact that the European Union's financial markets operate as a major element of the global financial system and cannot be insulated from external shocks. European policymakers should keep on working with their international counterparts to foster an even more harmonised regulatory structure for global markets.

Incentive compatible centralised clearing

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Policy-makers around the world recognise central clearing counterparties (CCPs) as a key tool to enhance financial stability. Recent research supports the arguments for an increased role for CCPs. CCPs can insure against counterparty risk through mutualisation, enable implementation of adequate margin requirements, save on collateral through greater netting efficiency and promote transparency in the market. The authors point out, however, that information asymmetries matter for clearing and that there may be a trade-off between ex post insurance and ex ante incentives. To be beneficial central clearing must therefore be incentive compatible. The authors discuss how risk management practices of CCPs can be designed to mitigate incentive problems. CCPs themselves must be properly governed, supervised and their competitive environment carefully monitored.

The global financial crisis highlighted a number of weaknesses of the financial system. One weakness was the lack of well-developed market infrastructures in some parts of the financial system. One area where infrastructures lacked was the market for over-the-counter (OTC) derivative transactions.[1] Infrastructures improve market resilience in times of stress. Accordingly, regulators around the world call for building up such infrastructures. One prominent example is clearing of standard OTC derivatives contracts through central counterparties (CCPs) that is to become mandatory. Contracts that are not centrally cleared are to become subject to higher capital charges.[2]

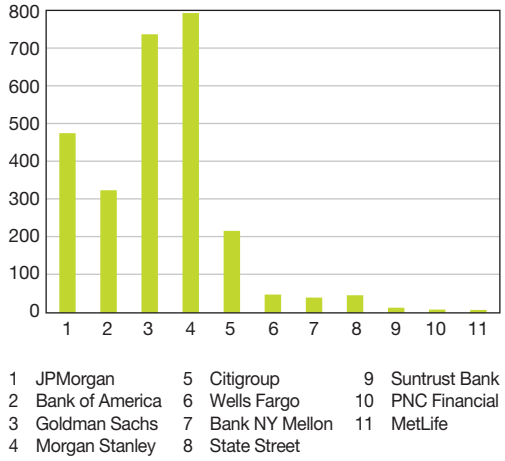
Is this the right move? What benefits does central clearing offer? What are the limits to reaping those benefits? And what new risks could emerge?

Contract theory has shown that in the presence of asymmetric information there is a trade-off between ex post insurance and ex ante incentives. In this paper, we argue that information asymmetries matter for clearing and that the insurance-incentive trade-off arises. To be beneficial central clearing must therefore be incentive compatible.

To assess the benefits of central clearing, it is useful to recall why and where financial markets failed. Take financial derivatives for example. They allow financial and industrial corporations to hedge their risk exposures in a customised way, thereby facilitating risk-taking that is integral to economic growth. But financial derivatives also pose significant risks. Being mostly OTC, the market is complex and opaque so that it can be difficult to keep track of transacting parties' contractual obligations. When transacting parties cannot live up to their contractual obligations, counterparty risk arises and undermines the value of hedging. Moreover, the "financial leverage" embedded in derivative positions magnifies any imbalance in hedged risks.[3] The failure of Lehman Brothers and the near failures of American International Group (AIG) and Bear Stearns were all tied in one way or another to derivatives and intertwined with counterparty risk issues.[4]

To obtain a sense for the magnitude of the counterparty risk problem, the chart below shows ratios of the notional value of derivatives to equity for a sample of US banks.[5] For the biggest players in the US derivatives market, this ratio ranges between 200 and 800. While notional amounts of derivative contracts *per se* do not provide a useful measure of either market or credit risk, they reflect the extent of derivatives activity and its inherent risks. Even if some of the derivatives positions can be netted or hedged, the sheer size of the "derivatives leverage" of these financial institutions makes them vulnerable to even the slightest imperfection in their hedging strategy. Moreover, 96% of the total notional value of

Chart
Ratio of the notional value of derivatives held by US commercial banks to their equity
Q1 2009



Sources: Bloomberg, OCC Quarterly Report on Bank Trading and Derivatives Activities (2009), and authors' calculations.

1 *See, for example, Russo (2010).*
2 *This project is implemented in different ways in various countries; for instance in the European Union through Markets in Financial Instruments Directive 2 (MiFID 2), Markets in Financial Instruments Regulation (MiFIR) and European Market Infrastructure Regulation (EMIR) and in the United States through the Dodd-Frank Act. In addition, the regulatory overhaul includes mandatory reporting requirements and making more use of electronic trading.*
3 *The study of counterparty risk in insurance markets (unlike more standard credit risk and default) is relatively recent. One of the first studies to tackle the issue is Thompson (2010). The issue of counterparty risk limiting hedging and the role of "derivatives leverage" is examined in Biais, Heider and Hoerova (2011).*
4 *Derivatives, especially those written on default events, can lead to other inefficiencies. An "empty creditor problem" arises when debt-holders modify their cash-flow rights, e.g., by insuring against default with credit default swaps, but retain the control-rights of their debt-holdings. A related problem arises when third parties acquire derivatives that commonly enjoy super-seniority in bankruptcy. On these issues see Bolton and Oehmke (2010); and Bolton and Oehmke (2012).*
5 *A comparable data base is not available in Europe.*

derivatives held by all US commercial banks in the first quarter of 2009 – a staggering USD 202 trillion – was held by only five institutions.[6]

As we explain below, centrally clearing derivative transactions, or indeed any transactions with significant counterparty risk, can mitigate the adverse consequences for the rest of the financial system should an institution fail. At the same time, only around one half of all OTC interest rate swaps, less than 10% of credit default swaps (CDSs) and almost no foreign-exchange or equity derivatives were centrally cleared at the end of 2012.[7]

1| What is central clearing?

Clearing refers to the series of activities between the formal agreement about a trade and the time when the trade is settled on the accounts of transacting parties. The agreement to transact itself can take place either on a central marketplace/exchange or "over-the-counter".[8] The clearing process involves three steps: trade novation, trade maintenance and trade settlement.

In the first step, the clearing agent interposes itself between the transacting parties. The contract on which the buyer and the seller agreed is replaced by two contracts, one between the buyer and the clearing agent, and another one between the seller and the clearing agent. In the case of *central* clearing, a central counterparty (CCP) becomes the buyer to many sellers and the seller to many buyers. A CCP transforms the risk exposure among counterparties into a risk exposure of each counterparty with the CCP. To manage this risk, counterparties typically make contributions to the CCP's default fund and post initial margins (in the form of cash or highly liquid and safe assets).

In the second step, the CCP maintains variation margins with counterparties to reflect changes in the value and risk of their position after the trade was agreed upon but before it is settled. The final step is the settlement of the trade. The CCP guarantees the outcome of the trade should one of the parties who had entered the trade fail. Should failure occur, then the CCP addresses the settlement of the defaulting member's positions through an orderly process of liquidation. The CCP uses the collateral obtained from the margin calls on the defaulting member to cover any shortfall. When the collateral is not sufficient, the CCP uses the default fund and possibly its own equity.

When a spot trade is cleared, there is not much delay between the first and last step of the clearing process, which then is relatively simple as it only involves arranging the exchange of a security. Clearing a derivative trade is more involved. Derivative contracts are written over a period of time and are contingent on certain events. Hence, the value of the transaction changes through time (hence the margin calls) and, moreover, the value changes can be such that the initial "seller" has to pay the "buyer" (e.g., in the case of a simple forward contract, when the price of the underlying has moved above the forward price).

2| What benefits does central clearing offer?

First, a clearing agent can offer insurance against the default of a transacting party (presumably because the clearing agent has specialised in such insurance). But insurance against counterparty risk is most beneficial when a CCP is the clearing agent. By pooling a large number of risks, a CCP can exploit the law of large numbers to make insurance payments to some out of the insurance fees of others. Such a "mutualisation" of risk (like in car insurance) works best for risks that are independent across transacting parties. A CCP can, however, not insure against any aggregate risk that is common to all transacting parties (e.g., in case of a downturn of an entire sector). Seeking insurance against aggregate risk can be cumbersome as it requires finding counterparties with little exposure to this aggregate risk (i.e. they have to come from another industry, sector or economic region).[9]

6 *According to the OCC (2009).*
7 *See Heller and Vause (2012).*
8 *For example, the trading and clearing platforms are vertically integrated on the German Stock Exchange (Deutsche Börse) whereas OTC derivatives such CDSs are often cleared separately, either by a clearing bank or centrally by a CCP (e.g., LCH.Clearnet or SwapClear).*
9 *These issues are examined in detail in Biais, Heider and Hoerova (2012).*

Second, clearing allows the consistent implementation of margin calls. As in standard borrowing and lending, margins can be thought of as collateral, which offers insurance and incentive benefits (see more below). But in contrast to standard borrowing and lending, there is no obvious borrower in a derivative trade. Moreover, the value and risk of transacting parties' positions changes, sometimes dramatically, between the moment a derivative trade is entered and the moment the trade is eventually settled. Such value changes are controversial among transacting parties as the losses of one are the gains of the other. For example, recall the disagreement between AIG and Goldman Sachs at the height of the financial crisis about margin calls on their CDS positions.[10] By enforcing margin calls, a separate clearing agent can avoid such disputes.

A central clearing agent is particularly well placed to implement margins as each of its (many) members only has limited bargaining power vis-à-vis the CCP to renegotiate the latter's calls to post more collateral. Moreover, a CCP has a more complete overview of its members' positions and can therefore come to a more accurate assessment of the changes in the value and risk of these positions.[11] A central clearing agent therefore has a clear information advantage. A CCP can keep track of all the transactions it clears.

The information advantage of a CCP yields a number of extra benefits. The CCP can compile aggregate measures of trading activity and report them to markets and regulators. Indeed, one of the problems in some parts of the financial system is a lack of transparency. For example, even for standard repo transactions, there is no reliable information about basic statistics such as aggregate trading volume, let alone exposures. A CCP's information advantage also allows countering a basic externality in financial markets. Whenever a party enters a new transaction, this affects existing exposures, but this is inadequately reflected in the new transaction as the newcomer is unaware of the other exposures. The CCP, however, is aware of all the transactions it clears and can therefore implement pricing schemes that limit this externality.[12] Finally, knowing about many transactions of several parties, a CCP can perform multi-lateral netting and thus save collateral.[13]

3| Incentive compatible central clearing

The main benefit of central clearing is that it offers insurance against counterparty risk. But as with any insurance, the concern is that insurance undermines incentives, or put differently, that ex post efficiency undermines ex ante efficiency. At a general level, the reason why insurance can undermine incentives is that we all react to the circumstances in which we operate. If circumstances change, so does our behaviour. Take the example of car insurance. Car insurance is obviously desirable ex post since it is not optimal for people to bear the consequences of a car accident by themselves (if that was the case some would never drive again). But car insurance may well encourage imprudent driving. Why avoid small collisions if we don't pay the garage expenses?

We argue that the same principle is at work in central clearing. Imprudent behaviour can occur on two levels. First, since the CCP insures its members against counterparty risk, they could become imprudent and fail to monitor the default risk of their counterparties (shirking on "due diligence"). Second, the CCP itself could become imprudent and fail to monitor its members and their transactions. A CCP is, almost by definition, a systemically relevant institution. As such, it is likely to be perceived as "too big to fail" or "too inter-connected to fail" by the public sector. Hence, a CCP enjoys an implicit insurance against default that could undermine the incentives to avoid default.[14] We now turn to each of these moral-hazard problems and explain how it is possible to achieve incentive compatible central clearing.

3|1 Moral hazard at the level of CCP members

To deal with incentive problems of its members, it is key for a CCP to structure its risk management practices optimally. In general, incentive problems cannot be solved using prices only. Quantity adjustments are

10 *See, for example, "Testy conflict with Goldman helped push AIG to the edge",* New York Times, *February 7, 2010.*
11 *For more on the (voluntary) disclosure of positions, see Leitner (2012).*
12 *For more on this externality, see Parlour and Rajan (2001); and Acharya and Bisin (2011).*
13 *On such "netting efficiencies", see Duffie and Zhu (2011).*
14 *The problem is amplified when the owners of a CCP are protected by limited liability.*

also needed. That is, it is not sufficient to request members to pay a fee for participating in the CCP (akin to an insurance premium). The CCP may also have to limit the amount of insurance it provides to clearing members and to relate the insurance premium to the amount and nature of risk clearing members take. That is, default fund contributions and margin requirements must be designed to tackle the underlying incentive problems.

Limits to insurance are similar to deductibles in insurance. Take again the example of car insurance. We are usually not fully insured against car accidents. There is a deductible, a sum that we have to pay out of our own pocket if we file an insurance claim. Moreover, our insurance depends on the car we drive, our past record of insurance claims and also on whether it can be shown that we were negligent or not. In other words, insurance companies worry about the behaviour that insurance induces. The trade-off between ex ante incentives and ex post insurance is apparent from the fact that if the deductible is too high, it may discourage insurance and therefore driving altogether. If, on the other hand, the deductible is too low, then drivers may become imprudent again.

A similar logic applies to insurance against counterparty risk. Limited insurance provision by the CCP may be necessary to ensure that clearing members do not free-ride on insurance provided by the CCP (say, through a common default fund) and that they have incentives to make sure that other clearing members are financially sound.[15]

Counterparty risk can be mitigated by search for counterparties with low default risk and by mutualisation of risk in a CCP. Search for creditworthy counterparties is costly as it entails time and resources spent on, e.g., due diligence. While mutualisation of risk offers important risk-sharing benefits, it is not a substitute for due diligence by clearing members, especially in the presence of aggregate risk that cannot be mutualised. Insurance against the aggregate component of one's own risk requires finding counterparties with little exposure to this aggregate component (say from another industry or economic region). Incentives to perform such due diligence suffer when a CCP provides fully insurance. A CCP must limit insurance provision to give incentives for clearing members to seek out sound counterparties that enhance the risk-bearing capacity of the CCP.

The risk-bearing capacity of the CCP can also be enhanced via margin deposits. Two features of margin deposits are often emphasised. First, margins are costly: there is an opportunity cost for assets sitting in margin accounts as they can no longer be used for other purposes. Second, margins may be destabilising since the selling assets to meet a margin call can depress prices, lead to a downward revision of asset values that requires a further margin call and so on.[16] Since CCPs will require and enforce more stringent margin requirements compared to OTC markets, moving transactions to CCPs will likely increase demand for high quality collateral. CCPs can thus adversely impact funding conditions and collateral scarcity. The more good collateral is pledged to the CCPs, the less is left to use in the other secured transaction (e.g., repo markets), and the fewer assets are available to other creditors in the event of default, making it difficult to obtain unsecured refinancing.

It is important to realise, however, that margin deposits also affect incentives of financial institutions.[17] Derivatives activity, which sky-rocketed in the recent years, can lead to a build-up of debt-like-liabilities jeopardising risk-management incentives and creating counterparty risk. When a protection seller (e.g., someone who is long in a forward) observes bad news about the underlying asset of the derivative trade, the hedge moves out of the money for her. For example, on observing a strong drop in real estate prices, sellers of subprime-mortgage CDS anticipate the positions to move against them so that they would expect to be liable for insurance payments. The liability embedded in the derivative trade undermines the risk-management incentives of the protection seller (i.e. encourages risk-taking): while the protection seller bears the full cost of risk-management, part of its benefits accrues to the protection buyer (akin to the debt overhang).

15 *See Biais, Heider and Hoerova (2012).*
16 *See Brunnermeier and Pedersen (2009).*
17 *See Biais, Heider and Hoerova (2011).*

Counterparties can use margin calls, requiring the protection seller to deposit securities (cash) in a margin account, to mitigate risk-taking incentives. Cash placed in the margin account is protected from risk-taking of the protection seller and is available to pay the protection buyer if the protection seller defaults. Margins can be adjusted depending on the news about the hedge (akin to "mark-to-market"). At the same time, by insuring against counterparty risk, margins can make market participants more complacent and more tolerant of risk-taking behaviour. The optimal margin requirements will trade-off efficiency effects (more insurance, lower opportunity cost of margins) versus incentive effects of margins.

3|2 Moral hazard at the level of a central counterparty

Governance of CCPs are key in ensuring that moral hazard problems at the level of a CCP are mitigated. One way to provide incentives for clearing members to ensure proper CCP risk practices is to structure a CCP as a cooperative or mutual, whose users are its owners.[18] Liability for potential losses incurred by a CCP would make its members averse to risk-taking by the CCP. A potential downside is that cooperatives are often limited in scope and scale. A for-profit CCP owned by external shareholders can be more efficient, but the objectives of making a profit and providing appropriate risk mitigation may not always be fully aligned with one another.

For example, we argued that optimality may require that a CCP offers only partial insurance against counterparty risk. A for-profit CCP owned by external shareholders may find it profitable to deviate from the optimal arrangement and offer full insurance. This undermines incentives to perform due diligence and find solid counterparties so that the overall rate of counterparty failure increases.

Even if the CCP takes proper account of the costs its failure would impose on its users, it may still fail to take into account such costs when they concern other market participants and the public sector. In this case, the private interests of a CCP (be they the interest of its user-owners or its shareholders) may diverge from the public interest and a CCP may take on too much risk from the social point of view.

A potential divergence between private and social optimality implies that activities of a CCP must be subject to stringent regulation and supervision. Regulators and supervisors must monitor CCP activities and make sure that adequate risk management practices are in place. Proper risk management practices for CCPs include optimally designed contracts and membership rules. Given the global nature of financial transactions, it is also important to ensure globally consistent standards and avoid potential for regulatory arbitrage.

Lastly, competition among CCPs could help. If a single big CCP is too big to fail, it may be optimal to have several smaller CCPs, which would be incentivised to exert risk management effort by the fear of liquidation. However, splitting the CCP in several entities could come at some costs. First, mutualisation benefits would decrease by reducing the economies of scale inherent in the pooling of risks. This is akin to the inefficiency of splitting natural monopolies. It may also entail the risk that the optimal amount of the public good in question (clearing) is ultimately not provided.[19] Second, splitting CCPs could also increase the cost of collateralisation. Third, competition between CCPs might lead to a race to the bottom in terms of risk management standards. CCPs may want to loosen risk management standards to attract new customers.

Interoperability between CCPs could help mitigate some of the downsides of splitting CCPs. For example, CCPs can use cross-margining, allowing clearing members to use their positions at different CCPs to lower collateral requirements. Furthermore, CCPs can employ linked arrangements, enabling their members to clear trades from multiple venues. However, interlinking CCPs is a complex process which may involve different jurisdictions and regulatory regimes, bringing about its own set of operational, legal and counterparty risks. In this respect, reaping the benefits from competition requires regulatory coordination, strict (international) standard setting and enforcement.

18 *Lee classifies eighty seven clearing entities around the world according to their governance structure and reports that about 40% of clearing entities are user-controlled, not-for-profit institutions. For details, see Lee (2011).*
19 *See for example Santos and Scheinkman (2001).*

4| Concluding remarks

Clearing financial transactions by a CCP transforms bilateral risk between transacting parties into risk of each party with the CCP. By pooling a large number of independent risks, CCPs can insure against risk (mutualisation), as well as achieve lower operational costs, save on collateral through greater netting efficiency and promote transparency in the market.

However, in the presence of asymmetric information, e.g., about transacting parties' "due diligence" efforts or a CCP's own risk management, central clearing can only be beneficial when it is incentive-compatible. A CCP's insurance can complement – but is not a substitute for – strong risk management of its members. Moreover, CCPs concentrate financial risks and automatically are systemic institutions. As such, they can be perceived as too-big-to-fail entities, creating moral hazard between a CCP and the public sector.

We outlined how limits to the amount of insurance, having insurance premiums, default fund contributions and margin requirements should be designed to tackle the underlying incentive problems. CPPs themselves must be properly governed, supervised and their competitive environment carefully monitored. These are difficult tasks where details matter. However, only by taking incentives in CCP clearing seriously can these financial infrastructures contribute to a more stable financial system.

References

Acharya (V. V.) and Bisin (A.) (2011)
"Counterparty risk externality: centralized versus over-the-counter markets", NBER *Working Papers*, No. 17000, April.

Biais (B.), Heider (F.) and Hoerova (M.) (2011)
"Risk-sharing or risk-taking? Counterparty risk, incentives and margins", ECB *Working Paper,* No. 1413.

Biais (B.), Heider (F.) and Hoerova (M.) (2012)
"Clearing, counterparty risk and aggregate risk", *IMF Economic Review*, No. 60, pp. 193-222, July.

Bolton (P.) and Oehmke (M.) (2011)
"Credit default swaps and the empty creditor problem", *Review of Financial Studies*, Vol. 24, No. 8, pp. 2617-2655, August.

Bolton (P.) and Oehmke (M.) (2012)
"Should derivatives be privileged in bankruptcy?", *Working Paper*, Columbia University.

Brunnermeier (M.) and Pedersen (L. H.) (2009)
"Market liquidity and funding liquidity", *Review of Financial Studies*, Vol. 22, No. 6, pp. 2201-2238, June.

Duffie (D.) and Zhu (H.) (2011)
"Does a central clearing counterparty reduce counterparty risk?", *Review of Asset Pricing Studies*, 1, pp. 74-95.

Heller (D.) and Vause (N.) (2012)
"Collateral requirements for mandatory central clearing of over-the-counter derivatives", *BIS Working Paper*, No. 373, March.

Koeppl (T.) (2012)
"Central counterparty clearing: incentives, market discipline and the cost of collateral", *Working Paper*, Queen's University, February.

Koeppl (T.) and Monnet (C.) (2010)
"The emergence and future of central counterparties", Federal Reserve Bank of Philadelphia, *Working Paper*, No. 10-30.

Koeppl (T.), Monnet (C.) and Temzelides (T.) (2011)
"Optimal clearing arrangements for financial trades", *Journal of Financial Economics*, Vol. 103, No. 1, pp. 189-203.

Lee (R.) (2011)
Running the World's Markets, Princeton University Press.

Leitner (Y.) (2012)
"Inducing agents to report hidden trades: a theory of an intermediary", *Review of Finance*, Vol. 16, No. 4, pp. 1013-1042, October.

Office of the Comptroller of the Currency (OCC) (2009)
Quarterly Report on bank trading and derivatives activities, 1st quarter.

Parlour (C. A.) and Rajan (U.) (2001)
"Competition in loan contracts", *American Economic Review*, Vol. 91, No. 5, pp. 1311-1328, December.

Pirrong (C.) (2011)
"The economics of clearing in derivatives markets: netting, asymmetric information, and the sharing of default risks through a central counterparty", *Working Paper*, University of Houston.

Russo (D.) (2010)
"OTC derivatives: financial stability challenges and responses from authorities", Banque de France *Financial Stability Review*, No. 14, July.

Santos (T.) and Scheinkman (J. A.) (2001)
"Competition among exchanges", *Quarterly Journal of Economics*, Vol. 116, No. 3, pp. 1027-1061, August.

Stephens (E.) and Thompson (J.) (2011)
"CDS as insurance: leaky lifeboats in stormy seas", *Working Paper*, University of Alberta and University of Waterloo.

Thompson (J.) (2010)
"Counterparty risk in financial contracts: should the insured worry about the insurer?", *Quarterly Journal of Economics*, Vol. 125, No. 3, pp. 1195-1252.

Access to central counterparties: why it matters and how it is changing

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The G20 leaders' commitment that all standardised over-the-counter (OTC) derivatives should be centrally cleared is intended to increase the transparency, safety and resilience of the global financial system. Achieving these objectives depends importantly on the conditions under which market participants can obtain access to central clearing counterparties (CCPs). Until recently, access criteria for some major OTC derivatives CCPs – developed in the era of voluntary clearing – admitted only the largest global dealers as direct clearing members and offered limited indirect clearing. There was thus the concern that increased central clearing of OTC derivatives would exacerbate the concentration of risk in those institutions. Partly in response to such concerns, principles and rules have been put in place to broaden access to major global CCPs.

This article discusses the implications of clearing access arrangements for economic efficiency, for the safety of the CCP and for systemic risk. It also reviews steps that have been taken to ensure fair and open access.

Central clearing of over-the-counter (OTC) derivatives markets is a key element of the G20 reform agenda to increase the safety and resilience of the global financial system. At the September 2009 Pittsburgh Summit, G20 leaders stated that *"all standardised OTC derivatives should be… cleared through central counterparties."* This commitment arose directly from the experience of the global financial crisis: markets for OTC derivatives that were settled bilaterally lacked transparency with respect to exposures and concerns about counterparty default intensified during the crisis, transmitting stress throughout the global financial system. In contrast, after the failure of Lehman Brothers, some USD 9 trillion of its interest-rate derivatives positions that were cleared through central counterparties (CCPs) were closed out relatively smoothly.[1]

When plans were being made to implement this commitment to central clearing, it became evident that the conditions under which market participants can access CCPs would have an important bearing on achieving its intended objectives of increasing the transparency, safety and resilience of the global financial system. The existing CCPs had restrictive rules under which only a limited number of large global dealers had direct access and client clearing was not typically available. The rationale for these rules was to protect the CCP and the market it supports: in the event that one of a CCP's direct participants failed, the remaining participants would need to have sufficient financial strength to absorb any losses not covered by the defaulter's margin as well as the expertise and financial diversity to take on the failing institution's derivatives positions. Given these access rules and limited client clearing, however, moving OTC derivatives onto CCPs could have excluded from the market important regional dealers and further concentrated clearing activity – and thus risk – in systemically-important institutions such as those that had been at the centre of the crisis.

In response to such concerns, it became clear that the configuration of access to CCPs would need to change in order to succeed in implementing widespread clearing of OTC derivatives in a way that materially strengthened the financial system. The macrofinancial implications of alternative access configurations therefore needed to be examined. Such arrangements could include increased use of the existing global CCPs – whether through expanded direct access or client clearing, the establishment of domestic CCPs in a number of jurisdictions, and the construction of links between CCPs. These possibilities were examined in a report of a Study Group established by the Committee on the Global Financial System (CGFS, 2011), which highlighted the implications of alternative access arrangements for market efficiency, the safety of the CCP and broader systemic stability.

This article reviews the issues and trade-offs related to alternative arrangements for access to CCPs. It reviews important steps that have been taken internationally – both by the authorities and by the CCPs themselves – to broaden access to CCPs while maintaining robust risk controls. Finally, it characterises the remaining barriers to access.

1| Direct versus client clearing

The restrictions that CCPs typically impose on direct access to their clearing services form an important element of their risk management framework. Because a CCP interposes itself between the counterparties to each cleared transaction, it bears a direct counterparty risk exposure to each of its members. In this context, restricting the institutions that are direct members affects risk management in two ways. First, to limit the counterparty risk faced by the CCP, it is essential that only high-quality institutions can participate in the service. Second, clearing members are expected to provide operational and, in more extreme cases, financial assistance in managing the default of a clearing member. Through its default management process, a CCP relies on surviving members to help hedge a defaulter's portfolio and in extreme cases to underwrite losses, allowing it to honour the defaulter's outstanding payments (the typical process for dealing with a member's default is depicted in Box 1). For this reason, CCPs regularly test their members' ability to price and bid for portfolios of products they clear.

1 *Russo (2010) and Norman (2011) describe how CCPs supported market stability during the financial crisis.*

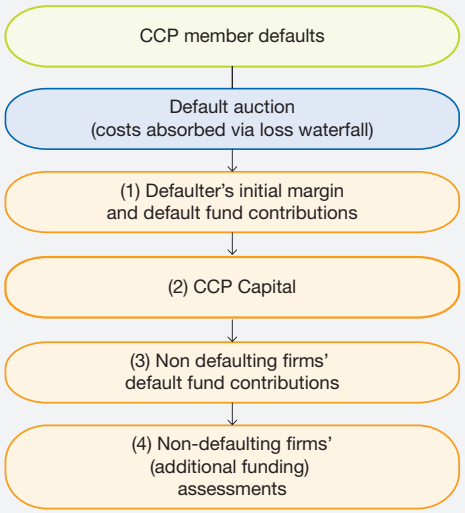
Box 1

Typical CCP default waterfall

In the event of a clearing member default, a CCP maintains its contractual obligation to the defaulter's original counterparties. The CCP must quickly hedge the majority of its exposure to the defaulter's portfolio and auction off these contracts in order to fully neutralise its risk of further losses.

Despite quickly receiving competitive bids, the CCP is likely to incur some loss in the hedging and auction process.

To absorb losses, most CCPs call upon several layers of protection, which are organised into a default waterfall. These resources are typically drawn on in the following order: (1) the initial margin and default fund contribution posted by the failing participant, (2) a CCP's non-operating capital buffer (also known as its "first-loss" capital), (3) the non-defaulting members' contribution to the default fund, and (4) a contractual claim to additional contributions by CCP members. The CCP should also have rules to determine how losses are allocated if the entire waterfall is exhausted.



Institutions that do not satisfy the requirements for direct access can typically clear as clients of clearing members.[2] In providing such indirect access, clearing members typically guarantee the performance of their clients' trades to the CCP and assume default management responsibilities on their behalf. Client clearers thus avoid some of the costs and responsibilities of direct members. But at the same time, client clearers may face several challenges: client clearing arrangements will attract higher regulatory capital costs for direct clearing members, which in turn set pricing and collateral demands for client clearers. This may put client clearers at a competitive disadvantage, especially when it comes to attracting client business of their own.

Thus, while CCPs' access requirements are in the first instance motivated by risk management considerations, they tend to concentrate business in those firms that can satisfy these requirements. The rules governing direct access to CCPs therefore have important implications for the concentration of risk in cleared markets and for overall financial stability, as described in the next section.

2| Broad access reduces concentration of risk and increases financial stability

Central clearing could, in principle, expand access and reduce concentration in the market for OTC derivatives. Because it reduces the incentives for market participants to concentrate their trading with only the largest dealers of known high credit quality, the use of CCPs should foster more open participation and increase competition (Fontaine, Perez Saiz and Slive, 2012). These benefits are maximised when CCP access is available to a wide range of qualified market participants, avoiding an increase in the systemic importance of large dealers.

The reverse result could occur, however, if a CCP's rules were to restrict direct access unreasonably. Large dealer members might, in principle, have an incentive to restrict participation beyond what would be needed for risk management purposes in order to reduce competition (Fontaine, Perez Saiz and Slive, 2012). If mid-sized financial

2 *Client clearing is also referred to as* non-member clearing, non-participant clearing *or sometimes* indirect clearing, *although this latter term can also refer to client clearers who clear for their own (second-level) clients.*

institutions were thereby excluded, this would result in a higher concentration of risk. Indeed, the competitive edge of the incumbent firms might not be limited to derivatives trading and clearing activity: benefitting from lower direct clearing costs, these large dealers might also gain market share in associated business lines such as market making, bond underwriting or structured finance where OTC derivatives play an important role as hedging instruments (Slive, Wilkins and Witmer, 2011). The resulting further concentration of trading and clearing activity in a few large firms – which are global systemically important financial institutions (G-SIFIs) – could further augment the role of these firms in transmitting and amplifying financial system stress. This outcome would be contrary to the intent of the G20 leaders' commitment to central clearing.

There has, therefore, been a consensus that the move to mandatory central clearing of OTC derivatives needs to be accompanied by steps to ensure fair and open access to CCPs. Broad access is needed both to prevent a further concentration of risk in large global dealers and to realise the efficiency benefits of the resulting greater competition. While risk management procedures may need to be adapted to ensure their continued efficacy with a wider membership (CGFS, 2011), broadening access requirements will to some extent contribute to the robustness of the CCP by helping diversify its risk exposures across a larger, more diversified membership, including both large institutions and high-quality mid-sized institutions. Furthermore, including mid-sized dealers may be helpful in handling a member's default. These dealers' market-making expertise in regional products or currencies could help to expedite the hedging and auctioning of the defaulter's portfolio, thus reducing losses to the CCP.

3| Ongoing changes to CCP rules are expanding direct membership

Largely for the reasons just discussed, over the past few years CCPs have faced heightened pressure from the regulatory community and the industry to open up their membership. The CPSS-IOSCO[3] "Principles for Financial Market Infrastructures" (CPSS-IOSCO Principles), a set of international risk-related guidelines that apply to CCPs and other market infrastructures, were introduced in 2012. The Principles require that CCP access requirements be objective, risk-based and publicly disclosed, while permitting fair and open access. US regulators have also implemented similar requirements for any CCP operating in their jurisdiction through rulemaking related to the Dodd-Frank Act.[4] US requirements notably limit minimum size requirements for CCP membership at not more than USD 50 million in net capital, with capital levels scaled to the risk introduced by the participant.

Before these US requirements were made final, LCH.Clearnet's SwapClear, the world's largest OTC interest rate swap (IRS) CCP, had already announced changes to its access rules. SwapClear dropped its minimum capital requirements for members from USD 5 billion to USD 50 million and, more importantly, eliminated a requirement that members hold a swap portfolio of at least USD 1 trillion in outstanding notional principal. Strict operational requirements for SwapClear membership are still in place, although members may outsource these obligations in some circumstances. By the end of 2012, these changes to access requirements, combined with the anticipation of mandatory central clearing in several jurisdictions, had increased SwapClear's direct membership to 72 financial institutions, from 25 in 2009.

Similarly, ICE Clear Credit, the largest CCP for OTC credit default swaps (CDS) in the United States, has imposed an across-the-board minimum net capital requirement of USD 50 million on members. This change replaced a USD 500 million net capital requirement for broker dealer members and a USD 5 billion capital requirement for non-broker dealers. ICE Clear Europe, the dominant clearing house for European CDS contracts, maintains its USD 5 billion minimum Tier 1 capital requirement for members.

3 *The Committee on Payment and Settlement Systems (CPSS) is an international standard setting body for payment, clearing and securities settlement systems. The International Organization of Securities Commissions (IOSCO) brings together member agencies, in part, to develop internationally consistent standards that promote the integrity of securities markets and their infrastructure.*

4 *CCPs operating in the US market must be registered as a Derivatives Clearing Organisations (DCO). DCOs are required to have participation requirements that are objective, publicly disclosed and which permit fair and open access. DCOs are also prohibited from adopting restrictive clearing member standards if less restrictive requirements that would not materially increase risk to the DCO or clearing member could be adopted.*

Broadening membership has not been costless, though, since these changes add complexity to the default management process. For example, incentives could be created for smaller members to free-ride on larger members' capabilities by not participating fully in managing defaults. Under the principles of loss mutualisation characterised in Box 1 above, all members must be prepared to provide support in both operational and financial terms. At SwapClear, one solution has been to increase the minimum pre-committed default fund contribution per member from GBP 2 million to GBP 10 million. The default process has also been adjusted to cap potential member losses and to allocate these based on the member's participation in handling the defaulted portfolio.

4| Clearing costs may still be a hurdle for some institutions

Despite changes to CCP membership rules, the costs of clearing may continue to impede CCP access for some market participants. CCP membership requires significant technological and operational investments in order to meet daily margin requirements and default management responsibilities. Under new regulatory capital requirements, bank clearing members will also incur higher costs on their credit exposures to a CCP, on pre-funded default fund contributions and on exposures to clients who clear indirectly through them.[5]

Since they can spread membership costs over a high volume of market-making business, large dealers will likely continue to clear directly at many CCPs. These dealers also trade with a diverse set of counterparties and therefore benefit most from a CCP's ability to reduce exposures through multilateral netting of contracts. For smaller dealers, which find it more difficult to justify the costs of direct CCP membership, the availability of affordable client clearing services is important to meeting clearing commitments.

At present, only a handful of large global dealers have the operational capabilities, necessary capital and willingness to offer a broad range of client clearing services. In the absence of greater competition, a few global dealers may have significant pricing power over client clearing – which they could exploit by charging higher fees and by requiring clients to post additional collateral outside the CCP. The resulting increased costs for smaller dealers could in turn increase the costs of risk management for end-users of derivatives and could therefore reduce hedging activity. If the costs of client clearing exceed those of bilateral trades, the financial incentives to clear centrally rather than to use non-clearable bespoke (non-standardised) products would also be diminished.

For client clearing to provide safe access to CCPs, the collateral that clients post to the CCP and the clearing member must be protected from defaults. The CPSS-IOSCO Principles recommend that a CCP use an account structure that enables it to identify and segregate client positions from those of a clearing member, facilitating portability of client positions and collateral to another member in the event that its primary clearing member defaulted. Such safeguards, while desirable, are not iron-clad. Certain account structures that meet these criteria may still expose clients to losses – for example, if they permit the commingling of client funds at a CCP, which could expose a client to losses from the simultaneous default of other clients and the clearing member. Furthermore, as illustrated by the 2011 default of US futures broker MF Global, client accounts held at a clearing member could also be subject to losses if controls supporting segregation of client assets are not adequately implemented.

5| Access via domestic or global CCPs

For most classes of cleared OTC derivatives, a few large global CCPs serve several jurisdictions and currencies; their rules effectively set the level of access for the broad market. However, new CCPs are emerging as some jurisdictions pursue a local approach to clearing that requires that certain products be cleared using domestic infrastructure.[6]

Establishing infrastructure locally has several potential advantages. It may provide CCP access to domestic market participants that cannot satisfy the requirements for access to global CCPs. It permits

5 *See Basel Committee on Banking Supervision (2012) for a full description of regulatory capital requirements for bank exposures to CCPs.*
6 *A full description of G20 jurisdictions' approach and progress in meeting OTC derivatives reform objectives can be found in Financial Stability Board, 2012b.*

more direct domestic regulatory oversight of markets that are viewed as systemically important. Certain jurisdictions also see market development benefits in establishing local CCPs.

At the same time, local CCPs also have some significant drawbacks. Because they typically attract a smaller and less-diversified group of market participants, they provide fewer opportunities for netting of exposures, and as a result are likely to be more costly to use. The greater cost would tend to undermine the efficiency of the derivatives markets as well as of other related financial markets whose participants use derivatives to hedge. Moreover, in an open economy, it would create incentives for trading activity to gravitate to institutions that clear at less-costly global CCPs.

Canadian authorities focused on financial stability and efficiency considerations in arriving at a decision that Canadian market participants may clear OTC derivatives using any CCP recognised by Canadian authorities, including global CCPs.[7] The approach taken in the Canadian case, as described below, is also relevant to other jurisdictions.

6| Financial stability considerations

One way that domestic CCPs could enhance financial stability is by increasing local authorities' capacity to oversee the CCP's activities and potentially augmenting their ability to intervene in crisis situations. A local CCP may also be able to tailor its rules and product offerings to local market conditions and thereby increase the overall level of central clearing in the local market.

A domestic CCP's ability to foster financial stability would, however, hinge on its robustness to financial shocks: first and foremost, its ability to withstand the default of one or more of its clearing members. Attracting a diversified set of high-quality participants is crucial in this regard, since surviving members play an important role in a CCP's default management process. Without a balanced mix of foreign and local market participants, a domestic CCP could be susceptible to idiosyncratic shocks that befall its membership base. A broad membership would also provide the domestic CCP with greater financial resources to withstand a crisis.

The financial stability benefits of a local approach to clearing would be lower when applied to a product class that is highly global. When local market participants trade extensively in foreign currencies and with numerous offshore counterparties, a domestic CCP may capture only a portion of local market activity. Participants would therefore continue to clear some their activity at global CCPs and local oversight benefits would be applied to only a segment of the domestic market.

In some circumstances, a local CCP might help insulate the local market from shocks affecting the global financial system. But since a robust local CCP requires the participation of foreign dealers and local participants need to access global CCPs in a global market, the local financial system would remain highly exposed to a default by a global dealer.

7| Efficiency considerations

If a domestic CCP cleared only a portion of market participants' trades, members would need to split their cleared portfolios across domestic and global infrastructure. Domestic CCP members would therefore face high collateral and regulatory capital costs due to lost cross-currency diversification benefits and reduced opportunities to net exposures. These market participants would also have to fund default fund contributions and pay clearing fees to each CCP. Associated incentives would be for foreign-market participants to concentrate clearing at global CCPs and potentially to cease trading in the local market.

If foreign-based participants withdrew from the local market, the resulting market fragmentation would decrease market liquidity and market efficiency would suffer. Without a deep and liquid market, costs of clearing and of risk management would increase for domestic market participants. The domestic CCP's safety may also be jeopardised since it would no longer have access to a liquid and efficient market in which to replace a defaulting clearing member's portfolio.

7 *A review of the Canadian authorities' approach to central clearing for OTC derivatives is presented in Chande, Dion, McVanel and Slive (2012).*

Box 2

The "four safeguards" for global clearing

In the evolving landscape for central clearing, international efforts have focussed on establishing four safeguards for the use of global CCPs by market participants that reside outside the jurisdictions where these CCPs are located (FSB, 2012a).

- ***Fair and open access**, to reduce the likelihood that high-quality market participants will be excluded from CCP membership. It requires that CCP access be based on transparent and objective criteria, further building upon the CPSS-IOSCO Principles, which require that access be fair, open and risk-based.*

- ***Co-operative oversight**, with the establishment of bilateral or multilateral cooperative oversight arrangements for global CCPs to allow relevant authorities to participate in overseeing CCPs that are important to their local markets.*

- ***Recovery and resolution frameworks** so that, in the unlikely event of the CCP's failure, severe market disruptions can be avoided. These regimes should be consistent with the FSB's* Key Attributes for Effective Resolution *Regimes and should take appropriate account of the interests of all jurisdictions served by the CCP.*

- ***Appropriate liquidity arrangements** whereby CCPs must hold adequate liquid assets or have adequate lines of credit in all of the currencies of the products cleared by the CCP. Compliance with the CPSS-IOSCO Principles is intended to ensure that a CCP has adequate liquidity self-insurance. For a CCP that is involved in activities with a complex risk profile or that is systemically important in multiple jurisdictions, it should consider covering a wide range of potential stress scenarios that include, but are not limited to, the default of the two participants that would create the largest aggregate payment obligation to the CCP in extreme but plausible market conditions. Further, central banks have been working towards a regime that ensures there are no technical obstacles for the timely provision of emergency liquidity assistance by central banks to solvent and viable CCPs, without pre-committing to the provision of this liquidity.*

8| A ROBUST GLOBAL APPROACH

Canadian authorities' decision to allow global clearing of Canadian-dollar-denominated interest rate swaps transacted by Canadian entities was based, in part, on the progress made at the Financial Stability Board to establish the "four safeguards" for global CCPs. These safeguards address concerns that might arise where systemically important markets are cleared through offshore CCPs (see Box 2). There has been considerable progress in defining and implementing these safeguards, although work is ongoing. These safeguards should enhance the safety of a global approach and support implementation of the G20 commitment to central clearing.

9| LINKS AMONG CCPS

In principle, some of the efficiency drawbacks associated with a local approach to clearing could be attenuated if links or cross-margining agreements were introduced between local and global CCPs. Such arrangements could mitigate some of the efficiency disadvantages of a local approach to clearing and thereby reduce incentives for participants to concentrate clearing at a few global CCPs. Links would allow trading counterparties to clear a contract, each at its own CCP, with an exposure between the two CCPs being created to match the exposure to their own member. With a link, participants could net their portfolio exposures multilaterally across the combined membership of both CCPs and regain some of the capital and collateral efficiencies from global clearing. Each CCP could also retain some discretion over its own membership rules, product offerings and risk management to provide fair and open access to domestic participants while maintaining robust risk controls.

Despite the potential advantages of links among CCPs for OTC derivatives, establishing such links would pose considerable challenges. Such links would be difficult to configure due to the potentially large default exposures they would create between CCPs, particularly in markets such as those for OTC derivatives. The approval of links would require agreement between relevant infrastructure providers

and regulators on a number of operational and legal issues. Perhaps most importantly, agreements would have to be reached on the level of collateral exchanged by CCPs to cover risk exposures across the link.[8] Due to these hurdles in establishing links, only a few have been successfully established and these examples have been for clearing cash rather than derivatives transactions.

More recently, there have been some small signs of progress in linking CCPs for OTC derivatives. The European Securities and Markets Authority (ESMA) released for consultation *Guidelines for establishing consistent, efficient and effective assessments of interoperability arrangements* for CCPs, which could lay the groundwork for eventual approval of links in derivatives markets by European authorities.[9] A group of CCPs including LCH.Clearnet, the Depository Trust and Clearing Corporation (DTCC), New York Portfolio Clearing (NYPC) and NYSE Euronext also announced their intention to investigate cross-margining opportunities across fixed income, cash transactions, repo, futures and OTC interest rate swaps.

Despite some apparent willingness by both infrastructure providers and regulators to consider links between CCPs, no concrete steps have yet been taken. Instead, large global CCPs have been focussing on improvements in other areas, such as introducing cross-product netting across their different business lines to reduce their members' collateral requirements.

10| Continued evolution of central counterparty access

Since the G20 committed to central clearing of standardised OTC derivatives, a great deal of progress has been made on broadening CCP access to include a wider range of high quality market participants and in promoting a safe and efficient environment for clearing through global CCPs. In the period ahead, international work should aim to ensure that these objectives are fully met for a wide range of infrastructures and participants.

Since only a minority of market participants will have direct access to CCPs – even under broadened access criteria – improving the efficiency and availability of client central clearing remains an important challenge. The total costs to client clearers – including collateral and capital requirements – should be appropriate to make central clearing a viable choice. Consideration should also be given to indirect clearing arrangements that let clients clear for their own clients, in order to attenuate the market power of the largest clearers. Further, if client clearing services continue to be dominated by a few large dealers, this could concentrate risk and create competitive barriers. For central clearing to promote resilient markets, client clearing access must be improved.

Finalising remaining work on full achievement of the four safeguards at global CCPs is another priority. Much of this effort will be directed towards the implementation of appropriate recovery and resolution regimes in jurisdictions that host the world's largest and most systemically important CCPs.[10] Continuing work to configure emergency liquidity and strengthen cooperative oversight as well as the monitoring of direct and client access rules is also important.

The structure of the OTC derivatives market will continue to evolve in response to financial reform initiatives and market developments. New CCPs will be created, some OTC trading will move to organised trading platforms and listed derivatives exchanges will likely take over some part of the market. As these changes take place, infrastructure providers, market participants and regulators must continue to assess what structure of access to clearing makes sense in order to promote safe and efficient markets and a resilient financial system.

8 *Despite its risk reduction benefits, collateral exchanged between CCPs could greatly increase costs of clearing through a link. Also, the return of a CCP's posted collateral in the case of a linked CCP default could raise serious concerns for regulators.*
9 *See ESMA (2012) for the full consultation paper, which discusses a number of issues related to oversight and collateralisation of linked CCPs.*
10 *This work will build on the CPSS-IOSCO Consultative Report on* Recovery and Resolution of Financial Market Infrastructures *published in July 2012.*

References

Basel Committee on Banking Supervision (BCBS) (2012)
"Capital requirements for bank exposures to central counterparties", Basel Committee on Banking Supervision and Bank for International Settlements.

Chande (N.), Dion (J.-P.), McVanel (D.) and Slive (J.) (2012)
"The Canadian approach to central clearing for over-the-counter derivatives", Bank of Canada, *Financial System Review*, pp. 43-49, December.

Committee on the Global Financial System (CGFS) (2011)
"The macrofinancial implications of alternative configurations for access to central counterparties in OTC derivatives markets", Report of a study group chaired by Timothy Lane, Bank of Canada, *CGFS Papers*, No. 46, November.

European Securities and Markets Authority (ESMA) (2012)
"Guidelines for establishing consistent, efficient and effective assessments of interoperability arrangements", *Consultation Paper*, December.

Fontaine (J.-S.), Perez Saiz (H.) and Slive (J.) (2012)
"Access, competition and risk in centrally cleared markets", *Bank of Canada Review*, pp. 14-22, Autumn.

Financial Stability Board (FSB) (2012a)
"Progress of financial regulatory reforms", FSB Chairman's letter to G20 Finance Ministers and Central Bank Governors, April 16.

Financial Stability Board (2012b)
"OTC derivatives market reforms: fourth progress report on implementation", October.

Norman (P.) (2011)
The risk controllers: central counterparty clearing in globalised financial markets, John Wiley and Sons.

Russo (D.) (2010)
"OTC derivatives: financial stability challenges and responses from authorities" Banque de France, *Financial Stability Review*, 14, pp. 101-112, July.

Slive (J.), Wilkins (C.) and Witmer (J.) (2011)
"Access to central clearing services for over-the-counter derivatives", Bank of Canada, *Financial System Review*, pp. 39-45, June.

Central counterparties in evolving capital markets: safety, recovery and resolution

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Capital markets – whether for raising funds or transferring risk – are a vital part of financial system. Perhaps even more so in the years ahead as banking is reregulated. The international authorities are working together to simplify the network of transactions by mandating that standardised over-the-counter (OTC) derivatives are centrally cleared. That entails a concentration of risk around central counterparties (CCPs) and so relies upon them being safe and sound. CCPs' risk management is a first line of defence: managing clearing-member positions to reduce the likelihood of default; ensuring financial mitigants to cover potential losses are adequate. Should mitigants be exhausted, CCPs need a comprehensive recovery plan, including ex ante *arrangements to mutualise remaining losses amongst surviving members. In case the plan fails, the authorities must be able to resolve a CCP safely without recourse to public funds.*

Capital markets are a vital part of the global financial system. As the international authorities reregulate banking, more activity will be intermediated through the capital markets. Higher capital requirements and new liquidity requirements will, over the medium term, raise the cost of holding securities, loans and trading exposures on bank balance sheets. "Originate and warehouse" is likely to be succeeded by "originate and distribute", which is how wholesale banking was meant to work in the first place. Although the role of capital markets has been smaller on this side of the Atlantic than in the United States, I suspect it will grow over the next decade or so.

This underlines the importance of capital markets themselves being safe, sound and effective. Stability is not only about banks![1]

The international community recognises that of course. Hence the measures being taken or planned on shadow banking, credit rating agencies and transparency. But, perhaps most important, the G20 leaders decided in 2009 that the derivatives markets need to be simpler, safer and more transparent. They mandated greater use of central clearing, trading on exchanges (or electronic trading platforms), and reporting of transactions to trade repositories.

1| The importance of central counterparties

The biggest change is that central counterparties (CCPs) will become a counterparty to all trades in standardised derivatives – the buyer to every seller and the seller to every buyer. This will entail a massive increase in the volume of business cleared through CCPs. Perhaps less than half of trades in the USD 250 trillion global interest rate swap (IRS) market were centrally cleared at end-2011. For the USD 25 trillion credit default swap (CDS) market, around a tenth was centrally cleared.[2] The transition is being staggered somewhat, but the direction is clear.

This is not an obscure corner of finance of interest only to technicians. In the first place, the derivatives markets covered by the G20 mandate are used by businesses and, on behalf of households, by investment managers to insure against all sorts of financial risks. More than that, second, central counterparties are increasingly involved in the cash markets – notably repo and equities. These markets are vital to the financial system and the economy.

So it matters enormously that much of the risk in the main derivatives markets and in some cash markets is becoming concentrated on the clearing houses. That simplifies the network of exposures via multilateral netting, and it can assist the management and monitoring of risk. But it is absolutely vital that the risks really are managed effectively. Having concentrated risk on the clearing house, it must be redistributed back to market participants in ways that are clear and which incentivise market discipline. Otherwise, CCPs would be too big or too important to fail.

That is not hypothetical. Markets typically cease to function if a CCP fails and closes abruptly. In 1974, the Caisse de Liquidation failed in Paris, following a default on margin calls when sugar-futures prices fell sharply. In 1983, it was the turn of the Kuala Lumpur Commodities Clearing House, when half a dozen large brokers defaulted following a crash in palm-oil futures. And, most dramatically, the Hong Kong Futures Exchange clearing house (and its guarantee corporation) failed in the wake of the global stock market crash in 1987. The Futures Exchange had to close. Traders faced margin calls on cash market equity positions but, with the futures market closed and the clearing house bust, they could not get margin moneys returned on profitable futures positions. For that and other reasons, the stock market closed too. Hong Kong's main capital market shut down. Reopening the exchanges was no small feat. Ultimately, Hong Kong taxpayers, together with the clearing banks, put up the funds to underpin the Futures Exchange. Major reforms followed.[3]

In those cases, the costs of clearing house failure were felt in the specific, local markets they served. Today – and even more so in the future – the disruption would be felt across the global financial system. That is what requiring central clearing of *global* capital markets means.

1 *See Tucker (P. M. W.) (2011): "Building resilient financial systems: macroprudential regimes and securities market regulation", International Council of Securities Associations.*
2 *Based on TriOptima data.*
3 *See the report of the Hong Kong Securities Review Committee, 1988.*

2| Central counterparties as system risk managers

Seen in that light, the role and financial integrity of CCPs becomes so central that it could be argued that they should be part of the public sector. The case against taking that radical step is, essentially, that privately owned, controlled and managed infrastructure-providers are better at innovation and operational efficiency, which matters over the long term. But the authorities do need to guard against clearing houses thinking of themselves primarily as vehicles for offering their members operational and capital efficiency. Too many clearing houses drifted into that mindset in the decade or so leading up to the current crisis.

The authorities have, therefore, reframed the regulatory, supervisory and resolution regimes for clearing houses. Globally, the key measures are the "Principles for financial market infrastructures" (PFMIs), issued by the Basel Committee on Payment and Settlement Systems (CPSS) and the International Organization of Securities Commissions (IOSCO); and on resolution, the Financial Stability Board's (FSB) Key Attributes of Effective Resolution Regimes for Financial Institutions. In the European Union, the core regulatory measure is the European Market Infrastructure Regulation (EMIR), which is due to be followed over the next few years by a resolution directive for non-banks and infrastructure providers, including CCPs. In the United Kingdom, where prudential supervision of post-trade financial infrastructure is being transferred to the Bank of England, we have set out our planned approach to supervising CCPs.[4] Taken together, these measures amount to the authorities putting in place a framework for determining how resilient a clearing house should be, and what happens if one fails. That is a legitimate and proper role for the authorities, acting in the wider public interest, given the spillovers and social costs of CCP distress. Moreover, the package reflects international agreements, in the interests of fostering a level playing field supportive of capital markets remaining global and integrated.

The driving principle is that CCPs need to do more than just look after their own risks in a narrow way. Their technical policies – for margining, collateral – set the terms of trade in the markets they serve. This is reflected in the CPSS/IOSCO Principles, which require CCPs to act in support of the stability of the broader financial system.[5] In other words, as well as ensuring their own safety and effectiveness, they are, in effect, system risk managers. Twenty-five years ago, the best of them thought like that. They need to do so again.[6] As the Hong Kong Securities Review Committee concluded in the wake of the 1987 crash: "*When everything else is stripped away, the most pressing issue is the management of risk. The focus of this is increasingly… the central clearing houses – indeed [their] prudent operation is perhaps the single most important objective for the market authorities and regulators*."

2|1 Governance and culture

This means that sound risk management, for themselves and for the system, must be ingrained in the culture of CCPs. To that end, the incentives and reward policies for clearing house executives should not prioritise profit or market share over effective risk management. And the equity of the clearing house must be exposed to a degree of risk.

Where a CCP is part of a vertically integrated group centred on an exchange, the CCP's risk managers must be appropriately insulated from the commercial imperatives that these days can all too easily dominate profit-maximising strategies of the boards of publicly quoted groups. Strong user representation – meaning senior risk managers and others from clearing members – is essential given the mutualisation of risk. Independent directors on boards and risk committees are important too.

4 *The Bank of England's approach to the supervision of financial market infrastructures, December 2012. See* http://www.bankofengland.co.uk/publications/Documents/news/2012/nr161.pdf

5 *See CPSS/IOSCO (2012): "Principles for financial market infrastructures". For example, Principle 2: Governance* – "An FMI should have governance arrangements that are clear and transparent, promote the safety and efficiency of the FMI, and support the stability of the broader financial system, other relevant public interest considerations, and the objectives of relevant stakeholders".

6 *See Tucker (P. M. W.) (2011): "Clearing houses as system risk managers".*

2|2 Absorbing the default of a clearing member

Enough of CCPs' importance and role – how are they to deliver?

CCPs are unusual principal risk takers in that, by definition, they run a matched book: they do not take market risk *directly* via their clearing activities. They are, however, exposed to counterparty credit risk in a big way; and thus to market risk if their members fail. These risks are real because the authorities are committed to not standing behind the solvency of banks and dealers: new resolution regimes will ensure that losses can and will be placed on creditors, which can include CCPs. Clearing houses are, therefore, in the business of reducing the likelihood of a counterparty default and of containing the impact of any such defaults.

In brief, they manage access to their services, and set rules – in the form of contracts with members – that redistribute risk back to their members. To reduce the *probability* of clearing member failure, membership of a CCP depends on financial strength, risk management capability and operational capacity. Once a firm has been given access, the clearing house management must monitor and respond to the risks it brings to the CCP, including large client positions, concentrations, etc. More widely, as required by the CPSS/IOSCO standard, CCPs must contain risks related to tiering arrangements, involving major players clearing through general clearing members.[7]

But the failure of a clearing member can never be ruled out. When that happens, the cost to the CCP of replacing its positions with the defaulting clearing member is uncertain. Until the trades can be replaced or closed out, the CCP will, contrary to its normal mode of operation, be running market risk positions. The failure of a big firm is likely to dislocate markets, so managing those positions will not always be easy. That is why CCPs collect initial margin from members; rebalance at least each day to maintain the required initial margin levels as markets move; keep the required level of margin under review, adjusting as necessary; maintain a default fund in case margin levels prove insufficient; and set rules on the distribution of any losses that outstrip even the default fund's capacity. (The international standards in this area are set out in Principles 4 to 6 of the CPSS/IOSCO PFMIs.)

Judging a prudent level for initial margins is not easy in any circumstances. Reliance on modelling also gives CCPs considerable discretion. And competitive pressures could give CCPs incentives to shade margin requirements to the low side. In that, CCPs are not dissimilar from banks and dealers.

The stakes are high – all the more so because adjustments in CCP margin requirements affect market dynamics. Succumbing to market pressure to relax margin requirements during periods of exuberance and apparent buoyant liquidity, only to tighten them sharply when conditions deteriorate, amplifies swings in market conditions and can exacerbate a crunch. Pro-cyclicality in margining practices is not in the interests of the wider system or, indeed, of CCPs themselves. Maintaining prudent margin levels through benign conditions can reduce the need to tighten requirements as conditions deteriorate. For that reason, the international authorities are establishing frameworks for setting margin requirements for, respectively, CCPs and uncleared trades.[8] Beyond that, there is an important question of whether macroprudential authorities should be able to require adjustments in minimum margin requirements to lean against overly exuberant market conditions. In the United Kingdom, the Bank of England's Financial Policy Committee plans to address this once the global and European Union regime for margining is clear.[9]

Margining is not the be all and end all. The second line of defence available to CCPs is a prepaid default fund, contributed by clearing members. This effectively mutualises the tail risk in the CCP, creating healthy incentives for members to monitor the CCPs' risk management. CPSS/IOSCO have specified a framework for determining the minimum size of such funds. Firms' contributions are effectively "capital" in the clearing house, and so cannot at the same time support tail risks in the banks and dealers themselves. If a clearing member loses their contribution to a CCP's

7 *CPSS/IOSCO PFMI Principle 19.*
8 *For the former, see Principle 6 of the CPSS/IOSCO PMFIs. For the latter, see BCBS and IOSCO (2012) consultative document: "Margin requirements for non-centrally cleared derivatives".*
9 *See the* Record *of the interim Financial Policy Committee's meeting on 16 March 2012.*

default fund, the financial system will be at greater risk if they have used the same capital to lever up their own business and balance sheet. The regulatory regime should reflect that.

All that applies to each CCP in isolation. But over recent years CCPs have been entering into so called interoperability agreements. The authorities must not allow this to give rise to a complex network of exposures amongst CCPs, obscuring the distribution of risk and impeding effective risk management. More work is badly needed on that. Some of it is underway in the European Securities and Markets Authority (ESMA).

3| Recovery of a distressed clearing house

What happens when all those measures prove inadequate? Regulation and supervision cannot focus solely on minimising the *probability* of distress at a CCP. That was one of the mistakes made by supervisors of banks and securities dealers in the years leading up to the crisis that broke in 2007. Infrastructure supervisors are learning from those mistakes.

It is vital that each CCP has a comprehensive recovery plan to ensure that they can maintain continuity of clearing services in the event of multiple member defaults overwhelming their normal defences.

Banks also need such Living Wills of course. But, in contrast to banks, a CCP's recovery plan can be, and should be, written into its rules – into the contract with its members. It must have a set of explicit rules and procedures that allocate losses left uncovered after drawing on the defaulting members' initial margin and the common default fund. That obviously needs to include a well-defined obligation for surviving members to top up the default fund – a specific number of times – after it is exhausted. But even that cannot be enough: even if clearing members were to accept an uncapped obligation, they will not always be able to fulfil those obligations. So CCPs' rules need to give them a richer set of tools, including their being able to apply a haircut to their variation margin obligations, and possibly to the initial margins of survivors. In case those measures proved insufficient, they probably also need rules that permit tear-up of contracts. In the United Kingdom, CCPs will be required, as part of the conditions for authorisation, to have loss allocation rules. Legal regimes need to be configured to ensure that such rules can be enforced.

By making it clear up front that surviving members are on the hook when a CCP's primary loss-absorbing resources prove inadequate, market discipline is enhanced. It should be in clearing members' interests to ensure that CCPs have prudent risk management policies and procedures; and also to judge whether their peers are running dangerous positions through the clearing house. CCP risk management policies and practices must, therefore, be clear to their members.

All of that revolves around maintaining a CCP's solvency in the face of clearing member defaults. But managing recovery in such circumstances will most likely also require liquidity. The need could be significant. CCPs therefore need either prearranged funding lines from banks or a portfolio of resiliently liquid assets that they can use in the money markets.

But we cannot rule out that there will be a shortfall of liquidity, endangering the wider system's stability. To cater for that, central banks will ensure that there are no technical obstacles in the way of their providing liquidity to a solvent and viable CCP at short notice.[10] Central banks are absolutely not committing to provide such support. Private sector liquidity absolutely *must* be the first port of call, and so CCPs should *not* rely on central bank funds in their liquidity planning. There may, however, be extreme circumstances where the amount of liquidity available on the market proves insufficient. Central banks will, therefore, need to be comfortable with a CCP's risk management and its recovery plan but also, crucially, with the available resolution mechanisms. Central banks will not be comfortable lending to a CCP if they have no idea what would happen if it goes into an insolvency procedure.

4| Resolution

In the past, supervisors – whether of banks, dealers or financial infrastructure – did not instinctively like to contemplate insolvency: its occurrence means that their prophylactic efforts and recovery plans have

10 *See Financial Stability Board (2012): "OTC Derivatives market reforms",* Third Progress Report on Implementation, *15 June 2012, page 48.*

proved insufficient. But the authorities have a duty to ensure that they do not run out of road; they need some control over events rather than just watching as chaos breaks out due to a CCP's insolvency and consequent entry into a standard liquidation procedure.

To be clear, resolution is an alternative to liquidation and, as such, is a last resort. Unlike liquidation, its objective should be to maintain continuity of clearing services or, if that is not possible, to withdraw services in a way that is as orderly as possible, with contained spillovers to capital markets and the rest of the financial system.

CCPs themselves have a big role to play in ensuring that they are resolvable. But, ultimately, resolution planning has to be the responsibility of the resolution authorities. That is because resolution of a CCP involves, in its essence, a reconstruction by the resolution authority of a failed infrastructure-provider – its capital structure, liabilities, operations and management.

To be able to do that, the resolution authority needs a rich set of powers bestowed upon them by a clear statutory framework. The benchmark is set out in the Financial Stability Board's Key Attributes, an international standard endorsed by G20 leaders that jurisdictions must meet. With more systemically relevant activity going through clearing houses, jurisdictions must take early steps to ensure that their resolution regimes also cover CCPs effectively, and soon.

At a minimum, resolution authorities need the power to take control of a CCP that is no longer viable (or doomed to become unviable) and where there is no reasonable prospect of its recovery. At that point, if for whatever reason the CCP's own loss allocation rules have not been exercised in full, it may be enough for the resolution authority to complete that process. The right to effect the CCP's rules should also extend to any outstanding contractual obligations to tear-up contracts or to replenish default funds.

If even those measures are insufficient to cover the CCP's losses and restore it to viability or wind it down in an orderly way, the resolution authority must have other options. Otherwise, liquidation would beckon.

As with other financial institutions, the resolution authority should have the legal power to transfer some or all the assets and liabilities associated with a particular CCP service to a solvent third party which would maintain the provision of those clearing services. If a solution of that kind is not immediately available, the transfer might need to be to a "bridge company", while a more permanent purchaser is sought. The statutory transfer must take effect immediately and without the need to obtain consent from the CCP's counterparties, creditors, members, owners or managers. Work is needed to operationalise this type of resolution strategy.

Another route will be to write down the liabilities of the CCP to a level where it is again solvent and viable. The liabilities of a CCP are typically different in kind from those of a bank – for example, initial and variation margin rather than deposits and bonds. But the principles are the same. This would be the application of what has become known as "bailin" to a CCP. That way, the clearing house may be resurrected.

Whatever resolution tools are employed in a particular case will depend on the circumstances. But any obstacles to effective resolution will need to be removed. For example, one such obstacle is the risk that counterparties exercise termination rights in derivatives and repo contracts. A mass abrupt close-out would be very disruptive, risking contagion to the system through fire sales. Removing that obstacle to orderly resolution will, in the European Union, require amendment to the Financial Collateral Arrangements Directive (FCAD). The Directive was framed before anyone in Europe was thinking about designing resolution regimes to cope with systemically important financial institutions or infrastructure such as CCPs. The draft Recovery and Resolution Directive currently going through the European Parliament cures this problem for banks. It could, and in my view should, be used to cure the problem for resolution of CCPs. The timetable for strengthening resolution regimes must keep pace with the timetable for the mandatory central clearing of standardised derivatives.

5| Conclusion

The reforms of global capital markets put clearing houses at centre stage. The system will not be resilient unless the CCPs themselves are safe and sound and capable of orderly resolution. Globally and in the European Union, steps are underway to deliver just that. They are vitally important. The reform programme cannot be, and is definitely not, just about banks.

Collateral

Collateral and new offers for an optimised management: an industrial revolution

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Chairman
Euroclear

The more cautious approach of market participants together with initiatives by regulators regarding the structure of the derivatives market have accentuated the use of collateral to secure market exposures over the past years and will probably continue to do so for many more to come.

This article examines the actual and rapid mobilisation of the eligible collateral, irrespective of where it is held and in what form – either to meet a permanent need or to respond to crisis situations. To address this question, the author considers a marketplace comprising a central securities depository, such as Euroclear, and the community of domestic and international banks that are also its clients. Indeed, this approach provides for a large, open and neutral market for mobilising collateral and sets out to dismantle the technical and commercial barriers that fragment and raise the costs of its management. This infrastructure is known as a collateral highway, as opposed to the narrower concept of a collateral hub. The aim is to be able to exchange, in different places (not just one recognised place) and among participating depositories, collateral in the form of any asset provided that it is recognised as eligible by private lenders, clearing houses or central banks.

It will take time to create this large marketplace but significant steps will have been taken before the end of the year. Already, all securities held with Euroclear, or with a national or international depository, can be mobilised and easily substituted.

1| The move towards borderless collateral

The current financial crisis has led to radical changes in risk management, be it at the initiative of financial institutions themselves or, through regulatory changes. One feature of this renewed caution is the increased use of collateral to secure market and interbank credit exposures in bilateral trading activity. New regulations requiring the central clearing of over-the-counter (OTC) derivatives will likely accentuate this trend.

An ongoing debate exists as to whether this growing demand for collateral represents a structural problem which could result in a shortage of quality assets. Other parties are perhaps better qualified to assess this risk. The view presented in this article, is that one should not overestimate nor exaggerate its urgency. As private sector restructuring and policy actions take hold, markets can be expected to find innovative ways to balance supply and demand, including through better pricing of collateral.

The key point however is the following: before the theoretical supply of collateral can be exhausted, other practical constraints will restrict the availability of collateral. The impossibility to track, source and mobilise a significant part of the theoretical pool as a result of existing barriers, which prevent efficient collateral management, will likely play a pivotal role.

Pools of securities collateral exist in many repositories, each under their own jurisdiction. This fragmentation prevents the mobilisation of the required assets at the required speed i.e. at the time required by markets.

The larger theoretical pool of collateral may prove to fall short of market needs in the medium term, but the problem faced by financial institutions today is that the freely available pool of collateral is already much smaller. And this, because of its fragmentation. Lifting the barriers which create this fragmentation is both urgent and possible.

1|1 Scarcity – which scarcity?

Collateral is not a scarce resource today in absolute terms. Pools of high-grade securities collateral do exist; for example: the International Monetary Fund (IMF) estimated the total global pool in 2011 at approximately EUR 51 trillion.[1] The conclusion one draws is that there is enough to meet current levels of demand.

As demand for collateral grows, it could become scarce in the sense that pools of collateral are often segregated, held in silos, difficult to track accurately and burdensome to mobilise efficiently when needed.

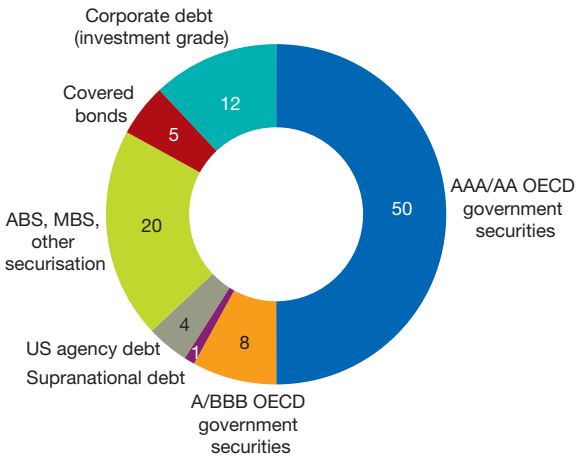
The capital market's growing appetite for collateral stems from two main developments:

- increased regulatory focus in the aftermath of the Lehman Brothers collapse in 2008;

- the wholesale changes in the capital market's risk appetite. Even bilateral trades between counterparties, now more often than not, are being done on a secured basis. Unsecured lending – for the time being – is a thing of the past.

Chart 1
Global oustanding amount of high-grade securities

(%; total = EUR 51 trillion; December 2011)



Source: IMF.

1 *International Monetary Fund – Global Financial Stability Report, Washington DC, April 2012.*

To put the shortage into a tangible context, estimates of the increase in collateral required following the implementation of Dodd-Frank Act and the European Market Infrastructure Regulation (EMIR) vary depending on the source. But the figure is likely to be somewhere between USD 200 billion[2] and USD 2 trillion.[3]

Conversely, the recent debt downgrade of a number of sovereign states has added further pressure by restricting the supply of high-grade collateral. This reduction in supply, with the increase in demand as a result of the tough capital and liquidity ratios imposed by the Basel Committee in the banking industry (and Solvency II in the insurance industry), mean that some institutions are finding themselves with a collateral imbalance. In other words, the collateral previously set aside to cover a bank's regulatory requirements is now no longer sufficient, either in quantity or quality.

Collateral scarcity is compounded by the way in which institutions currently manage their securities inventories. Collateral management operations historically have been organised in silos with separate pools of collateral being managed independently, by business line and often by geographic location. The growing scarcity of quality collateral, coupled with the increasingly global nature of clearing for an expanding range of transactions and the international reach of most banks and financial institutions, mean that there is a powerful need for cross-regional access to collateral.

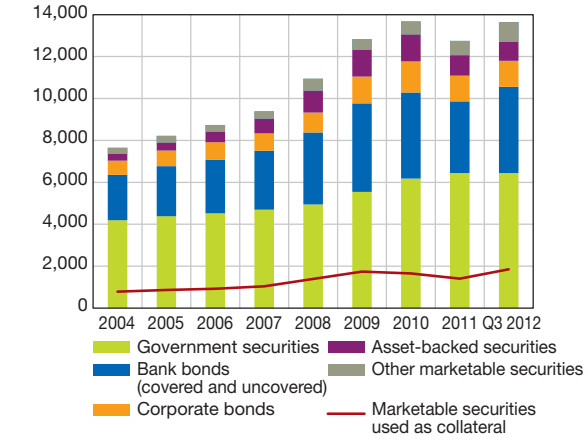
The hereafter figures from the European Central Bank (ECB) are a good illustration of the problem of collateral fragmentation.[4]

According to the ECB, the Eurosystem currently houses a pool of almost EUR 14 trillion of eligible securities collateral. Only EUR 1.9 trillion of these available securities are currently pledged as collateral.

A closer look at these securities shows that of the EUR 1.9 trillion, EUR 0.7 trillion is made up of non-marketable securities.[5] Since the credit crisis non-marketable securities have been increasingly used as collateral in the Eurosystem despite the relative difficulty associated with their trading. Equally surprising are the figures from the ECB suggesting that over 80% of the pool of marketable securities[6] is theoretically still available[7] for use as collateral to secure exposures.

Chart 2
Marketable securities eligible as collateral in the Eurosystem

(EUR billion; averages of end of month area)



Source: ECB.

Chart 3
Securities used as collateral in the Eurosystem

(EUR billion; averages of end of month area)

Source: ECB.

2 *International Monetary Fund – Global Financial Stability Report, Washington DC, April 2010.*
3 *Tabb Group – Optimizing Collateral: In Search of a Margin Oasis, June 2012.*
4 *European Central Bank – Collateral data report (November 2012),* http://www.ecb.int/mopo/assets/html/index.en.html.
5 *Any type of security that is difficult to buy or sell because it does not trade on a normal market or exchange. These types of securities trade OTC or in a private transaction. Finding a party with which to transact business is often difficult; in some cases, these securities can't be resold due to regulations surrounding the security.*
6 *Any equity or debt instrument that it readily saleable and can be converted into cash, or exchanged with ease.*
7 *European Central Bank – Download lists of eligible marketable assets (January 2013),* www.ecb.int/paym/coll/assets/html/list.en.html.

And this brings us to the main driver behind the potential scarcity of high-grade securities collateral, fragmentation.

Of this Eurosystem pool of EUR 14 trillion, a large part is held by "buy and hold" investors. These buy-side firms are typically pension funds and insurance companies that will buy the securities and hold them until maturity. A recent IMF report estimates that almost 50% of all government securities worldwide are held by such investors. Another considerable portion of this pool is held by non-European investors who do not have access to the Eurosystem for liquidity purposes, hence the relatively small percentage of marketable securities freely available to be pledged as collateral.

But, of course, the potential collateral scarcity problem is a global one and not restricted to the Eurosystem alone. Fragmentation in collateral pools exists in all major markets and this is due to two main factors.

The first is based on regulation and eligibility criteria. Central banks are governed by different laws and regulations, resulting in different strategies and policy decisions. The ECB for example will not accept US Treasury bills as collateral and conversely the Federal Reserve will not accept European government debt. Likewise when looking at clearing houses and their activity, one can observe differences in the way central counterparties (CCPs) operate. Some accept mortgage backed securities as collateral, while others do not.

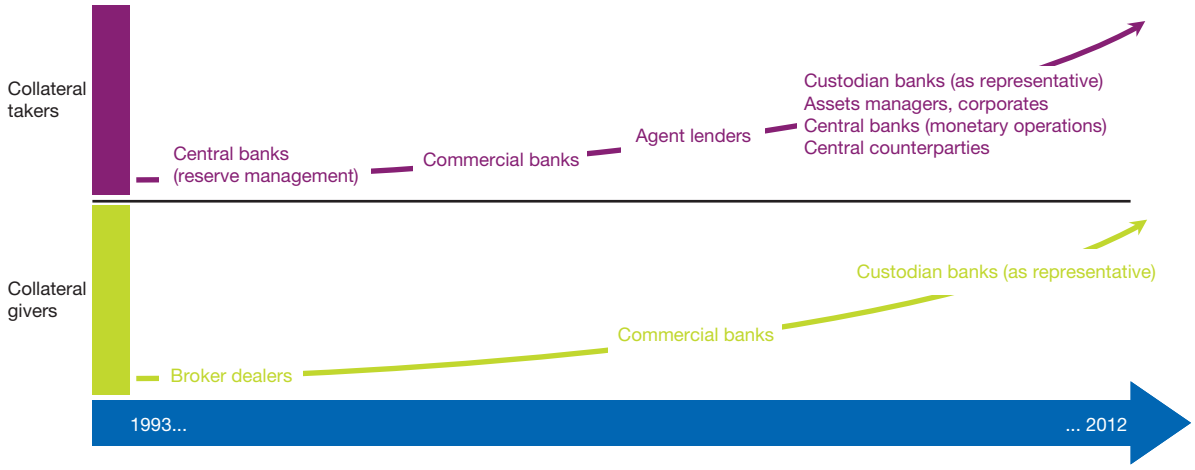
The second factor comes down to technology. At present there is no "all-encompassing" network between financial institutions to interconnect all the collateral givers and all the collateral takers in an efficient way, tailored to meet market needs. Collateral assets are almost always held locally. Mobilising them to meet the increasingly global nature of the markets poses a considerable challenge. At present this process is both time consuming and heavily manual for financial institutions, resulting in high operating costs, making the current process unsustainable in the medium to long term.

1|2 Moving to a secured environment

Looking at the financial institutions that are actively involved in the exchange of collateral, one thing is clear. The last twenty years have seen a dramatic increase in the number of participants on both sides of the collateral equation.

The practice of collateralisation has expanded significantly both in absolute terms, but also in the type of transaction to which it is applied. More importantly the type of financial institutions involved in the exchange of collateral is also evolving rapidly. An increased number of collateral takers and collateral givers have appeared and moved into the world of secured transactions. For the purpose of this article it is interesting to look in more detail at a selection of the protagonists.

Figure 1
Increase in the number of participants



Source: Euroclear.

1|3 Central banks

One of largest consumers of high-grade securities collateral are the central banks. These institutions are inherently risk averse, acting as the stabilising force in a country's economy. When, as in present times, markets are distressed, the central banks are the solution that financial institutions turn to in order to borrow cash. Providing liquidity to keep an economy afloat is one of many weapons that a central bank possesses in its arsenal, but this activity can carry with it considerable risk. This risk of extending credit to the market is mitigated through the use of collateral to back up the exposure.

For central banks, managing the collateral they hold is crucial to their existence. They need a reliable method to ensure that exposures are always fully collateralised, meaning regular mark-to-market valuation of collateral positions, with related margin calls if necessary. They also need a flexible system to ensure that they can change their eligibility criteria as and when the market needs additional liquidity.

1|4 Bilateral interbank trading and the role of central counterparties

The most important event for the purpose of this discussion is the decision by regulators to move the bulk of OTC derivatives transactions to clearing houses acting as a CCP to any two trading parties.

The effects of this proposed regulatory change are far reaching. On the one hand, central clearing should eliminate market friction inherent to the current complex web of bilateral transactions. All market participants would now trade with a CCP, and multiple transactions between two participants would be netted down to a single transaction. The over-collateralisation resulting from previously inefficient management of bilateral exposures is likely to disappear.

On the other hand, the flexibility of bilateral agreements (which is also part of their inherent risk) will also disappear. Temporary deviations – such as temporary under-collateralisation – from the terms of a contract, based on bilateral trust and strength of commercial relationships, will be a thing of the past.

It is too early to tell how these two opposite forces will balance, and whether limited friction will reduce the need for collateral or loss of flexibility will, as it is more plausible, increase it.

The apparently chaotic, somewhat opaque and pragmatic design of the English garden of the OTC derivatives market is going to be replaced by the transparent, disciplined and rigid structure of the French garden of central clearing. In this rules based world, all pre-requisite criteria and deadlines have to be met, without exception. But with the added security and structure comes additional constraints – securing immediate access to all available assets will become more important, and the opportunity cost of the fragmentation of assets may well increase.

1|5 Market requirements

There are a variety of solutions available to the market to mitigate the impact of the potential collateral scarcity problem. Financial firms will need to ensure that any solution they opt for either reduces their demand for high-grade collateral, or alternatively, frees up "hard-to-reach" collateral held across product or geographic silos by "optimising" the existing supply.

In essence, optimising collateral usage hinges on three main criteria:

- ensure all exposures are collateralised to the precise level required; follow the golden rule of "no over-collateralisation";

- ensure that no collateral is ever idle in a firm's securities inventory. All assets should be made to sweat. After all, idle collateral generates no return; and

- ensure that collateral is allocated from the bottom up. In other words, ensure that collateral pledged to cover any exposure is at the lowest end of the range of acceptable collateral as defined by each counterparty. This allows higher grade collateral to be stockpiled for when it is needed most.

Many banks already have their own collateral optimisation tools. However, these tend to work on a very basic level, often covering only local securities inventories. Among the recognised providers of

collateral optimisation services are the central securities depositories. They have an exceptionally comprehensive view of securities movements, including trades that fail to settle.

To achieve maximum collateral optimisation, the collateral management process needs to work across products, markets and depositories. This is the only way that a financial institution with a global presence can efficiently allocate collateral. And the only way this can truly work is if the market infrastructures, including intermediaries, interoperate to the maximum extent possible. Interoperability is needed between the collateral management service providers, and between the collateral takers, but especially between the central securities depositories, as this is where the bulk of collateral resides.

2| Which way to go

Few institutions have the required scale and financial capacity to manage large collateral pools. Only the largest global custodians and the international central securities depositories (ICSDs) offer such services. These few entities are capable of successfully meeting the needs of their clients, counterparties and CCPs through which they clear their trades, while complying with numerous central banks and respective regulatory requirements. And all of these institutions have pedigrees in the collateral management field, boasting years of experience and vast pools of collateral managed daily.

As the collateral landscape continues to evolve, it will make sense for many market participants to outsource the management of their collateral. Many have the capacity to invest in limited purpose platforms, to manage collateral locally, for domestic trading and business activities. But very few can afford to build an all-purpose platform, able to flawlessly perform the basic collateral management functions, but also meet collateral transformation needs by seamlessly mobilising securities irrespective of geographic location.

Market concentration is thus to be expected around a small number of very large financial institutions, managing very large pools of collateral, according to very demanding standards.

An efficient, market-wide collateral management infrastructure would need a number of key attributes in order to meet the needs of global financial institutions:

- real-time centralised tracking of positions across geographic locations and business sectors;
- ability to pool existing collateral sources;
- automatic selection of appropriate and/or unused collateral to cover needs in multiple locations;
- automatic movement/realignment of the collateral once selected;
- daily collateral substitutions to ensure that pledged collateral is the lowest grade acceptable at all times (ensuring high-grade securities are available for use elsewhere);
- regular mark-to-market valuations of securities pledged as collateral; and
- automatic exclusion of securities with *forthcoming* corporate events.

Market concentration may result in reduced collateral fragmentation, but it is unlikely to eliminate it completely. There may well be less pools of collateral, and those that remain will be larger and more diverse in nature, but they will remain segregated, unless a market infrastructure is developed to efficiently inter-connect them.

This is where we believe Euroclear adds value by offering a truly global, open solution.

2|1 Euroclear's proposal – the global "Collateral Highway"

Euroclear has already developed a technological solution to allow all of the group entities to interact with one another and access the collateral management infrastructure that has been a staple part of Euroclear Bank's services for over two decades. This new developments allows the ICSDs to exist as if they were one single legal and operational entity. The internal barriers which in the past led to fragmentation of the securities collateral held across

the various entities of Euroclear group have now been dismantled. Euroclear clients can now freely pledge their assets as collateral, irrespective of geographic location of their securities.

This initial achievement has guaranteed that one of the largest (previously segregated) pools of securities collateral (EUR 23 trillion of assets are held across the different entities) can now operate as one single pool.

Having witnessed the internal gains in efficiency within the group, Euroclear has now begun the implementation of a project aimed at defragmenting the pools of high grade collateral available across markets. Once fully completed, the global "Collateral Highway" will allow all participants, be they lenders or takers of collateral, to access a very large pool of assets, worldwide, from many points of entry, without restriction or delay.

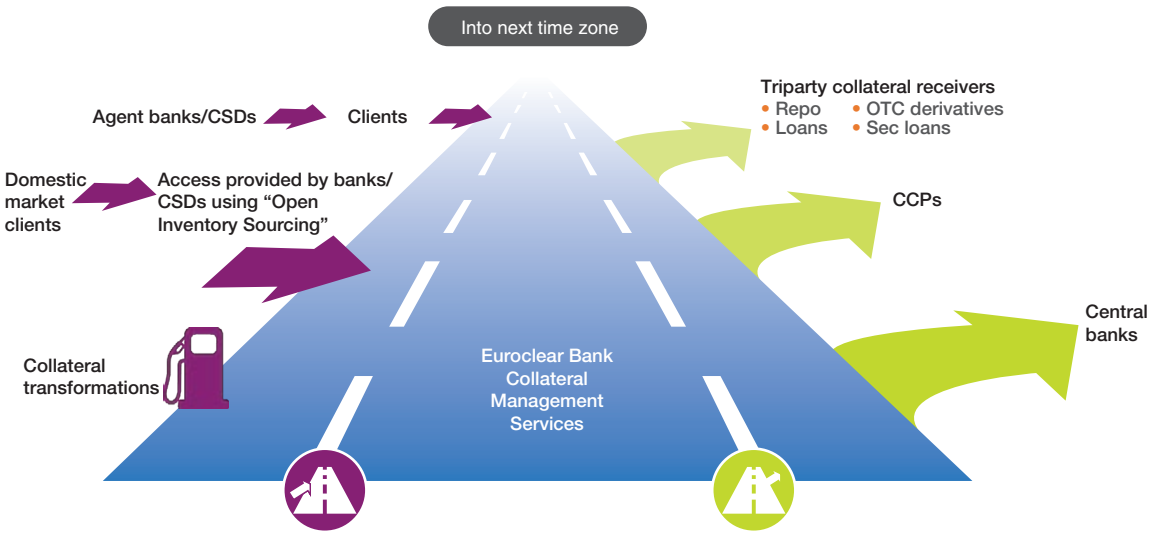
It will create the first fully open global market infrastructure to source and mobilise collateral across borders and time zones.

In order to cover the business needs of financial institutions, any infrastructure must include the key attributes mentioned previously. But in order to garner their trust, it must also include the below:

- legally robust and reliable infrastructure;
- technological prowess, so that most barriers that currently fragment the available collateral be removed and processes be automated;
- real-time movement of collateral that meets the demands of both the collateral taker and the collateral giver, the standards of the market and the requirements of the regulators;
- neutrality. An infrastructure that would use the technology and services of one market player could not attract its competitors. Therein lies one of the main advantages of a genuine marketplace such as Euroclear, which only operates marginally (mostly for intraday and overnight liquidity purposes to smooth the settlement process) as a principal in the collateral lending market;
- operating beyond the boundaries of any single nation or market;
- open-ended. In order to operate as the infrastructure of the present but also the future, the system will need to allow access to new partners and participants alike.

Euroclear group's client base is comprised of many different types of financial and retail institutions. Euroclear Bank alone has 1,300 financial institutions as clients and entity CSDs have many more.

Figure 2
Euroclear's global "Collateral Highway"



Source: Euroclear.

Included in this figure are ninety-three central banks, supra national and sovereign agencies, all of which play a crucial role in the provision of liquidity, and therefore the supply and demand of high-grade securities collateral. It is this diversity that allows a common collateral management infrastructure to operate successfully.

The key component of this infrastructure is an open architecture model to interconnect collateral pools and make it possible to manage asset positions wherever they are held and, additionally, a collateral transformation functionality to allow different grades of collateral to be freely exchanged between its participants.

2|2 The open architecture model

Euroclear has developed an Open Inventory Sourcing technology that keeps track of clients' collateral positions deposited across geographic locations. Euroclear Bank's conventional tri-party collateral management system previously sourced securities for collateral held only in Euroclear Bank. The first building block of the "Collateral Highway" was the integration of the group CSDs onto this system.

Today, this technology enables Euroclear, together with partnering agent banks and CSDs, to search and manage virtually all client asset positions, even if they are not held within the Euroclear group, and to automatically move the right collateral to the right place at the right time. Securities pledged as collateral can be substituted if and when needed during the lifetime of the transaction, and returned to the original place of deposit when they are no longer needed.

Recent agreements with some of the largest global custodians such as BNP Paribas and Citibank allow assets held within these banks networks to be used in tri-party deals at Euroclear Bank. This building block will expand as other banks join.

This open architecture framework is also available to non-Euroclear group CSDs as well as central banks, central counterparties, large corporations and a wide array of banking participants such as global custodians, sub-custodians, investment banks and commercial banks.

Box

A first step – collateral management for CSDs: Euroclear France

In 2011 Euroclear began the roll out of fully fledged triparty collateral management services in the three ESES CSDs (Belgium, France and the Netherlands), with the objective of facilitating the mobilisation of assets held in the domestic Securities Settlement System (SSS).

Launched in cooperation with Banque de France, the new service:

- *collateralises domestic credit operations conducted by the French national central bank;*
- *allows the French banking community to automate the processing of interbank repos and other securities financing transactions using securities held in the ESES CSDs as collateral;*
- *uses existing triparty mechanisms to support LCH.Clearnet SA' s upcoming collateral basket with pledge (CBWP) product.*

Settlement will be possible in a domestic (ESES) and international environment (Euroclear Bank), allowing both domestic and international counterparties to access liquidity on an anonymous basis (Internal Interoperability between ESES CSDs and Euroclear Bank).

Another important building block is the agreement with Banque de France and LCH.Clearnet to create a liquidity hub in euro (similar to the one developed by Clearstream Banking Frankfurt with the Bundesbank) that will be connected to this global network.

Given the regulatory drive to extend central clearing for an expanding range of OTC and exchange-traded instruments, Euroclear has also been partnering with key CCPs to become active on the "Collateral Highway". Market participants are now able to utilise Euroclear's infrastructure in order to mobilise collateral from their securities inventories in order to cover their initial and variation margin calls. Of the twelve largest CCPs globally, six are now lined up as participants on the "Collateral Highway" and Euroclear is working to attract the others, predominantly US-based clearers.

2|3 Collateral transformation by accessing the Euroclear network

Euroclear has identified additional pools of high-quality global securities that can be mobilised for collateralisation purposes, but are currently held in the securities inventories of "buy-and-hold" investors. In some cases, these pools are sitting with central banks that are using Euroclear Bank as their depository for fixed-income securities.

Euroclear also offers users of the "Collateral Highway" a lending and borrowing functionality through which the market can potentially "unlock" this sizeable pool of high-quality securities as collateral. Normally, the programme serves as a settlement fail coverage facility designed to ensure that adequate securities are available to trading counterparties to ensure timely and efficient trade settlement. Euroclear is now expanding this programme to provide "collateral transformation" service, allowing tri-party participants to borrow high-quality government debt securities from Euroclear's pool against corporate bonds or other lower grade collateral that meets with Euroclear's collateral eligibility guidelines for transformations.

3| Answering the collateral conundrum

The problem of managing multiple securities inventories intended for use as collateral poses a considerable challenge. Collateral is abundant but hard and costly to move. The main challenge is therefore to find a way to source collateral easily and use it efficiently.

Today, collateral is fragmented in many silos. It is difficult to track, access and mobilise. There is no real global infrastructure serving as the backbone. Large agent banks present one possible choice with their links to many markets; they are an important part of the solution: they will help reduce fragmentation but, unless they become interconnected in an open and automated marketplace, collateral fragmentation cannot be eliminated.

Regulatory pressures are real and Dodd-Frank Act, EMIR and Basel III will have an impact. The international capital markets have begun to feel the effects, with major financial institutions already investing considerable amounts of manpower and money in preparation for what lies ahead. But will all be ready for the future, which points to a more risk-controlled financial environment, secured mostly by high-grade securities collateral?

There are clear signs that the markets are looking for solutions to mitigate or avoid altogether the potential problems of collateral management and collateral scarcity. Proposals appear at regular intervals, with service providers attempting to take advantage of new windows of opportunity to fill a niche, particularly as some firms are keen to outsource this potentially expensive and time-consuming activity to qualified third party providers.

The current picture fails to identify a panacea because no single entity looks like it will be able to meet the market's collateral management needs alone. With continued turbulent market conditions and the related emphasis on cost containment, there is a subtle yet identifiable move towards collaboration among institutions, witnessed by the evolution of Euroclear's "Collateral Highway". Former competitors are already turning to their rivals to work together via partnerships. Sharing expertise and utilising existing technology and networks provide attractive cost mutualisation opportunities. Efficient sourcing and mobilisation of collateral will be based on a collaborative approach in the future where proven expertise and global reach will be the primary factors for success.

An ICSD such as Euroclear Bank could provide the solution through the global "Collateral Highway" – the common infrastructure the market needs. It has the technological know-how. It operates proven links to multiple markets, and it boasts relationships with a large majority of the global custodian community. As an ICSD, it also provides a level of comfort through its international reach, but also through its neutrality.

Will this be enough to satiate market demands? Only time will tell. But the future looks promising. Many market participants have embraced the idea of a common infrastructure based on collaboration. Interconnecting traditionally segregated pools of collateral via an open network is a vital step in addressing the collateral scarcity conundrum.

Collateral scarcity and asset encumbrance: implications for the European financial system

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In the financial sector, there is increasing demand for high quality collateral assets that combine liquidity with low credit risk. This is fuelled by greater risk aversion since the onset of the global financial crisis in 2008 and by regulatory initiatives such as collateral requirements in derivatives markets and liquidity requirements for banks. In turn, increasing collateral use is boosting the share of encumbered assets on banks' balance sheets. This may have adverse implications for the financial system. Collateral use adds to complexity, opacity and interconnectedness between financial market participants. Asset encumbrance also reduces the scope for bail-in given less residual assets for unsecured creditors. Beyond this, increasing collateral use exacerbates procyclicality stemming from haircuts, margin requirements and collateral eligibility. Taking a European perspective, this article maps out the recent rise in collateral demand and asset encumbrance, investigates the implications and sketches policy options, including greater transparency, prudential limits, better guarantee pricing and tighter risk management practices.

NB: The authors currently serve as chair and member, respectively, of a working group of the Committee on the Global Financial System (CGFS) that has been asked to analyse the implications of increased demand for collateral assets from a system-wide perspective; inputs from individual working group members and stimulating discussions at the group level are gratefully acknowledged. The opinions expressed in this article remain those of the authors and do not necessarily reflect the views of De Nederlandsche Bank or the CGFS.

Since the beginning of the global financial crisis in 2008, counterparty credit risk has risen markedly in the banking sector. Natural responses are to demand higher risk premia or to request more collateral, which have both been observed in bank funding markets. Interest rate spreads in unsecured money markets have soared while unsecured interbank lending has collapsed. By contrast, volumes in the secured market for repurchase arrangements (repos) have increased substantially, reflecting a shift from unsecured to secured funding. Similar developments have been visible in long-term bank funding markets, where issue volumes of long-term unsecured bonds also fell significantly after the crisis, while total covered bond issues have been on the rise.

In addition to increased risk aversion, the use of collateral in financial transactions and the demand for high quality liquid assets (HQLA) have also been spurred by regulatory initiatives. Examples are the introduction of collateral requirements for centralised and non-centralised derivatives and the introduction of liquidity requirements under Basel III. Although risk aversion will abate as stress in financial markets declines, the increase of collateralisation and demand for HQLA due to new regulations are of a structural nature.

Increased collateral use in financial transactions has important implications for the structure of the financial system. A greater scarcity of assets that can be used as collateral is likely to boost securities lending, collateral transformation and the shadow-banking sector, and heighten interconnectedness within the financial system. Moreover, it will bring about a rise in the share of encumbered assets on banks' balance sheets. This adds to complexity and opacity in the financial system and reduces the scope for bail-in. Furthermore, increasing asset encumbrance exacerbates procyclicality due to haircuts, margin requirements and collateral eligibility.

The main message of this article is that policymakers should mitigate the negative implications of increased collateral use, while sustaining the regulatory initiatives geared at greater financial resilience. This can be done by increasing transparency requirements, setting maximum limits and pricing deposit guarantee schemes to reflect encumbrance of bank assets. These measures should be combined with a closer monitoring of market responses to asset encumbrance and collateral scarcity, and an upgrade of risk management practises to incorporate collateral provision and transformation.

The remainder of this article is structured as follows. Section 1 sketches the increased use of collateral in financial transactions. Section 2 discusses the likelihood of collateral scarcity given higher risk aversion and ongoing regulatory reforms. Section 3 then describes the risks stemming from increased collateral use in financial transactions. Section 4 draws policy conclusions.

1| Increased use of collateral in financial transactions

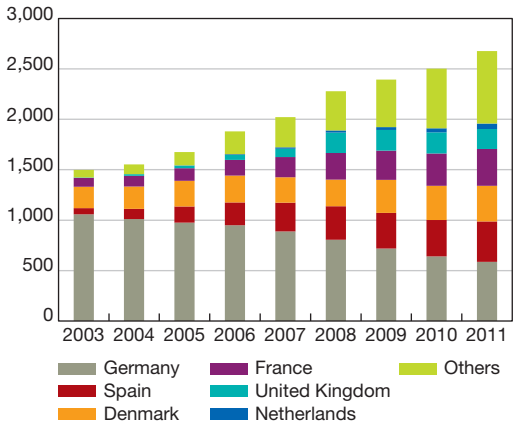
The use of collateral in financial transactions is on the rise. Driving factors behind this trend can be found both in funding and over-the-counter (OTC) derivatives markets.

1|1 Secured funding

There is a rising trend of reliance of banks on collateralised market funding in Europe. The obvious cause for this is the financial and sovereign debt crisis in the euro area. Risk aversion has increased sharply due to concerns about the solvency of

Chart 1
Covered bonds, outstanding in Europe

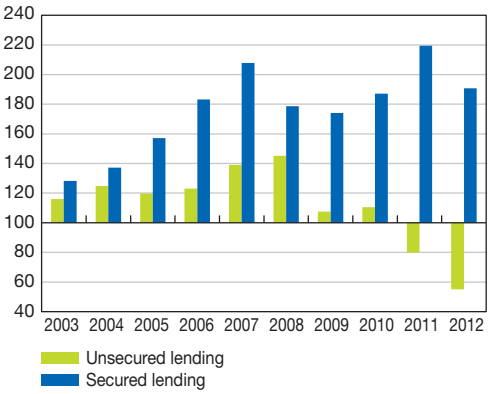
(EUR billions)



Source: European Covered Bond Council, DNB.

Chart 2
Average daily turnover in secured and unsecured cash lending

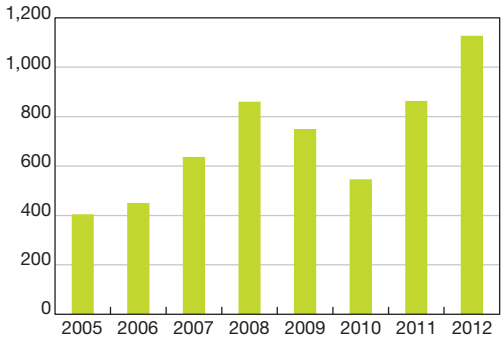
(Index: 2002 = 100)



Note: The panel comprised 105 credit institutions.
Source: ECB.

Chart 3
Central bank lending to euro area banks

(EUR billions)



Note: Excluding Emergency Liquidity Assitance (ELA).
Source: ECB.

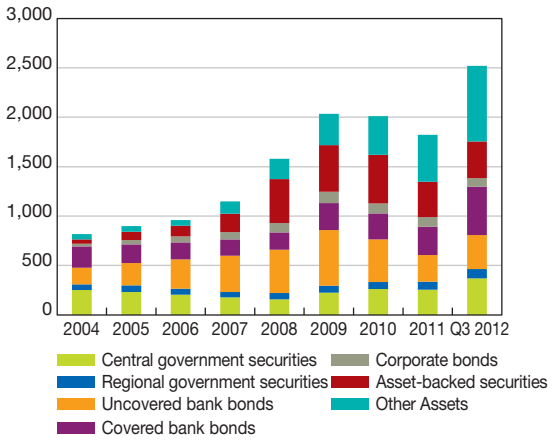
European banks and the fiscal position of euro area countries. This has caused investors to demand more collateral or higher risk premia on unsecured debt. As a result, long-term debt markets have shifted towards secured funding. Since 2007, the amount of outstanding covered bond debt has increased significantly in all euro area countries except Germany, where legislative changes have made the issuance of covered bonds less attractive (Chart 1). Simultaneously, the issuance of unsecured debt declined by approximately 20% between 2007 and 2012. In the short-term funding markets, there is also a clear shift from unsecured towards secured interbank funding. While unsecured interbank lending fell by half in the past decade, secured lending doubled (Chart 2). The rising trend in secured interbank funding, of which repos are the main instruments, is expected to continue. Various factors, such as the preferential treatment of repos under Basel III and the persistent strains in the unsecured interbank market, are likely to contribute to a further increase in repo funding.

Another factor driving increased secured funding in the euro area is the liquidity operations of the European Central Bank (ECB). In response to market tensions, the ECB has expanded these operations and official collateralised funding has soared since 2007 (Chart 3 and Chart 4). In its continued efforts to support the liquidity of euro area banks, the ECB lent over EUR 1 trillion (EUR 489 billion in December 2011 and EUR 530 billion in February 2012) under two longer-term refinancing operations (LTROs). The net amount of additional loans is about half this sum, as this financing partly replaces other ECB liquidity operations. Nonetheless, on balance, this intervention has substantially increased the share of collateralised funding in the euro area.

While reliance on secured funding has risen sharply in Europe, these funding levels vary substantially across banks and between countries. A first reason

Chart 4
Bank assets pledged to tap ECB funding

(EUR billions)



Note: Value of assets after haircuts and valuation of the ECB.
Sources: ECB, DNB.

is differences in bank business models. In particular, banks that specialise in mortgage lending often have a relatively high level of secured funding. This explains the large share of Danish covered bonds in the total issues within Europe. A second factor is differences in national market practices and legislation. Germany, for instance, has a long history of covered bond legislation that promoted the use of these instruments. German banks have therefore traditionally relied relatively heavily on secured funding, although this reliance has declined over the past decade. By contrast, other countries like the Netherlands (since 2008) and Norway (since 2012) have set ceilings on encumbrance levels, through bank specific limits on the issuance of covered bonds, thereby curbing the share of secured funding in banks' financing schemes.

1|2 Derivatives

Another market prompting increased collateral use is the derivatives market. Again the driving factors are both risk aversion and regulatory reforms. First, in the OTC derivatives market, collateral use surged after the crisis, reflecting both higher risks and tighter counterparty risk management. In fact, International Swaps and Derivatives Association (ISDA) estimates that the notional amount of collateral posted in OTC derivatives transactions almost doubled in 2008. Although collateral use fell in the subsequent two years, in line with the decline in gross credit exposures, it picked up again in 2011. Second, OTC derivatives market reforms, in response to problems in these markets during the crisis, are widely expected to reinforce this trend of increased demand for high quality collateral assets. While the reform process is still ongoing, key initiatives are the mandatory central clearing of standardised derivatives and the introduction of margin requirements for non-standardised OTC derivatives. The former includes a requirement for central clearing parties to segregate member and client collateral. This will result in reduced netting, and hence in a higher demand for collateral assets. For the latter, new standards that discourage the re-hypothecation of collateral are expected later this year.

Higher margin requirements in both centrally and bilaterally cleared derivatives are boosting collateral demand. Initial margins are required to be posted by both parties to a centrally cleared derivative trade and a two-way margin is proposed for bilateral OTC derivatives. These initial margin requirements will directly increase collateral demand. Moreover, restrictions on the re-use or re-hypothecation of collateral assets, while promoting financial stability through reduced interconnectedness, will result in a net increase in collateral demand. Although variation margin (daily payments reflecting changes in the market price of a derivative) will not directly increase collateral demand, it may do so indirectly. This is because market participants are likely to respond by holding additional buffers of eligible collateral to be used in times of heightened market volatility.

Several studies have attempted to quantify the impact of the derivative market reforms on collateral demand, but outcomes vary widely on account of differences in methodologies and assumptions. The estimated total increase in collateral demand varies between several hundred billion and over one-and-one-half trillion euro (e.g., Basel Committee on Banking Supervison (BCBS) – International Organization of Securities Commission (IOSCO), 2012; Bank of England, 2012; International Monetary Fund (IMF), 2012). A study by the Nederlandsche Bank (Levels and Capel, 2012) focuses on the euro area and finds that an additional EUR 375 billion collateral is needed. This figure includes a correction for current "under-collateralisation" and reduced possibilities for re-hypothecation under the new regulation.

2| Collateral scarcity

Greater collateral use in financial transactions together with the introduction of liquidity requirements may create a scarcity of high quality liquid assets. The key question is whether an increasing supply of such assets will keep pace with the increasing demand.

2|1 Demand for high quality liquid assets

Rising collateral use in financial markets has boosted demand for assets that are highly liquid and have low credit risk. Besides greater collateral use in financial transactions, increased demand stems from the introduction of new liquidity regulation. The BCBS has introduced two new global standards under Basel III: the net stable funding ratio (NSFR)

and the liquidity coverage ratio (LCR). The NSFR aims to secure the longer-term stability of funding, whereas the LCR focuses on short-term resilience to liquidity stress. From the viewpoint of collateral scarcity the LCR is more relevant, as it requires banks to hold sufficient HQLA to withstand a severe stress scenario lasting one month.

The additional demand for HQLA related to the introduction of the LCR is difficult to ascertain, because banks will adjust their behaviour to limit their increased need for such assets. For example, banks are likely to comply with the LCR in part by replacing short-term with long-term funding sources. Focusing on the euro area only, the initial increase in demand for HQLA is expected to be around EUR 900 billion (Levels and Capel, 2012). This estimate likely needs to be significantly revised downwards, however, given the recent revisions to the LCR (BCBS, 2013).

In Europe, demand for 'safe' assets will also increase from insurance companies as a result of Solvency II, because debt instruments with high ratings will enjoy a preferential regulatory treatment (CGFS, 2011). This comes in addition to the already higher demand for "safe" assets from institutional investors that has been witnessed in recent years. Data are available for France, where the portfolio of safe assets in the insurance sector almost doubled from EUR 0.6 trillion in 2007 to EUR 1.1 trillion in 2011. Finally, rising official reserves also raise such demand, as countries invest their foreign exchange holdings in HQLA.

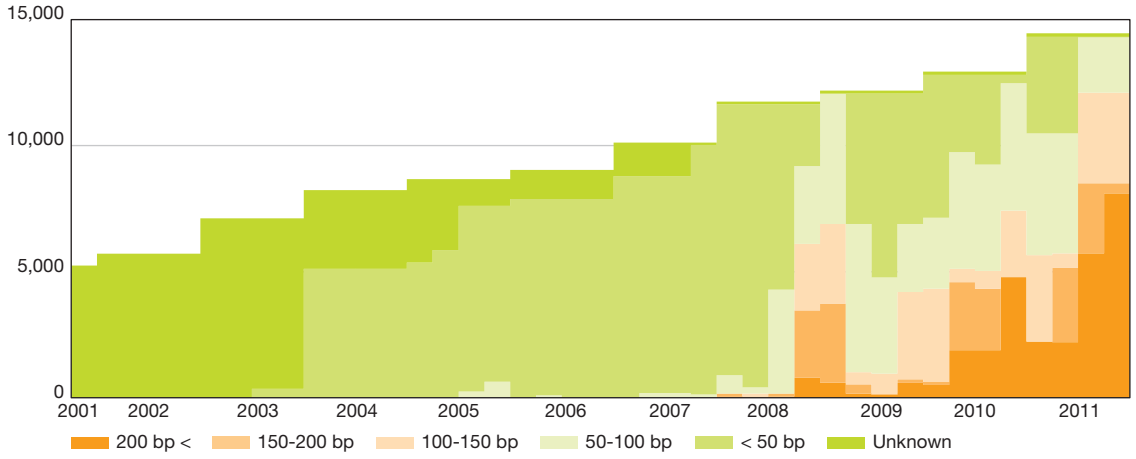
2|2 Supply of high quality liquid assets

In the euro area, sovereign issuers are the dominant suppliers of HQLA. In recent years, government debt has grown substantially due to automatic stabilisation, discretionary stimulus packages and public support to financial institutions. Since the beginning of the financial crisis, the overall supply of debt issued by sovereigns has thus surged; this supply is expected to increase further on account of continued high budget deficits and still rising debt levels. However, not all government debt is considered as HQLA anymore. The increases in public debt levels are threatening the risk-free status of sovereign debt, resulting in lower ratings and higher spreads on credit default swaps (CDSs). Chart 5 shows that the supply of government debt has indeed grown substantially, but that the quality of outstanding government debt has actually deteriorated. In fact, the total amount of outstanding government debt with the highest quality has even declined at the euro area level.

The supply of HQLA can also increase on account of more so-called quasi-high quality liquid assets such

Chart 5
Safe assets
Government debt of EU countries, classified according the CDS spread

(USD billions)



Note: Period: Q4 2001 – Q4 2011.
Sources: IMF WEO, Datastream, DNB.

as covered bonds and corporate bonds. While the issuance of these instruments is also rising (Chart 1), the size of this market is small in comparison with that for sovereign debt and accounts for only one fourth of the total supply of assets that qualify as HQLA. Hence, an increase in the volumes of covered bonds and corporate bonds will only have a limited impact on the total supply.

2|3 Scarcity of high quality liquid assets

These developments in demand and supply raise the question whether assets that can be used as collateral and to meet liquidity requirements are likely to become scarce. This is a difficult question to answer because, besides behavioural changes, estimates for the increase in demand and supply are hampered by data limitations and assumptions. However, Levels and Capel (2012) can be taken as an approximation of the current and expected demand and supply of HQLA in the euro area.

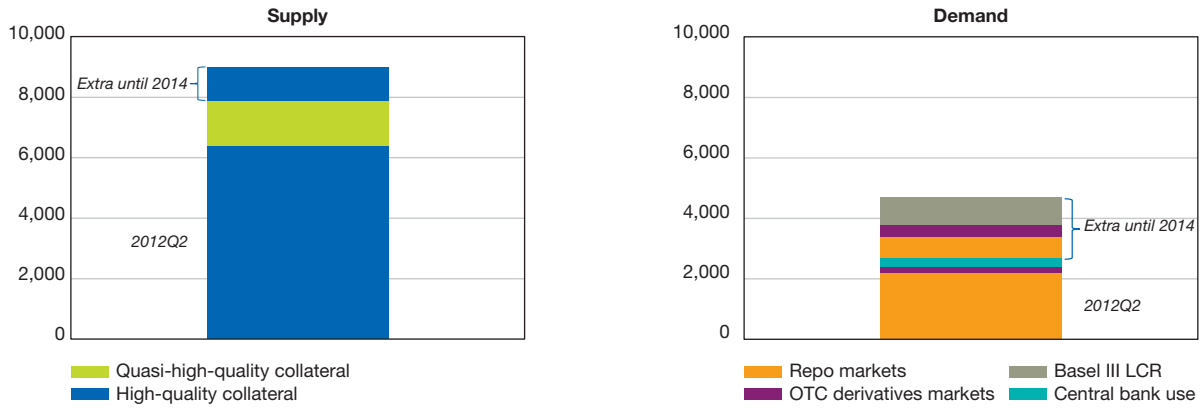
Demand for HQLA is estimated to grow by EUR 2,000 billion in the coming two years and supply by EUR 1,500 billion, resulting in greater scarcity of HQLA. These estimates are in line with a recent study by European Securities and Market Authority – ESMA (2013). Nonetheless, total supply of these assets will continue to outsize demand and hence no absolute shortage of collateral assets is to be expected in the near future (Chart 6). However, this situation varies markedly across jurisdictions. In the euro area, for instance, there is a clear distinction between banks in so-called "core" countries such as Germany and the Netherlands, and banks headquartered in "peripheral" countries like Greece and Portugal. Many banks in these latter countries face shortages in HQLA that can be used as collateral. Outside Europe, Australia is an example of a jurisdiction with a shortage of HQLA: the government budget is in surplus and the outstanding debt level is low. To ensure banks' access to liquidity in times of acute stress, the Reserve Bank of Australia will introduce a new committed facility in 2015 enabling banks to enter into repurchase agreements of eligible securities outside the central bank's normal market operations and herewith to meet the LCR requirements. Eligibility criteria explicitly allow assets issued by bankruptcy remote vehicles, such as self-securitised residential mortgage-backed securities (RMBS), to avoid promoting excessive cross-holdings of bank-issued instruments.

2|4 Adverse implications of collateral scarcity

Scarcity of high quality liquid assets that can be used as collateral will be reflected in a higher price for such assets. In turn, price changes will prompt endogenous private sector responses that may have adverse implications for the stability of the financial system. Specifically, more collateral transformation may be expected to lead to greater complexity,

Charts 6
High-quality collateral: supply and demand

(EUR billions)



Source: Levels and Capel (2012).

opacity and interconnectedness, and will attach greater importance to the role of central banks in stabilising the financial cycle.

More complexity and opacity in collateral structures

A higher price for collateralised transactions also incentivises banks to create collateral that can be used for such transactions. While banks have already done so by pooling assets and over-collateralising them, the creation of additional collateral assets generally involves more heterogeneous claims with more complexity and opacity. In periods of stress the actual quality and liquidity of these assets will be more difficult to establish and may turn out to be lower than expected. This occurred during the credit crisis, when the confidence of market participants in the underlying assets of some securitisations collapsed and virtually the whole securitisation market became highly illiquid.

Greater interconnectedness through collateral lending

Another likely reaction to price rises is that banks will expand their collateral lending activities. Banks with a surplus of HQLA will have an incentive to lend these out to those with a shortage. At the same time, banks with shortages will also attempt to borrow HQLA from other institutions such as insurance companies and central clearing parties. This development will increase interconnectedness within the financial system. Moreover, maturity and funding risks will increase since collateral lending transactions generally have a shorter maturity than the transactions they are used for. Finally, as these transactions are not publicly reported, transparency will decline.

Accumulation of lower quality collateral assets in central banks

As the price of HQLA rises, banks will try to use these assets more efficiently. By contrast, institutions that accept a range of collateral with fixed criteria for quality, value and liquidity, are likely to be offered the cheapest eligible assets. This is because the best quality assets will be used in market transactions to reduce costs related to risk premia. In practice, this means that especially central banks, via their market operations, will be confronted with a decreased quality of collateral in times of market stress. In effect, central banks may have a more important role in dampening the financial cycle by broadening collateral acceptance when market participants narrow their collateral acceptance.

3| Asset encumbrance

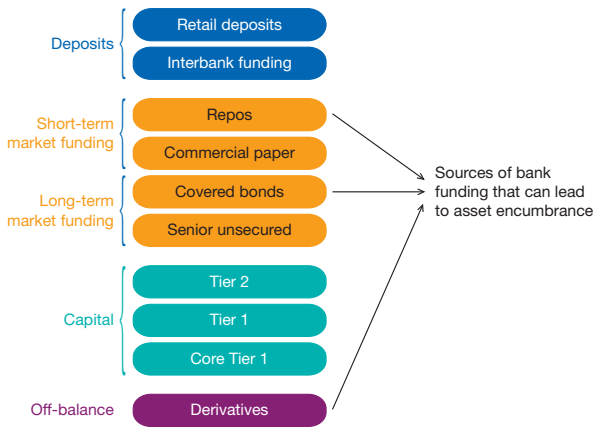
Increasing collateral use in financial transactions leads to greater encumbrance of banks' balance sheets. Rising asset encumbrance has a number of adverse implications for the stability of the financial system.

3|1 Sources of asset encumbrance

Banks use various instruments to fund their business activities (Chart 7). These differ in terms of attributes such as maturity, seniority and collateralisation. This latter feature is present in short and long term secured funding instruments and in derivative exposures. Essentially, collateralisation means that a bank pledges assets to creditors in order to limit their loss given default (LGD); the assets pledged for this purpose are then encumbered.

Long-term secured funding is typically in the form of collateralised mortgage debt. Two types of instruments are common. The first type consist of covered bonds, which remain on the issuing bank balance sheet and add to asset encumbrance. The second type are RMBS, which are generally off-balance sheet

Chart 7
Sources of asset encumbrance



instruments. RMBS affect encumbrance only to the extent that issuing banks provide implicit or explicit guarantees, or retain the RMBS on their own balance sheet. For short term secured funding, repurchase arrangements (repos) are the most common instruments. These instruments play an important role in secured funding markets, including central bank liquidity provision. Repo positions are often offset through reverse repos, reducing the net contribution to asset encumbrance levels.

Derivatives are another class of instruments that lead to asset encumbrance. Besides the initial collateral posted as margin, one counterparty typically accumulates claims against the other, as the value of the derivative contract changes over time. To limit counterparty credit risk, the debtor then posts additional collateral that increases the level of asset encumbrance.

3|2 Adverse implications of asset encumbrance

High levels of asset encumbrance adversely impact the residual claims of unsecured creditors, raising their LGD. There are three reasons for this. First, banks typically over-collateralise, thus pledging assets in excess of the nominal value of the bonds issued. This increases asset encumbrance relative to obtained funds, thereby lowering the amount of assets to satisfy residual claims in the event of default. Second, banks generally use better-quality assets to back secured instruments, thus eroding the average quality of the assets backing claims of other creditors. Third, the cover pool of secured instruments is usually dynamic, obliging a bank to replenish weak assets with good quality assets over the life of the bond. By implication, the assets available to meet claims of other creditors can decline quickly, particularly under stressed market conditions.

The increased risks for junior creditors will spur changes in market behaviour that may adversely impact the stability of the financial system. There are at least five ways in which this may occur.

More procyclicality

During economic downturns, the effects of the economic cycle on bank leverage and credit supply is amplified when the share of collateralised financial transactions is higher. In particular, falling collateral values and higher non-performing assets in covered bond pools have to be compensated or replaced to maintain the desired credit ratings of the secured debt outstanding. Similarly, falling asset values and higher haircuts will imply that more assets need to be pledged to raise a given level of repo funding or to meet (initial) margin requirements on derivatives exposures. While the increased demand for collateral assets in such periods could turn out to be difficult to meet without reducing balance sheet leverage (e.g., via asset sales), funding constraints will typically also limit new banking activities. Institutional investors would likely add to these pressures by pulling back from securities lending and similar activities in times of financial stress. Other potentially destabilising dynamics can arise from cliff effects, for example when a particular asset class is no longer eligible for margin posting due to a rating downgrade or a tightening of credit standards (see CGFS, 2010).

Less scope for bail-in

Bail-in legislation gives public authorities the power to convert into equity or write down subordinated and senior unsecured debt. The main objectives of bail-in are to allow for recapitalisation in resolution and to ensure the continuity of a bank's critical economic functions, while minimising the need for governmental support and, by implication, taxpayers' money. Bail-in tools thus also reduce moral hazard by allocating losses to debt holders in the case of bank failure. As such, bail-in has been identified as a key element of effective resolution regimes and is being vigorously pursued by the international financial community (FSB, 2011). However, high levels of asset encumbrance and, conversely, low levels of unsecured funding reduce the scope of application of bail-in and hence limit its effectiveness.

Less access to unsecured funding

The issuance of substantive amount of collateralised debt will reduce access to unsecured funding and may even precipitate a death spiral. As the investment risk for unsecured debt holders rises with the level of asset encumbrance, new unsecured creditors will become increasingly wary and may demand higher interest rate payments. This is especially likely to occur once bail-in policies take effect. A rise in the cost of unsecured debt will pressure banks to increase reliance on secured funding, thereby further raising

asset encumbrance. Beyond a certain threshold level of asset encumbrance, and in absence of other risk mitigants, banks will find it increasingly difficult to retain access to unsecured funding markets.

Risk shifting to deposit guarantee schemes

In jurisdictions where retail depositors and senior unsecured debt holders enjoy the same seniority (i.e. rank *pari passu*), they face equal risks from asset encumbrance via greater losses in case of default. However, while the holders of senior unsecured debt will in principle demand compensation for any extra risk, the pricing of deposit insurance schemes is usually insensitive to the effects of changing loss given default ratios and balance sheet opacity. This means that banks with a large retail deposit base may find it attractive, from a cost perspective, to issue secured rather than unsecured debt, thereby shifting risks to depositors and the deposit guarantee scheme.

Less monitoring of banks

Traditionally, unsecured creditors play an important role in monitoring banks, as their incentive to acquire information is greater than that of insured depositors and secured creditors. However, if rising asset encumbrance reduces the role and number of unsecured creditors, this may lead to less bank monitoring and, in turn, more bank risk-taking. However, the incentive to monitor a bank will increase for those counterparties bearing the higher risks. Consequently, shareholders as well as other creditors will have correspondingly greater incentives to monitor bank risk going forward. This will limit any effect on bank monitoring and risk-taking.

4| Policy implications

Increasing collateral use may raise complexity, opacity and interconnectedness in collateral structures, and asset encumbrance may increase procyclicality and risk shifting to deposit guarantee schemes, while reducing the monitoring of banks and the scope for bail-in. Targeted policies can mitigate these drawbacks.

A first policy recommendation is to improve transparency on asset encumbrance. If banks periodically publish the extent to which their assets are encumbered, and are available for encumbrance, other creditors will be better able to assess the actual risks they face. This will improve the pricing of funding. Higher asset encumbrance will gradually lead to higher bank funding costs and banks will face a time consistent incentive not to issue excessive secured funding.

The extent of asset encumbrance should be included in the pricing of deposit guarantee schemes. After all, any increase in asset encumbrance will raise residual risks for such schemes, as well as for the government as the ultimate safety net. Since depositors will not factor in this increased risk – because their deposits are guaranteed – a higher premium will serve to discipline the bank. In other words, including encumbrance levels in guarantee premiums internalises the related risks for the guarantee scheme.

Next to policy measures to internalise the risks of asset encumbrance, hard prudential limits can serve as a back-stop. Various countries such as Australia, Canada and Singapore apply strict ceilings for the amount of covered funding or covered bonds. In the Netherlands, Norway and the United Kingdom a case-by-case approach is used that sets threshold values for covered bond issues per institution. Besides this, banks should perform regular stress tests that evaluate encumbrance levels in periods of market stress and the outcomes of such tests should be disclosed. Prudential supervisors should ensure that other financial institutions involved in collateral transformation and lending have adequate risk and collateral management arrangements in place. The risk management practices of these institutions should be designed to survive prolonged periods of heightened market strain without spill-over effects to counterparties and the wider financial system.

Finally, given increasing encumbrance levels, closer monitoring of collateral scarcity and asset encumbrance is well-advised. Macroprudential authorities should monitor the demand and supply of collateral and related collateral lending, which increases interconnectedness within the financial system. This monitoring involves not only banks, but also institutional investors that engage in collateral lending, such as life insurance companies and pension funds. In this context, starting this year, the largest global banks are comprehensively reporting their activities and inter-linkages, including to non-bank counterparties. This detailed information should greatly improve our understanding of institution-to-institution exposures and of the resilience of the financial network.

References

Basel Committee on Banking Supervision (2013)
"Basel III: the liquidity coverage ratio and liquidity risk monitoring tools", Report, January, *http://www.bis.org/publ/bcbs238.pdf*.

Basel Committee on Banking Supervision (BCBS) (2013)
"Margin requirements for non-centrally cleared derivatives", second consultative document, February, *http://www.bis.org/publ/bcbs242.pdf*.

Committee on the Global Financial System (CGFS) (2010)
"The role of margin requirements and haircuts in procyclicality", CGFS Papers, No. 36, March, *http://www.bis.org/publ/cgfs36.pdf*.

Committee on the Global Financial System (2011)
"Fixed income strategies of insurance companies and pension funds", CGFS Papers, No. 44, July, *http://www.bis.org/publ/cgfs44.pdf*.

European Central Bank (ECB) (2012)
"Changes in bank financing patterns", *http://www.ecb.int/pub/pdf/other/changesinbankfinancingpatterns201204en.pdf*.

European Securities and Markets Authority (ESMA) (2013)
"ESMA Report on trends, risks, vulnerabilities", *http://www.esma.europa.eu/system/files/2013-212.pdf*.

Financial Stability Board (FSB) (2011)
"Key attributes of effective resolution regimes for financial institutions", *http://www.financialstabilityboard.org/publications/r_111104cc.pdf*.

International Monetary Fund (IMF) (2012)
"Global financial stability report: safe assets: financial system cornerstone?", *http://www.imf.org/external/pubs/ft/gfsr/2012/01/pdf/c3.pdf*.

Levels (A.) and Capel (J.) (2012)
"Is collateral becoming scarce? Evidence for the euro area", *Journal of Financial Market Infrastructures*, Vol. 1, No. 1, pp. 29-53.

Sidanius (C.) and Zikes (F.) (2012)
"OTC derivatives reform and collateral demand impact", *Financial Stability Paper*, No. 18, Bank of England, *http://www.bankofengland.co.uk/publications/Documents/fsr/fs_paper18.pdf*.

OTC derivatives market – regulatory developments and collateral dynamics

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In the coming years, unconventional monetary policy by central banks, regulatory demand for collateral, custodian efforts to build a collateral highway, collateral re-use rate, etc. will all impact the global demand/supply for collateral. The changing collateral space will look very different than the past. This article looks at the recent regulatory requirements for the over-the-counter derivatives market (central counterparties and non-cleared trades) and new risks that will shape this market.

NB: The views expressed herein are those of the author and should not be attributed to the IMF, its Executive Board, or its management.

In the coming years, unconventional monetary policy by central banks, regulatory demand for collateral, custodian efforts to build a collateral highway, collateral re-use rate etc., will all impact the global demand/supply for collateral. The changing collateral space will look very different than the past. This article looks at the recent regulatory requirements for the over-the-counter (OTC) derivatives market (central counterparties (CCPs) and non-cleared trades) and new risks that will shape this market.

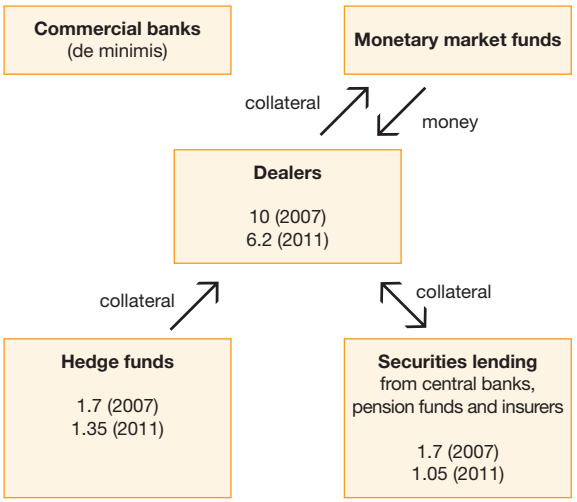
1| Objective

This article looks at the changing collateral space with a primary focus on the OTC derivatives market. As part of the extensive regulatory reform proposals, the new rules will warrant significant increase in the use of collateral across the financial system. Estimates by markets and research/policy institutions suggest that Dodd-Frank Act, Basel III and European Market Infrastructure Regulation (EMIR) may warrant between USD 2-4 trillion in additional unencumbered collateral that will span margins for OTC derivatives at both CCPs, liquidity ratio(s) under Basel III, and related needs stemming from parallel developments under EMIR and Solvency II. At the same time, due to the recent crisis and quantitative easing (QE) and other central bank objectives in the United States and Europe, significant amounts of collateral have been drained out of the financial system and silo-ed at central banks. Furthermore, due to counterparty risk in dealing with large banks and risk aversion of clients, collateral re-use (or velocity) has also been decreasing lately.[1] In fact the bilateral pledged market that offers a genuine market clearing price for collateral has shrunk from about USD 10 trillion to about USD 6 trillion in recent years (see Figure 1 below). More importantly, many of the proposed regulations (e.g., moving OTC derivatives to CCPs) have not yet been in force and some key start-dates are being postponed on several fronts.

So far, the bilateral pledged collateral market included collateral from hedge funds (primarily from repo and rehypotheaction) and from securities lending (via custodians for pension fund, insurers, official sector accounts etc.). Money market funds were the main source for funding (in exchange for collateral). The active banks/dealers intermediate the pledged collateral between these clients (Figure 1, Singh, 2012).

Figure 1
Old collateral space has velocity (2.5 to 3.0)

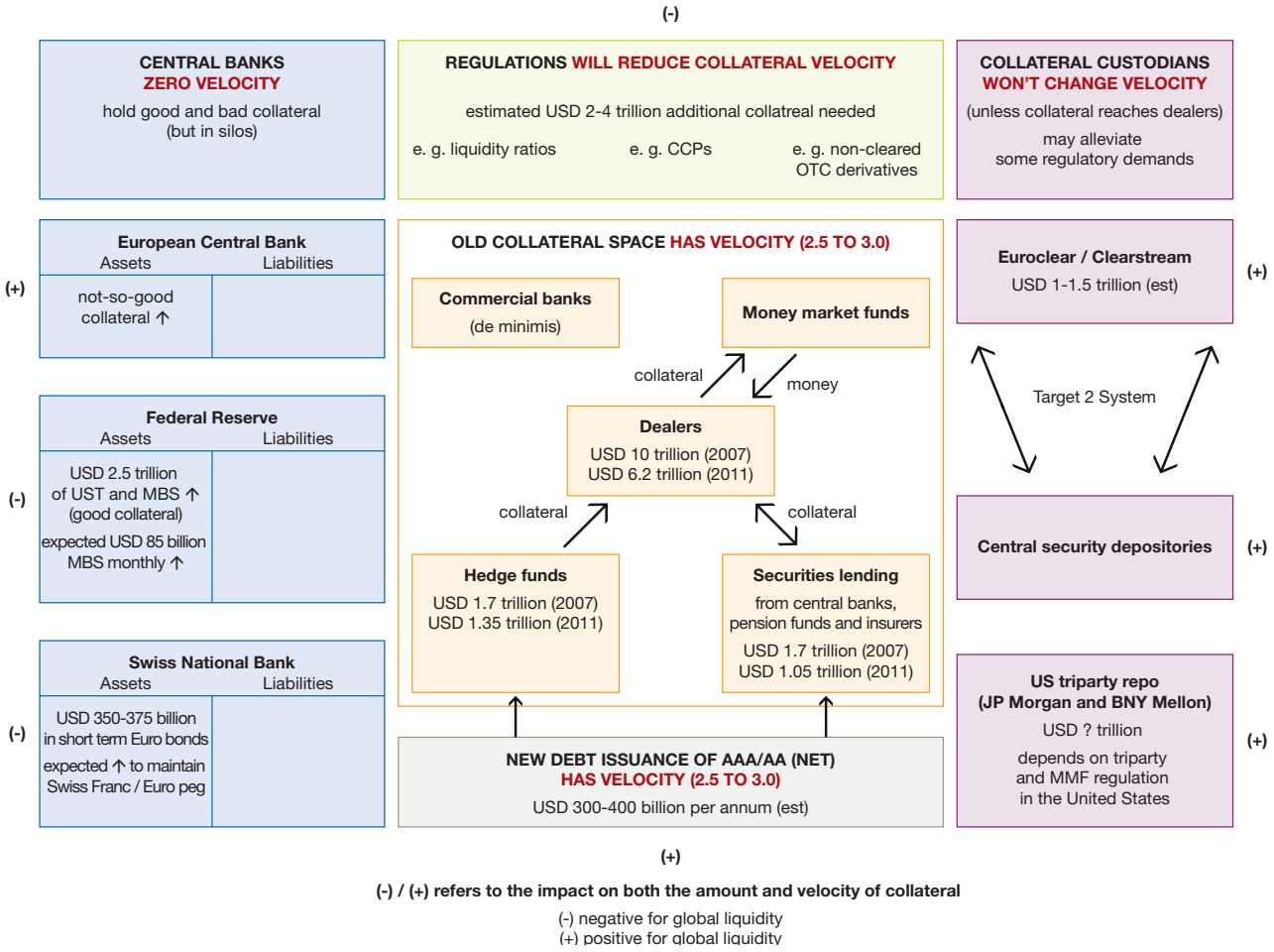
(USD trillions)



Looking forward, the regulatory landscape for clearing will now include *new sources* of collateral (e.g., from pension funds, insurers, large corporates, and smaller firms who will take indirect access to CCPs via large banks and custodians). The "new" collateral space straddles not only the bank/nonbank nexus (where collateral generates a velocity), but other participants who are now significantly impacting collateral availability. The increasing role of central banks, regulations and collateral custodians is significantly changing the collateral landscape. These new dimensions involve (i) some aspects of unconventional monetary policies pursued by advanced economy central banks that remove good collateral from markets to their balance sheet where it is silo-ed; (ii) regulatory demands stemming from Basel III, Dodd-Frank Act, EMIR etc. that will entail building collateral buffers at banks, CCPs, etc.;

1 *Velocity of collateral,or its intensity/re-use rate, is important to understand. It is computed by adding the pledged collateral that banks receive with re-use rights (i.e. with title transfer) and then divided by the sources of such collateral. So for example, in 2007, total pledged collateral received that could be re-pledged was USD 10 trillion; the sources from where this collateral came was about USD 3.3 trillion, primarily from hedge funds and other nonbanks (via their custodians). Dividing the two numbers give an approximate re-use or velocity of 3.*

Figure 2
The changing collateral space



(iii) collateral custodians who are striving to connect with the central security depositories (CSDs) to release collateral from silos; and (iv) net debt issuance from AAA/AA rated issuers. (Figure 2, Singh, 2013).

The *re-use* of collateral (and associated markets) is fundamental in understanding the divide between demand and supply, and this aspect is generally missing in most academic/regulatory research agenda (Singh, 2011b).[2] In other words,

$$\text{Demand}_{\text{collateral}} = \text{Supply}_{\text{collateral}} * \text{re-use factor}$$

2| Regulatory developments for the OTC derivatives and collateral needs

Reforms planned in the OTC derivatives market will try to overcome the under-collateralisation and are two-pronged: *first* is the move to CCPs (i.e. central clearing) that will require collateral to mark position to market and *second* capital charges to systemically important financial institutions (SIFIs) – for OTC derivatives that do not move to CCPs – via higher

2 *For example, Australia's proposals manage to cope with the upcoming structural change that will demand significant collateral without issuing more debt securities. Their suggested route is akin to collateral transformation but at a penalty rate, but this would keep the collateral re-use rate from declining.* http://www.rba.gov.au/publications/bulletin/2012/sep/pdf/bu-0912-6.pdf.

risk-weighted assets. However, there is much misunderstanding between the bilateral and the cleared world (which does impact collateral calculations).

While a much cited figure, the notional value of contracts of about USD 600 trillion, overstates the importance of this market. More relevant are the "in-the-money" (or, gross positive value) and "out-of-the money" (or, gross negative value) derivative positions, which are further reduced by "netting" of related positions. From a collateral demand/supply framework, under-collateralisation is the more relevant metric for policy discussions. While typically collateral – both initial and variation margin – is posted by hedge funds, asset managers, and other clients, large banks active in this space do not have a two-way margin agreement with some clients (e.g., sovereigns, quasi-sovereigns, large pension and insurers, AAA corporations, etc.); so collateral may not be *forthcoming* when due and, as a quid pro quo, the banks may not be posting collateral either to such clients. Interestingly, regulatory proposals may also exempt foreign-exchange swaps from central clearing.

A key incentive for moving OTC derivatives to CCPs is higher multilateral netting, i.e. offsetting exposures across all OTC products on SIFIs' books – intuitively, the margin required to cover the exposure of the portfolio would be smaller in a CCP world. However, if there are multiple CCPs that are not linked, the benefits of netting are significantly reduced, because across-product netting will not take place (since almost all CCPs presently offer multilateral netting only in the *same* asset class and not *across* products).

At present, there is under-collateralisation within the OTC derivatives space that stems from several privileged investors within the financial system – pension, insurers, sovereigns/sovereign wealth funds/central banks, corporate, multilateral institutions, etc. There is reported under-collateralisation in recent years of about USD 3-5 trillion (BIS Quarterly, June, 2012, and Singh, 2011a) – see Table. Even if we consider half of the total positions (i.e. when SIFIs are out-of the-money) that are risks to taxpayers, these estimates are sizable. Furthermore, although BIS indicates about USD 1.8 trillion of collateral dedicated to this market, this collateral is fungible and includes a re-use factor of about 2.5 to 3, dedicated collateral may be only USD 600-700 billion.

Netting within the OTC derivatives market is the flip side of collateral needs (Singh, 2010). The large banks active in the OTC derivative space are reticent to unbundle "netted" positions on their books, as this results in deadweight loss and increases collateral needs (see Box 1).

Since there is no universally accepted formal definition of a "standard" contract (or contracts that are "clearable" at CCPs), there is room for these banks to customise their derivatives (that are non-standard) despite the higher capital charge associated with keeping non-standard contracts on their books. For some banks, the netting benefits may be sizable relative to the regulatory capital charge wedge. This can be expected at large banks where risk management teams build high correlations across OTC derivative products for hedging purposes.

Table
Under-collateralisation in the OTC derivatives market
(global OTC derivatives market, amounts outstanding, USD billions)

	Gross market value							
	2008	2009		2010		2011		2012
	H2	H1	H2	H1	H2	H1	H2	H1
GRAND TOTAL	35,281	25,314	21,542	24,673	21,296	19,518	27,285	25,392
Foreign exchange contracts	4,084	2,470	2,070	2,524	2,482	2,336	2,555	2,217
Interest rate contracts	20,087	15,478	14,020	17,533	14,746	13,244	20,001	19,113
Equity-linked contracts	1,112	879	708	706	648	708	679	645
Commodity contracts	955	682	545	457	526	471	487	390
Credit default swaps	5,116	2,987	1,801	1,666	1,351	1,345	1,586	1,187
Unallocated	3,927	2,817	2,398	1,788	1,543	1,414	1,977	1,840
Gross market value after netting[a]	**5,005**	**3,744**	**3,521**	**3,578**	**3,480**	**2,971**	**3,912**	**3,668**

a) Gross market values have been calculated as the sum of the total gross positive market value of contracts and the absolute value of the gross negative market value of contracts with non-reporting counterparties. The values in the last line are the gross market value after taking into account legally enforceable bilateral netting agreements.
Source: Bank for International Settlements.

Box 1

Netting fragmentation – cleared and non-cleared OTC derivatives

Before the regulatory proposal to move OTC derivatives (D) to CCPs, there were n *big banks with* n-1 *netting sets between them. Those netting sets were fully cross-product within each bilateral relationship. The beneficial effect of netting on risk (and thereby capital and margin) was large around 80-90% of the in/out of the money positions (let us say* X*).*

One global "CCP" that would became the counterparty to all OTC D (including across products and currencies) transactions among the n *big banks, so there were* n *netting sets each between a bank and CCP, which not only preserved the cross-product nature of the netting set but made the overall risk of CCP to be multilateral, and this was good and the beneficial effect was greater than* X*, let us say* Y*. However, a global CCP is unlikely due to political, legal and business model constraints – there will be multiple CCPs (including due to the specialisation and niche business models of CCPs towards certain OTC D product categories like CDS only, or interest rate swap (IRS) only) – let us say* p*, and thus the netting sets proliferated to be* n x p*, plus of course the netting sets associated with the remaining bilateral trades, which were still* n-1 *in number but much less diversified because many trades had been moved to the relevant CCP.*

Algebraically, the original n-1 *netting sets will become* n(p+1)-1 *netting sets. The unbundling of the original netting sets will create more sets (numerically) but smaller and less diversified in content – until a CCP can offer to clear all OTC D (unlikely so far). So the netting benefit is likely Z, which will be much less than* X *or* Y*. (There have been studies to show that initially* Z *will be less than* X*, but* Z *will only overtake* X *when a sizable part of the OTC D market will be offloaded to CCPs, and when the number of CCPs will consolidate from say* p *to about* q *(where* q < p*). Reducing the number of CCPs improves netting and lowers margin requirements. For illustration,* n *is about 10-15;* p *is envisaged to be (initially) between 20 and 30. It remains to be seen if the number of CCPs will consolidate where* q *is a single digit number (e.g., London Clearing House (LCH), Intercontinental exchange (ICE), Chicago mercantile exchange (CME), Eurex and a few more more). Note that ICE Europe and ICE US are two CCPs from a netting perspective. Also if LCH UK has a branch in the United States for US clients, then netting will be fragmented netting since LCH UK will net independently of LCH US.*

Non-cleared trades will continue to remain on the books of the banks but after netting bundles are broken.[1] *The* n-1 *remaining bilateral netting sets are proposed to be subject to different margin rules, and so the number of netting sets will become* n (p+2) -1*, since each bank's book will not net linearly like in the past.*[2] *Thus, the netting benefit from here will be even smaller than Z. Netting set fragmentation is real and increases risk. Thus, in line with the economics of International Swaps and Derivatives Association (ISDA) agreements, the non-cleared trades should be allowed to net to limit fragmentation and collateral silo(s).*[3]

1 It's like breaking a Ming vase by dropping it and then picking up one of the pieces and saying "well at least this bit's not broken".
2 International banks desire one book but may end up with more than one derivative book for non-cleared OTC derivatives – for example US banks due to the Lincoln "push out" clause will keep safe derivatives (like interest rate swaps) under the "bank" part of a bank holding company; other derivatives will be in another part.
3 From an estimated USD 10 trillion (IOSCO's draft study on collateral needs on non-cleared OTC derivatives market, 2012). Netting linearly is likely to reduce this estimate to about USD 1-2 trillion. Also see http://isda.derivativiews.org/2012/04/24/the-bilateral-world-vs-the-cleared-world/.

Not surprisingly, the regulatory efforts are meeting resistance from the financial industry that includes the large banks, asset managers such as pension funds and insurers etc. Another market that has lobbied to avoid posting collateral are the "end-users" such as airlines or non-financial corporates, who presumably are genuine hedgers but will nevertheless contribute toward the systemic risk stemming from the use of OTC derivatives if they pass the buck to their bank by not posting their share of collateral.

The status quo of this market will change (e.g., lower overall netting, no interoperability between CCPs, demand for segregated collateral, extraterritoriality and regulatory arbitrage, etc.).[3] Several countries may have their own CCPs (see Box 2). Initially, the regulatory

3 *Interoperability, or linking of CCPs, will increase each CCP's clearing fund in line with the net open positions between them. So CCPi may hold or have access to collateral from another CCPj that may go bankrupt in the future, so that losses involved in closing out CCPj's obligations to CCPi can be covered. However, legal and regulatory sources indicate that cross-border margin access is subordinate to national bankruptcy laws (such as Chapter 11 in the United States). It is unlikely that CCPi in a country would be allowed access to collateral posted by CCPj registered in another country. Neither is it of interest to CCPs to change their business model and lose their niche market. Neither is it of interest for CCPs to change their business model and lose their niche market(s). The sheer collateral arithmetic to support interoperability is daunting.*

Box 2

Should every country have a CCP? Case of Canada and Australia

Canada's decision of not having its own CCPs is based on sound economics that many other key jurisdictions have not undertaken. For example, Canadian banks deal in non-Canadian currencies so will get higher netting benefits only if they access a global CCP. Since netting will not be substantially less for Canadian participants if they used a domestic, Canadian-dollar only CCP (putting these participants at a competitive disadvantage relative to their global peers), Canada has opted that it is not in their interest to foot the infrastructure cost of having a Canadian CCP (that may need to be bailed out).[1] In particular, accessing an international CCP like LCH Swapclear UK was deemed to be satisfactory since the following safeguard provisions identified by the Financial Stability Board were viewed as being sufficiently in place (since resolution regimes for CCPs is not fully in place yet):

- *fair and open access by market participants to CCPs;*
- *cooperative oversight arrangements for CCPs between relevant authorities;*
- *resolution and recovery regimes that aim to ensure the core functions of CCPs are maintained during times of crisis, and*
- *appropriate emergency liquidity arrangements for CCPs in currencies in which they clear.*

Australian banks, on the other hand, do not deal much in non-Aussie dollar OTC derivatives. Thus netting benefits from cross-currency derivatives may not justify going to a global CCP. Local CCP may suffice and thus their present position is open to hosting a domestic CCP. In such a case, regulatory oversight of Aussie dollar (AUD) derivative positions along with netting benefits of banks dealing in AUD derivatives etc., will accrue to Australia. On the flip side, since CCPs will be systemically important, any cost of bailing out a domestic CCP will be an Australian taxpayer liability.

From a global systemic risk angle and collateral perspective, consolidation of CCPs will be welcome since risk will be less fragmented and collateral per unit of clearing will decrease.

1 Generally speaking, large losses stemming to a bank from their OTC derivative positions – if it leads to bailout – will typically be picked up by taxpayer from the jurisdiction in which the bank is located. Also for example, derivative losses at branches of a Canadian bank in a foreign jurisdiction (e.g., London) will also become Canadian taxpayer liability. Moving OTC derivatives positions form say a Canadian bank to a foreign CCP that is owned/incorporated in a foreign jurisdiction, could shift some of the Canadian taxpayer liability related to cleared OTC contracts to a UK taxpayer liability if the United Kingdom had to bail-out the CCP.

proposal may lead to higher collateral per unit of clearing, although the economies of scale may catch up in the long term. Lately, post MF Gobal and Peregrine saga(s) there will be a decrease in the "re-use rate" of collateral as there is increasing demand from several clients (asset managers, hedge funds, etc.) for "legally segregated" accounts. Also, the recent demand for bankruptcy remote structures – another form of silo-ing collateral – that stems from the desire not to legally post collateral with CCPs in jurisdictions will reduce re-use of collateral. Basel III allows a 0% capital charge for bankruptcy remote collateral structures, relative to the 2% capital charge that accompanies CCPs.

3| Policy Suggestions

There are other avenues to remove OTC derivatives risk from the large banks books with similar underlying economics and perhaps lower collateral needs. For example a tax, or a levy on residual derivative liabilities (i.e. after netting and after whatever collateral is posted) is a more transparent approach than moving OTC derivatives to central counterparties, especially if the costs of bailing out CCPs are to be funded by taxpayers. If a levy is punitive enough, then large banks will strive to minimise their residual derivative liabilities. This will minimise systemic risk via the OTC derivatives markets if a large bank fails. More importantly, as a by-product of the above levy, the residual derivative assets will also go towards zero.[4] Due to national bankruptcy laws, there is an asymmetry when a bank fails at time "t" – the residual derivative assets cannot be used at time "t" as they go under receivership. The levy route brings the collateral stuck in residual derivative assets into consideration. So, there may be enough collateral within the OTC derivative markets that if "reshuffled" appropriately may not warrant sizable additional collateral.

4 This will happen since the large banks typically have matched books (i.e. the size of the derivative liability and derivative asset positions at each bank is, on average, roughly the same).

References

Bank for International Settlements (BIS) (2012)
Statistical release, semi-annual, OTC derivatives statistics, various issues.

Canadian Securities Administrators (2012)
Statement by Canadian authorities on clearing of standardised OTC derivatives contracts, October 1.

Heath (A.) and Manning (M.) (2012)
"Financial regulation and Australian dollar liquid assets", Reserve Bank of Australia, *Bulletin*, September Quarter.

International Swaps and Derivatives Association (ISDA) (2012)
"Initial margin for non-centrally cleared swaps", November.

Singh (M.) (2010)
"Collateral, netting and systemic risk in the OTC derivatives market", IMF *Working Paper*, No. 10/99.

Singh (M.) (2011a)
"Making OTC derivatives safer – a fresh look", IMF *Working Paper*, No. 11/66.

Singh (M.) (2011b)
"Velocity of pledged collateral – analysis and implication", IMF *Working Paper*, No. 11/256.

Singh (M.) (2012)
"The (other) deleveraging", IMF *Working Paper*, No. 12/179.

Singh (M.) (2013)
"The changing collateral space", IMF *Working Paper,* No. 13/25.

New challenges ahead

OTC derivatives: ensuring safe, efficient markets that support economic growth

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In 2009, the G20 committed to strengthening the financial system and improving the over-the-counter derivatives markets by increasing regulatory transparency and reducing credit risk. Three years on, the industry is delivering, with significant progress made in increasing usage of central clearing facilities and in nearly universal centralised trade reporting by dealers.

Today, however, the global financial system and market participants face new challenges and risks. Proposed collateral requirements for non-centrally-cleared derivatives may be pro-cyclical and exacerbate, instead of alleviate financial market stress. Short-selling and other restrictions threaten prudent risk management and investment in the European economy.

Overcoming these challenges is important to ensuring robust, stable financial markets, as well as a strong, growing and productive economy.

In September 2009, at their Pittsburgh Summit, the heads of state of the G20 nations committed to strengthening the financial system and the world economy. One initiative announced in their end-of-summit communiqué was to improve the resiliency of the over-the-counter (OTC) derivatives markets. Proposals included measures such as the reporting of OTC derivative transactions to central trade repositories (TRs) and the mandating of central counterparty clearing.

Now, more than three years on, a great deal of progress has been made towards safer, more resilient markets. For example, TRs have been established covering derivatives in all major asset classes – interest rates, credit, equities, commodities and foreign exchange. Regulators around the world now have tools that give them access to activity in the derivatives market. With this development, the amount and completeness of information that will be available to regulators is unprecedented in global financial markets. For no other financial instrument, in any asset class, has there ever been a way for authorities to access a complete database of the entire global transaction population. Regulators will now be able to readily detect improper behaviour, observe transaction flows and identify trends in liquidity in the OTC markets.

With regard to clearing of derivatives through central counterparties, nearly two-thirds of the interest rate swap market is already centrally cleared, largely due to voluntary initiatives and commitments by banks to global regulators in advance of legal mandates. Clearing will increase significantly in the next twelve to twenty-four months as trades between dealers and their clients become subject to mandatory clearing; this began in the United States in March 2013.

Since the 2009 Summit, and even before that in the case of clearing and in the area of operational risk reduction, policymakers and industry have worked diligently and constructively together on the shared goal of reducing systemic risk and improving the safety of the OTC derivatives markets.

There are many initiatives underway that are designed to improve systemic resiliency in markets and most of these initiatives have clear benefits and they themselves create little or no incremental risk to the system. But in certain cases, a new element of systemic risk may be introduced by a proposed reform. The test, in terms of whether or not to implement a change designed to improve market resiliency, is whether the benefits of the change – in terms of tangible improvements to the system that result from it – outweigh any potential risks to the system created by such change. As an example, TRs introduce very limited incremental risk other than obvious (and solvable) data security concerns that information might get into the wrong hands.

With respect to clearing, the case needs a little more thought. The primary goal of central clearing is the elimination of the risk of peer-to-peer default contagion. Each participant in the cleared markets will face the central clearing house, not other market participants. This is clearly an extremely worthy goal and is largely achieved.[1] However, there are risks associated with mandatory clearing.

As regulations push transactions into clearing houses, the clearing houses will become the contractual counterparty to entire markets or large proportions of markets. As a result, the default of a major clearing house would be a catastrophic event. Simply put, clearing houses are now among the most systemically important institutions, and with that comes the obligation to ensure they are managed prudently and carefully regulated.

Fortunately, the risk of such a default can be, to a very large degree, controlled by adopting policies and procedures that ensure a proper risk profile for the clearing house. These include robust operational systems, conservative risk and margin policies, a high creditworthiness standard for membership eligibility and diligence with respect to product eligibility. Clearing houses must not be allowed to clear products which have insufficient liquidity or price transparency, since in the time of ultimate stress – a member default – they must be able to liquidate positions quickly and aggressively. Clearing of products that are illiquid or difficult to trade or value could severely impact a member closeout, resulting in unhedged losses which would erode the capital and consequently impact the stability of the clearing house. Rigorous product approval processes

1 *In the case of clearing house members clearing for their clients, it is those clearing house members, not the clearing house itself, that are exposed to the default risk of those clients.*

will ensure the right outcome. Overall, in the case of clearing, the benefits to the system will outweigh the risks if clearing house policies and risk frameworks continue to be as robust as they are today.

There are many other initiatives designed to reduce systemic risk underway in the OTC derivatives markets, such as the transition from the exchange of paper contracts to real-time electronic matching. Portfolio compression exercises, where counterparty risk and operational risk is significantly lowered as portfolios of transactions are reduced to smaller portfolios with equal risk characteristics, are another example. Compression has greatly rationalised the OTC markets. As of mid-year 2012, compression had resulted in OTC notional contracts outstanding being reduced by over USD 230 trillion in notional terms. In the credit default swap market, compression has resulted in notional outstandings being reduced by a factor of three. Modernisation of the confirmation process and portfolio compression are examples of initiatives with real systemic benefits and very little risk.

The systemic risk-reward cases for TRs, electronic confirmations, compression and clearing are clear. Now, however, regulators are considering rule proposals where the systemic benefit is not clearly defined or understood. These proposed rules are in the area of margin for non-cleared OTC transactions. Such rules, if badly crafted, could potentially threaten, rather than strengthen, the global financial system.

In 2011, the G20 supplemented their 2009 communiqué with a call for regulators to devise proposals to improve margin arrangements in the non-cleared OTC derivatives market. Market participants also see robust deployment of margin practices as an essential tool for systemic resiliency. With this new regulatory focus and with industry support, why the controversy? Where do the potential problems lie?

The new margin framework proposed by regulators consists of two elements: variation margin and initial margin. Many OTC derivatives transactions currently involve the payment, or "posting", of variation margin. Variation margin is a mechanism which is used to avoid the build-up of unsecured risk exposures between counterparties.

Variation margin is called for as portfolio valuations change and can be thought of as daily settlement of amounts owed and is extensively used as a tool to reduce risk by a wide variety of market participants. The International Swaps and Derivatives Association (ISDA) has promoted the use of variation margin for non-cleared trades for more than twenty years and fully supports the regulatory push for the mandatory exchange of variation margin for the broader OTC derivatives markets as a means to improve systemic resiliency. ISDA research[2] reveals that more than 70% of all OTC derivatives transactions – including 84% of those executed by large dealers – are subject to variation margin arrangements. The major exceptions to the practice of posting collateral are sovereigns, the majority of whom do not pay variation margin to their banks for historical reasons.

The case for initial margin, on the other hand, is much more complex. While variation margin covers amounts owed under derivatives contracts, initial margin represents extra payments made between parties in excess of amounts owed. Payments of initial margin are a safety cushion, designed to cover the replacement costs in the event of a default by the party posting the initial margin. And initial margin really does improve the situation of the non-defaulting party by insulating that party against losses. This reduces the risk of default contagion across the system, which is clearly a very worthwhile goal. However, initial margin comes with some significant potential costs, all relating to the fact that it consumes the financial resources of the posting party, causing a potential liquidity strain – and can therefore introduce risk into the system.

Before discussing the risks of mandatory initial margin in more detail, it is worth understanding which products and markets exist in the non-cleared OTC sector.

1| Who uses non-cleared OTC derivatives... and why?

Why does any of this matter? How important is the non-cleared OTC derivatives market segment? The cleared sector of the OTC derivatives market, which is the majority of the market when expressed in

2 *ISDA Margin Survey 2012 available at* http://www2.isda.org/functional-areas/research/surveys/margin-surveys/.

notional terms, accounts for only a handful of the many types of OTC products. Non-cleared products comprise not just the majority of OTC derivative transaction types, but many of the types that are most beneficial to today's global economy.

The list is extensive, but some examples of important non-cleared OTC derivatives include currency swaps that corporations, sovereigns and supra-nationals use to enable capital raising in foreign markets; interest rate options that facilitate the mortgage markets – in the United States, for instance, mortgage agencies could not properly function without access to interest rate options; single name credit hedges that banks use to hedge lending activities and that investors and underwriters use to hedge corporate bonds and inflation swaps that pension funds use to hedge their long term liability needs. And there are many others, many of which are vital to economic activity and growth. In addition to the many product types that cannot be cleared, there is another segment to the non-cleared market, transactions that utilise products which, in their generic form, could be cleared, but which are modified to meet the needs of the end user. It could be argued that these transactions, tailored to suit the exact risk management needs of the user, are the most socially useful of any derivative transactions, cleared or non-cleared.

2| Inherent conservatism of initial margin

While initial margin has the clear benefit of reducing the risk of default contagion, it is an inherently conservative approach to risk management. The premise of an initial margin arrangement is that the counterparty posting the margin could default at any time, and that in preparation for such possible default, the costs that might be incurred by the non-defaulting party are pre-funded in full from the outset of a transaction.

At a clearing house, this degree of conservatism is appropriate, due to the overwhelming systemic importance of those institutions. However, the introduction of mandatory initial margin into the non-cleared derivatives market introduces an enormous degree of conservatism into that market.

To give an insight into this conservatism it is useful to compare initial margin in the cleared market to initial margin in the non-cleared market. The total initial margin currently held at the major OTC clearing houses is approximately USD 40 billion. This provides very robust support for a population of cleared transactions of approximately USD 300 trillion. In the non-cleared sector, under current proposals,[3] ISDA estimates[4] that total global initial margin requirements will be in the range of USD 0.8 trillion to USD 10 trillion.[5] This much larger amount of margin would support the smaller, non-cleared population of approximately USD 125 trillion. Put another way, using a figure of just USD 2 trillion for the total global initial margin, which is at the lower end of that estimated range, the amount of initial margin required in the non-cleared sector would be over one hundred times more than in the cleared sector for the same notional amount of trades. Even with the lowest estimate of USD 0.8 trillion,[6] it will be around fifty times more expensive to trade in the non-cleared market compared to the (already robustly margined) cleared market.

Again, this is due to the inherent conservatism of the initial margin approach. The numbers are so large because they reflect the implicit premise that any market participant could default at any time, and provides for pre-funding of replacement costs associated with all such potential defaults. In other words, in order to ensure that the market is protected from the next default, whoever that might be, every party in the market must pre-fund any costs that might be associated with its default to any other party in the market that it transacts with. Given this conservatism, the wholesale

3 *Basel Committee on Banking Supervision (BCBS) and International Organization of Securities Commission (IOSCO) formed a working group, the Working Group on Margining Requirements (WGMR) to study the margin market and develop proposals for a new margin framework. Proposals were issued in July 2012. WGMR commissioned a Quantitative Impact Study (QIS) asking major market participants to provide estimates as to the quantum of margin needed in the proposed regime. A revised proposal was issued in February 2013.*

4 *ISDA estimates are based on member submissions to the WGMR QIS. A presentation setting out these estimates, "*Initial margin for non-centrally cleared swaps: understanding the systemic implications, November 27, 2012*", is published at* http://www2.isda.org/functional-areas/risk-management/.

5 *The wide range depends upon two key variables: whether parties obtain approval for risk models or use standardized tables; and whether thresholds are adopted – thresholds allow for a certain amount of risk activity to be undertaken with no initial margin requirement.*

6 *A USD 0.8 trillion total market initial margin estimate reflects the assumption that every participant in markets obtains regulatory approval for a margin risk model and policymakers globally grant a threshold of EUR 50 million, the highest threshold contemplated in the WGMR QIS.*

deployment of a mandatory initial margin regime into the non-cleared market carries an enormous cost. Addressing risk through variation margin together with an appropriate capital regime, rather than initial margin, will lead to a much more logical outcome while still retaining systemic resiliency.

3| Impact on depth and liquidity of OTC markets

Mandatory initial margin imposes very significant cost and resource drains on the posting party. This leads to a number of consequences both at the level of the market participant and at the systemic level. From the perspective of the market participant, the posting of initial margin consumes valuable liquidity, and liquidity management is of paramount importance to all financial institutions.

Current initial margin proposals call for margin to be calculated using a value-at-risk (VaR) approach. VaR models, in the context of initial margin, are designed to project short term movements in the market value of portfolios of derivatives with a certain confidence level. VaR results depend upon volatility inputs, since volatility is used to create the dispersion of portfolio values, and as volatility used by the VaR models increases, initial margin will increase. Initial margin is dynamic in this sense – it rises and falls according to changes in volatility inputs of the VaR models. Increases in model volatility, such as might occur in a crisis, could cause significant increases in initial margin requirements. From the perspective of a market participant, initial margin therefore gives rise to both a *current* liquidity requirement, needed to fund current margin obligations, and a *contingent* liquidity requirement, resulting from potential increased margin calls should volatility increase.

Initial margin therefore creates both a liquidity cost and a liquidity risk for market participants. The cost is the funding cost of initial margin sent out to counterparties, which must be added to the costs of transactions. The risk aspect is that even without any new trading activity, the dynamic aspect of the margin calculation could lead to large liquidity calls, which might be particularly stressful in times of crisis.

The funding cost component of initial margin will also cause bid-offer spreads in the non-cleared OTC derivative market to widen. This is because banks need to cover their costs when quoting prices to a customer (or withdraw from the business). A bank could face two amounts of initial margin[7] on each customer trade: it will be required to post initial margin both to its customer and to the institution on the other side of the trade that provides the hedge for the bank. For end-users, wider bid-offer spreads quoted by banks will be additive to direct costs of funding the initial margin that they must post to the banks.[8] Under proposed rules, end-users will therefore face transaction costs that run to multiples of current market bid-offer spreads.

Given all of the extra cost, the application of the proposed measures will come at a very high price in terms of impact on depth and liquidity of non-cleared OTC derivative markets. Even with the envisioned use of thresholds, the proposed measures are likely to lead to a significant deterioration in market liquidity and product availability.

If policymakers are focused on preservation of market liquidity in these important markets, the terms of any mandatory initial margin proposals must be carefully considered. Imposing initial margin requirements as contemplated by current proposals will have damaging consequences, severely impacting liquidity in those important sectors of the economy as noted above.

4| Pro-cyclicality concerns

In addition to the impact on market liquidity and transaction costs caused by initial margin, the potential for levels of initial margin to rise in times of market volatility could be destabilising for the financial system.

In its study on collateral requirements, the Bank for International Settlements (BIS)[9] showed that, for

7 *Current proposals call for banks to post initial margin both to other banks and to their clients.*
8 *A customer could effectively end up paying for the funding impact of three amounts of initial margin on just one trade.*
9 *BIS Working Papers No. 373,* Collateral requirements for mandatory central clearing of over-the-counter derivatives*, March 2012, p. 20; available at* http://www.bis.org/publ/work373.pdf.

OTC interest rate swap portfolios of fourteen major derivatives dealers, initial margin requirements for cleared portfolios under high market volatility would be approximately three times the initial margin requirements in low market volatility (increases were more pronounced for credit products). If the same ratio held true in the non-cleared world, this would create a very significant, potentially unmanageable stress in markets. In terms of quantum, a "peacetime" total global initial margin requirement of USD 1 trillion, for example, could increase to USD 3 trillion in market stress conditions. Many institutions could face individual incremental liquidity needs of USD 10 billion or more. These needs would be in addition to any other funding stresses that might occur at the same time in other parts of their businesses. History shows that liquidity drains of this magnitude can cause the default of institutions.

This dynamic aspect of initial margin is clearly inconsistent with the objective of systemic resiliency. Simply put, in stressed market conditions, it may not be possible for the market to deliver the incremental margin implied by the proposals as currently formulated.

5| Common misperceptions regarding non-cleared OTC derivatives

The concerns expressed above with regard to the impact of proposed rules on market liquidity and pro-cyclicality are very real. These concerns are sometimes countered by incorrect arguments or assertions. At this point it is worth laying some of these out in order to better inform the debate.

5|1 Perception: if it can't be cleared, it's too risky

There are those that believe that if an OTC derivative can't be cleared, then perhaps it is too risky, and it should not exist. For some, the prevailing perception of non-cleared OTC derivatives may be that they are complex and risky; to others, non-cleared OTC derivatives should either be cleared or those markets should be shut down.

The fact is the riskiness of an OTC derivative is not a proxy for its clearing eligibility. As highlighted above, clearing houses must have stringent product eligibility criteria. To meet such criteria, products must pass many tests, but the riskiness of a product is not one of them. Most importantly, products must be easy to value and have sufficient liquidity to be readily tradeable in the event of a member default. With respect to riskiness, there are products deemed "risky" that meet the criteria, and therefore can be cleared, and there are non-risky products that cannot be cleared since they fail, most importantly, liquidity, valuation or other tests.

5|2 Perception: market participants don't want to clear

There is a perception that banks and end-users are predisposed to avoid clearing a derivative. Or that they might alter the economic characteristics of a trade to change it from being clearable to non-clearable. Such views diametrically oppose reality. Banks have been clearing interest rate swaps at LCH.Clearnet SwapClear for more than twelve years – and that development was entirely market driven, not the result of a regulatory push. The fact is that market participants, including both banks and end-users, prefer to clear. Capital is lower, operational risk and operational costs are lower and credit risk is lower. These incentives existed in large part when SwapClear was launched and will become even stronger in the future. In fact, there are few, if any, factors that make the non-cleared space more attractive to market participants than the cleared space, other than the case where the desired economics of a trade are not catered for in the cleared market.

5|3 Perception: participants should use clearable products instead of non-cleared products

Another prevailing perception is that market participants can easily find another alternative to a non-cleared OTC derivative by using a cleared or exchange traded alternative. End-users and dealers alike have a preference to trade cleared swaps, for many reasons as described above. But often,

end-users need to hedge unique and specific risks in order to manage their businesses. If end-users are not able to use the true hedge, but instead have to hedge with a cleared or exchange traded alternative, they would have an imperfect hedge. The resulting financial risk exposures would lead to uncertainty, earnings volatility, and possible unmanaged losses in their financial results with potentially damaging consequences, such as less investment, lower employment and lower contribution to public finances.

Consider the case where an interest rate swap was needed in a certain currency, but instead a swap in a "similar", but clearable, currency was used. Or if an entity in need of an option product had to hedge with a linear, non-option, product – for instance the use of interest rate swaps to hedge risks where an interest rate option was really required. Or consider the case where a bank credit officer when making a loan to a corporation was forced to execute a credit hedge in a "similar" corporation or a broad index. In all of these cases, where parties were forced to use a cleared product when perfectly good but non-cleared alternatives were available, the residual unhedged risks could be harmful or damaging to the individual institutions, with knock-on effects for the wider economy.

The unhedged portion of the risk, the difference between the true hedge and the imperfect hedge, is known as basis risk. Some might say that this basis risk should simply be absorbed by the end-user. But end-users are charged with managing their underlying businesses. Hence their drive for hedges that best match their risks. To meet this need, banks typically provide and make a market in transactions that provide such a solution. It is far better for the end-users and far better for the economy that banks with appropriate expertise manage the net basis risk across the thousands of their clients, rather than inflicting such risks on those clients.

5|4 Perception: if initial margin is set high enough, that will provide an incentive to clear more products

Another misconception is that setting initial margin requirements for non-cleared OTC derivatives at a high enough level will induce and incentivise market participants to clear more.

This position is seriously flawed. The best way to maximise clearing is straightforward. First, and most importantly, ensure that clearing house product eligibility decisions are appropriate – this should be done by diligent scrutiny of products proposed for clearing, such scrutiny being performed by experts at regulators, clearing houses and clearing house member risk committees. Once such decisions are made, laws should then be passed to ensure that such clearable products cannot be traded without being cleared. This approach removes any commercial or subjective considerations entirely and achieves the desired result of clearing the entire universe of products that are suitable for clearing.

So, if a product is clearable, then legal mandates – and not punitive initial margin – should drive clearing. If a product is not clearable, then no amount of initial margin can cause it to be cleared. If a punitive level of initial margin is the tool used to try to incentivise clearing, not only would such a strategy fail, but there would be a number of potential adverse ramifications: market liquidity will be drastically affected in non-cleared OTC markets; end-users may be driven to use imperfect hedges; and market participants and clearinghouses will be strongly biased towards introducing products to the clearinghouse that are not suitable for clearing.

5|5 Perception: there should be a level playing field in margin terms between cleared and non-cleared OTC derivatives

Another misperception regarding non-cleared OTC derivatives is that because initial margin is required for cleared OTC derivatives, it should also be required for those that are not cleared, in order to ensure a level playing field. This argument misses two key points:

First, initial margin is essential at clearing houses because clearing houses typically have very little capital of their own supporting the creditworthiness of the clearing house, often a tiny fraction of the capital of their larger members. Even though they

will be the largest participants in global markets, the clearing houses are not creditworthy in their own right. The members provide the capital to the clearing houses in the form of default fund contributions and initial margin. Quite simply, without initial margin there would be no clearing houses.

In the non-cleared sector, counterparties bring their own creditworthiness – supported by assets and tangible capital. Initial margin is not necessary for the market to function, as it is in the cleared space. Having said that, initial margin is used in the non-cleared market, but based on commercial decisions at the option of the counterparties. Institutions of lower credit standing may choose, or be required by their banks, to post initial margin in order to facilitate credit lines.

Second, in the non-cleared sector, capital charges will be higher than for cleared transactions. In its 2009 Pittsburgh communiqué, the G20 stipulated that non-cleared OTC derivative contracts should be subject to higher capital requirements than cleared transactions. The logic behind this approach is sound. Capital must be aligned with risk and in general, a clearing house is of better credit standing than bilateral counterparties. In the non-cleared market, capital will be sized commensurately for cases where there is initial margin and for cases where there is no initial margin. And for that matter for cases where there is no variation margin.[10] In summary, with appropriate capital rules, initial margin for non-cleared trades is not necessary to ensure systemic resiliency.

5|6 Perception: all standardised products should be cleared

Some use the words "standardised" and "clearable" interchangeably. Others refer to standardised as the key criteria for clearing house eligibility. Clearability is a very different concept to standardisation. Just because a product is standardised does not mean it will meet the clearing house product eligibility criteria; and if a product is not standardised it does not mean that it will automatically fail to meet such criteria. Interestingly, almost any type of interest rate swap, though not standardised, can be cleared. Conversely, most single name credit derivatives, though standardised, cannot be cleared due to lack of liquidity in many reference names.

6| What if there is no mandatory initial margin? – The theory

Having discussed some of the problems with initial margin, let us consider the case where there is no mandatory initial margin requirement. Will the system be safe?

ISDA fully endorses the goal of the G20 to ensure systemic resiliency and supports global policymakers in their efforts to achieve it. With respect to ensuring systemic resiliency around non-cleared OTC derivative markets, ISDA believes that a three pillar framework is appropriate for ensuring systemic resiliency:

- mandatory clearing of OTC derivatives where appropriate;

- a robust variation margin framework for non-cleared OTC derivatives that involves frequent collateral exchanges; and

- an appropriate capital regime to cover any residual counterparty risks in either the cleared or the non-cleared markets.

This approach will ensure systemic resiliency without compromising the liquidity in key OTC markets. Adding mandatory initial margin to this framework could increase rather than decrease systemic risk and harm liquidity in vital markets.

10 *Regulatory proposals currently contemplate granting exceptions to the margin proposals for many types of end-users.*

7| No mandatory initial margin – the empirical evidence

Experience – both good and bad – has demonstrated that the practice of frequently settling the unrealised valuation changes between two parties using variation margin is beneficial in reducing counterparty risk. It avoids the build-up of large unrealised exposures that could become destabilising in periods of market stress.

The American International Group (AIG) and Lehman Brothers situations are cases in point. From inception, AIG did not post full daily variation margin with all counterparties. Faced with huge collateral calls when its ratings declined, this triggered post-facto variation margin calls on a systemic scale. The liquidity drain caused by the sudden collateral requirements led to AIG's collapse, to widespread fears about systemic contagion and, ultimately, to the government bailout.

In contrast, Lehman Brothers posted variation margin daily (and did not post initial margin). It faced no large or sudden increase in collateral requirements. When it collapsed, there were shocks to markets, but there was no contagion in OTC markets and no government bailout. The disruptions arising out of the Lehman Brothers situation had to do with the long process of resolving its positions in markets other than OTC derivatives and not market disorder as such. OTC derivatives positions were closed out immediately under ISDA protocols, and OTC derivatives margin was liquidated immediately (notably, OTC margin was not held up at custodians as in other asset classes). Counterparties did incur losses over and above variation margin held (losses which would have been mitigated by initial margin) but those losses were minor, considering that Lehman Brothers was a major global financial institution, compared to the costs of the proposed remedy of mandated initial margin. As stated above, initial margin has benefits, but comes at a cost. The benefits must be considered in relation to the costs involved. Total losses in OTC portfolios as a result of the bankruptcy of Lehman Brothers were of the order of USD 10 billion globally; the estimated cost of the purported "remedy", mandatory initial margin, as noted above could run to multiple USD trillions.

8| Conclusion

ISDA, the OTC derivatives industry and global policymakers share a common goal: safer, more efficient markets. The significant progress made in key areas of financial regulatory reform – in terms of clearing and transparency – evidence this commitment.

The non-cleared OTC markets play a vital role in key sectors of the global economy, ranging from housing to corporate and sovereign funding to credit origination. The importance of these markets to a stable and efficient global economy cannot be overstated.

Current proposals would significantly impact market depth and liquidity in the OTC derivative markets and in so doing, could harm important sectors of the global economy.

And while current margin proposals are motivated by a desire to establish systemic resiliency by reducing *counterparty* risk, their application is likely to increase *economic* risk (and thus compromise systemic resiliency) by discouraging (or even eliminating) the ability of market participants to hedge risks to their businesses. Finally, the pro-cyclical problems caused by the use of a dynamic approach to margin are a real concern.

ISDA strongly urges policymakers to conduct a new, thorough impact study before imposing margin requirements. The proposed requirements will have serious negative effects on the markets as a whole, in terms of liquidity drain, collateral demand and transaction costs. The toll of such effects may well outweigh any actual benefits realised.

ISDA is committed to working with regulators, policymakers and market participants around the world to overcome the challenges we currently face and secure robust, stable financial markets, as well as a strong, growing and productive global economy.

Consequences of the new regulatory landscape on OTC derivatives trading

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Derivatives are a vital mechanism of risk-transfer, and are an essential tool for banks in providing financing and risk-management solutions to clients. They are used by every type of company in every type of industry in every part of the world. During the financial crisis, derivatives were perceived to have had a negative influence and consequently policymakers and others moved to strengthen the market and build a more robust financial system. Four years later, we need to ask: are we on the right track and headed in the right direction? To answer these questions, we need to first understand the real lessons of the financial crisis. It is increasingly clear that over-the-counter (OTC) derivatives performed their risk-transfer function effectively during this period. Key regulatory initiatives, including clearing and transparency, are making the system safer. But the impacts of further initiatives are unclear and may well lead to undesirable outcomes such as:

- *significantly increasing costs to derivatives users and particularly end-users;*
- *leading to more cross-border fragmentation of markets;*
- *increasing regulatory risk as implementing measures with broad structural impact are drafted under stressed conditions (particularly acute in European Union where there is no possible relief via US-style non-action letters);*
- *curtailing innovation as tailor-made solutions fall victim to the pressure for standardisation (including margin requirements).*

All of this has the potential to make the cost of transferring non-standard risk prohibitive, potentially increasing risk in the system.

As banks move forward out of the crisis, seeking to provide the best solutions to their customers' needs and to finance the growth of the economy and industry, they must continue to engage constructively with regulators on financial reform. The task collectively facing regulators and industry is complex but essential.

For the past five years, we have been living through a financial crisis and dealing with the aftershock of what can only be described as an economic earthquake. The economies of developed countries are still dealing with the aftermath of the global financial crisis, due to an excessive reliance on debt and, in many cases, a structural lack of competitiveness. The balance-sheet growth of banks which supplied the debt is, in a way, the symptom of these imbalances. The banking industry assumes its share of responsibility for the crisis, but the time has come to move forward and we must recognise that we are also a very big part of the solution.

The solution – for the global economy, Europe, France and our trading partners – is to generate growth, albeit with an acceptable and appropriate level of risk. Funding growth effectively and taking an active part in the financing of the real economy without taking on inappropriate risk is, and must continue to be, at the heart of the financial sector's mission. A sound banking industry is crucial to support economic growth and to enhance competitiveness both from an industry and a national perspective.

It is vitally important that policymakers and market participants recognise that regulatory reform of the banking sector and financial markets, both globally and domestically, must take into account its impact on economic growth and on the risk management framework. It simply cannot and should not be done without looking at the consequences, unintended or otherwise.

This is particularly true of the new regulatory framework for over-the-counter (OTC) derivatives. During the financial crisis, derivatives were portrayed as exacerbating stress in the financial system and the global economy. As a result, policymakers and others moved to build a more robust and transparent framework for the global derivatives markets. After all the work that has been done, and as we contemplate the work that remains to be completed, it's legitimate to ask: are we on the right track and heading in the right direction?

1| Lessons of the financial crisis

To answer these questions, we need to first understand the real lessons of the financial crisis. The origins of that crisis lie in a prolonged period of too-easy credit that worked its way into the global real estate market, causing a bubble that burst with devastating consequences. Derivatives did not cause the crisis; in fact, it is increasingly clear that during this period OTC derivatives effectively fulfilled their main function which is to hedge risks. The interest rate swap, equity and commodity swap markets functioned largely without incident during this period.

The notable exception, where derivatives are broadly perceived to have been a facilitator and accelerator of the crisis, was, of course, American International Group (AIG) and its role in the credit default swap (CDS) market. I will not pass judgment here on AIG's strategy of reinsuring structured debt; what is clear is that AIG failed to manage its collateral and risk exposure appropriately. It did not engage in the daily calculation and exchange of variation margin calls with its counterparties, which would have prevented its large and toxic build-up of exposures. When these margin calls were ultimately triggered, the company suddenly faced multi-billion dollar collateral calls which ultimately prompted its need for government aid to fund its liquidity requirements.

In addition to AIG's collateral management and margin call management failure, there were broader concerns about what AIG's collapse might mean for the global financial system. Fears at the time centered around the interconnectedness of firms with AIG. Concerns were raised about the possibility of multiple financial institution failures.

Recent research indicates that such contagion fears may have been unfounded. Harvard Professor Hal Scott and the staff of the Committee on Capital Markets Regulation[1] have explored the issue of interconnectedness and their recent report indicates that such contagion fears may have been unfounded, due to the relatively manageable derivatives

1 *The Committee on Capital Markets Regulation is an independent and nonpartisan research organisation comprised of thirty-three leaders from the investor community, business, finance, law, accounting and academia and dedicated to improving the regulation of US capital markets.*

exposure of individual counterparties to AIG. But it is equally true that the lack of transparency on OTC markets and of verifiable data on counterparty exposure helped stoke contagion fears, in turn making public sector intervention inevitable. If we want to ensure that such situations do not happen again, the new framework must provide sufficient transparency to regulators regarding total counterparty exposures.

These are important lessons which must be taken into account as policymakers and market participants work constructively together to devise a stronger, more robust financial system. This is particularly true given the work that is currently being conducted to develop global margin requirements for OTC derivatives.

2| Over-the-counter derivatives regulatory pillars

Such a framework for counterparty risk can and should be constructed on a few fundamental pillars: first, mandatory clearing for liquid, standardised products; second, a robust variation margin regime for non-cleared OTC derivatives; third, appropriate capital standards for all financial instruments; and fourth, improved regulatory transparency in derivatives activity and exposures.

These pillars are, of course, central to the G20's commitments to make OTC markets safer, as articulated in its 2009 Pittsburgh Communiqué:

"*All standardised OTC derivative contracts should be traded on exchanges or electronic trading platforms, where appropriate, and cleared through central counterparties by end-2012 at the latest. OTC derivative contracts should be reported to trade repositories. Non-centrally cleared contracts should be subject to higher capital requirements…*"

The banking industry fully supports the goals of the G20 and is committed to working with regulators, policymakers and the rest of the financial industry to successfully implement these reforms and to ensure we all benefit from a sound and robust banking sector. The progress made in increasing regulatory transparency via reporting of OTC derivatives transactions can and must ensure that exposures should not build up unnoticed by supervisors, as was the case prior to the crisis.

Indeed, market participants have made substantial progress in key areas. Clearing and transparency initiatives have advanced substantially ahead of regulatory timetables – which themselves have been delayed past the G20 deadlines, largely due to the complexity of the reforms undertaken.

But there are also growing fears that regulatory reform efforts are now expanding well beyond the original core areas of focus. Some of these efforts, particularly in the area of trade execution and reporting, threaten to change the market structure of the derivatives business with little or no resulting benefits. Proposals for mandatory bilateral initial margin proposals for non-cleared derivatives could create a significant and pro-cyclical drain on financial liquidity. This may result in increasing systemic risk rather than decreasing it, which may substantially diminish the ability of banks to appropriately serve the interests of their customers. This is an area where the impact of proposed measured must be carefully assessed.

Furthermore, banks are currently faced with a large number of regulatory initiatives across a number of jurisdictions, sometimes contradictory. The risk of cross-border market fragmentation is a very real one: despite the shared G20 objectives, different jurisdictions are pressing ahead with regulatory regimes that can sometimes diverge significantly. Regulation of the banking sector and more specifically, the global OTC derivatives market, cannot be effectively addressed other than through a coordinated effort among regulators from all the major jurisdictions. We believe the established international regulatory co-ordination bodies have an important role to play here, a process in which the Banque de France and other French regulators have been early and strong proponents. It is clear that policy initiatives need to be developed, coordinated, implemented and monitored in a consistent way both at home and abroad.

3| Key challenges

Efforts towards a sensible reform of OTC derivatives are hampered by a commonly-held sentiment of ambivalence or downright suspicion towards derivatives. Derivatives are, however, a vital risk-hedging instrument. They are an essential tool for banks in providing financing and risk management solutions to clients. And they are used by every type of company in every type of industry in every part of the world.

The apparent sprawling nature of OTC markets tends to overshadow the fact that transactions on these markets tend to be of significant size but of relative low frequency. Despite its apparent size, there are only perhaps 20,000 OTC derivatives trades carried out around the world each day according to industry figures (about 7% of global interest rate swaps volume takes place in France). This is in sharp contrast to the exchange-traded equities or futures markets, where hundreds of thousands of trades on individual exchanges occur daily. Approximately 6,000 to 7,000 of the daily OTC derivatives trades involve interest rate derivatives. Roughly the same amount involves CDS; of these about 4,000 are single-name CDS contracts. Considering that there are roughly 3,000 single-name reference entities, it is clear that CDS trading in many individual names is very low. The large transaction size and low frequency explains the off-exchange nature of these markets.

Given the experience of the past several years, there seems to be a growing wariness these days towards financial innovation. This appears to be part of a larger change or hardening in attitude towards the globalisation of markets, particularly the globalisation of financial markets. Indeed, we are seeing some signs of a move away from globalisation towards a more splintered or regionalised approach in banking and finance.

Part of this movement reflects the financial industry's own need to focus on core businesses and core markets to improve capital and earnings and build shareholder value. Bank balance sheets, after all, are finite. Capital needs to be allocated most efficiently and effectively, and this often means building stronger ties with one's best customers, often in the home market. Some of it is also due to uncertainties among financial market participants about the legal and regulatory structures and provisions to which they may be exposed in certain jurisdictions. And some of it also results from regulators wishing to erect stronger walls of protection around their respective financial systems.

The ultimate impact of all of these trends and issues is still unclear. There are, however, growing concerns that elements of the new regulatory regime could adversely impact derivatives users and end-users in significant ways. Cross-border market fragmentation, for example, could lead to an exodus of liquidity suppliers and market makers in certain markets. Increased regulatory uncertainty and the mistrust of financial innovation could also reduce the availability of customised risk management tools. Without the ability to hedge the risks on the interbank market, market-makers will not be in a position to respond to end-user needs to hedge their risks – or if they are, it may be at a very high cost. This could severely impair the markets for customised derivatives, which are very important for end-users.

The end result: the cost of hedging could increase substantially, and risks may go unhedged. In the worst case scenario, the inability for our clients to hedge risks could delay or impede business decision-making, which would in turn hinder investment and dampen economic activity and growth.

4| Adapting to the future landscape

It is important that industry and regulators work together to ensure that regulatory reform addresses the real causes and problems of the financial crisis. Efforts need to continue to put the global financial system on sounder footing. An effective framework must be developed, drawing lessons from the past, which will help prevent future crises.

The banking sector is renowned for its innate ability to quickly adapt and innovate in order to meet the needs of its clients. We can and will do so when it comes to the changing OTC derivatives market. We firmly believe that by working together with our customers we fulfil our role as bankers by providing a valued service to our clients and to the economy.

Our focus going forward is two-fold. First, we will work with customers, policymakers and others to deliver on G20 commitments to reduce systemic risk. We will build on the already substantial progress made by market participants in reducing credit risk (via central clearing) and increasing regulatory transparency (through trade repositories).

Second, we will continue to work constructively to address issues that risk getting in the way of delivering on the G20 commitments. Today, for example, there is no question that there is a considerable lack of certainty on the rules of the game from a regulatory point of view, detrimental to investment decisions and therefore unsettling for financial markets. More transparency, greater clarity and less uncertainty on the regulatory agenda is urgently required if we want to foster long-term growth.

The resilience and strength of the financial sector, which is fundamental to the long-term health and growth of the real economy, is closely intertwined with the quality of regulation and particularly the supervision and policy-making which govern it. Regulation needs to recognise that credit origination is crucial for securing economic recovery and the supply of credit itself must be controlled and sound. Short-term policy objectives must not encourage the over-reliance on debt which in the recent past led to the global financial crisis and, more recently, the Eurozone crisis.

Appropriate rules and regulations for capital and, in particular, liquidity ratios are critical to the success of the new regulatory framework. The Basel III rules, which will come into force between 2013 and 2018, will bring significant progress on this front. The new metrics require banks to significantly improve the quantity and quality of their Tier 1 capital, and introduce short and long-term liquidity ratios to ensure that banks are able to meet their cash commitments in times of crisis.

It is clear that the future regulatory framework will result in an increased role for financial markets in the financing of the economy. We are moving towards a different banking model and we need to allow banks to effectively manage the transition from a lending-based model to a new one reflecting the greater part played by capital markets in funding the economy. This transition is well underway and we firmly believe that the European universal banking model has demonstrated its resilience even in times of crises and is uniquely suited to provide the full range of financing services to our clients.

Derivatives will continue to play a key role in the financing and hedging needs of end-users. Regarding OTC derivatives in particular, the G20 commitments foresee relatively lower capital requirements for cleared OTC derivatives and relatively higher requirements for non-cleared transactions. Margin requirements, which were not addressed in the original Pittsburgh Communiqué, were later added to the agenda. Such requirements need to take into account existing capital standards for non-cleared derivatives and the benefits of a robust variation margin framework.

At Société Générale, we continue to adopt a proactive stance to meet our regulatory capital requirements, while ensuring that our customers' needs are at the core of our model. It demonstrates the financial sector's commitment to building a safer, more robust financial system.

In our view, despite near-term clouds the future of banking and finance continues to be bright. To achieve this potential, banks must properly focus on their core mission of facilitating and enabling growth by responding to customers' needs and financing the development of the economy and industry. They must do so while taking appropriate levels of risk and ensuring those risks are carefully understood, monitored and controlled. And they must work constructively with policymakers around the world to build a financial regulatory framework which supports sustainable growth and a more robust financial system.

Will the new regulatory regime for OTC markets impede financial innovation?

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Central clearing and settlement for standardised products provides private and systemic benefits with few costs. The required central clearing of non-standardised products would not be a good idea. To get the balance right, there should be some costs (be it capital adequacy or other) for non-central clearing and settlement which would encourage all standardised products to be centrally cleared, but allowing for non-standard products to exist if they can justify their existence through the added regulatory costs. There are some competition concerns. The regulatory requirement for central clearing gives monopolistic powers to clearers and vertically integrated institutions and there needs to be a counter-veiling competitive pressure such as the requirement of central clearers to accept clearing from different trade execution platforms.

At approximately EUR 500 trillion, the notional amount of over-the-counter (OTC) derivatives outstanding now exceed the size of the underlying cash markets by more than five times. This runs against the better instincts of many outside the financial sector. To them it seems unnatural for the tail to wag the dog. A popular view of the financial crisis is that it was caused by bankers, pulling out of their back pockets derivative instruments of mass destruction, throwing them into a crowd of bewildered consumers, grabbing the money and running away. Others believe that the business model of banks is to take advantage of asymmetric information: to over-charge their clients for derivative instruments that are more complex and opaque than they need or that they can comprehend.

Investors nursing heavy losses following the meltdown of the credit markets in 2008-2009, showed off fat prospectuses of credit derivative instruments they had purchased, filled with pages of impenetrable legalese, *before the small print* and asked how they could ever have been expected to understand it all? Perhaps they should have been expected never to have bought them all, but in these popular narratives, financial innovation is seen as a rouse for egregious profit by bankers at the expense of innocent consumers. There is strong clamour for radical changes to the OTC derivatives markets in order to better protect consumers.

The rise of OTC derivative instruments, especially in the credit markets over the past two decades, has contributed to the widening gap between gross exposures and net exposures. In normal times it is net exposures that matter. In times of crisis, where there is counterparty risk and uncertainty, gross exposures count and can engulf financial institutions. Unless mitigated in some way, the gap between gross and net exposures in the derivative markets, represents, and is a measure of, a systemic risk.

In response to these concerns politicians have contemplated aloud whether some derivatives should be banned, whether all instruments, including derivatives, should be exchange traded and centrally cleared, and whether new derivative products should require stringent regulatory approval before they can be sold, even into wholesale markets. Bankers have responded sharply against these threats. They have argued that these restrictions would strangle the capital markets, creating "missing markets" that would cause welfare losses. More prosaically, they argue that these restrictions would increase the costs for manufacturing and exporting companies of hedging their revenues or costs from swings in interest rates or the price of foreign exchange or commodities. Ably supported by their bankers, executives from the airline industry, for instance, have pleaded with the EU Parliament and US Congress to have derivative contracts for hedging the price of jet fuel exempt from new regulations that would require these contracts to be centrally cleared. They cite studies indicating that central clearing could add 10-20% to the cost of the hedge and that they would have to pass on the extra costs of central clearing to their customers.

Regulators have sought a middle road. The emerging framework for the regulation of OTC derivatives is generally not to ban or force all instruments on to exchanges, but (a) to improve transparency by mandating the reporting of all trades, (b) to end market abuse behaviour (c) and to reduce systemic risk by encouraging and requiring vanilla derivative options to be centrally cleared and exchange traded, and where they are not, for holders of these instruments to have margin requirements or to set aside additional capital. Is this a compromise born out of weakness towards the industry, or to populist pressure? What are the fundamental principles that should lie behind reaching the right balance? That is the subject of this article, which represents my personal views that may or may not be shared by officials at the Banque de France.

1| Political pressures post-crash

The detail of each financial crisis is often complex. Crises have many proximate causes. At the very highest-level, financial crashes, in which a great many people suffer, are simply the end-product of financial booms, in which many people benefited directly and many more indirectly. The line between victim and perpetrator is blurred. There are more than fifty shades of grey. There are also few quick fixes. Yet, in the heat of the crisis, caution by policy makers is interpreted as a reluctance to act or even, such is the politically combustible atmosphere, complicity. Faced with a crisis in which billions of tax-payers' money (the final bill across the European Union and the United States will be in the trillions of euros) have to be diverted from social programs and defense budgets to save banks, politicians are commanded

by newspapers and voters to deliver urgent, decisive and bold action: to seize the culprits and ask for the money back or some other restitution.

In the eyes of the newspapers and wronged consumers, the "crime" looms large and obvious. A popular parable of the crisis was of foreign speculators, using derivative instruments to sell local stocks they do not own, to press the value of a company's shares down to the point that triggered bank covenants that required the company to issue more shares, lowering share prices further and therefore creating self-fulfilling prophesies and general market stress. It is important to note that the equity derivative market is a small fraction of the credit derivative market. The credit markets were the main act. Moreover, this kind of behaviour was already unlawful, or where not specifically so, at least could have fallen within the catch-all of market abuse, or other banned behaviour. Nevertheless, what should be clear is that it was highly tempting and understandable, for governments everywhere, faced with the political pressures we have described above to outlaw instruments that many finger as toxic with a swash-buckling draw of the legislative axe.

On May 18, 2010, the German Minister of Finance announced that naked short sales of euro-denominated government bonds, credit default swaps (CDSs) based on those bonds, and shares in Germany's ten leading financial institutions would be prohibited. Similar, temporary, steps were made in Italy, Spain and the United Kingdom, and also outside the European Union in the United States and Korea. In November 2012, in an attempt to co-ordinate a number of similar but different initiatives across Europe, the European Union adopted regulation that included a ban on uncovered ("naked") CDS shorts on member states sovereign paper.

The idea that it was financial innovation and complexity (so well embodied in "CDOs-squared") that tripped up global finance last time around, has spawned the further proposal that the finance sector should have the equivalent of a Food & Drug Administration, that would rigorously test new innovations in the same way that new drugs are tested before doctors can prescribe them. Such testing might take years, at which point those instruments that were approved would then be sold alongside appropriate health warnings. This idea has been gaining momentum. It was a major part of the debate surrounding the Dodd-Frank Wall Street Reform and Consumer Protection Act that was signed into US Federal Law by President Obama July 21, 2010. The newly minted US Consumer Financial Protection Bureau may well take up this task. Europe's new single supervisor may follow suit.

Banning toxic instruments and cautiously approving others is not enough for many. Those suspicious of markets and in search of further decisive action are persuaded by the idea that the reason why all instruments do not trade on exchanges is solely the desire by traders to avoid the kind of reporting, transparency and central clearing that would reduce profit margins but also reduces systemic risk. Stories abound of shady activities taking place in "dark pools" of liquidity between financial institutions or even within them. Certainly, the shortage of information surrounding the size, nature and location of exposures was a contributory factor to the uncertainty that effectively closed the inter-bank money markets.

Politicians have called for everything to be brought into the bright light of exchanges. Some say that if traders do not wish to trade complex instruments on exchanges, where pricing, quantities and terms are available for all to scrutinize, or if they do not wish these instruments to be centrally cleared and settled, these instruments should not be traded at all. It should be noted that this idea benefits exchanges, many of which are no longer mutuals but for-profit entities. Unsurprisingly, exchanges can be found promoting or supporting the notion that everything should be on an exchange, or at the very least cleared by clearing houses, which are more often than not, also owned by exchanges.

These ideas – banning some existing, complex, derivative instruments, requiring new derivatives to be tested and approved, and requiring all others derivatives to be exchange traded – are flawed for a number of practical reasons and some quite fundamental ones. Regulators are right to be moderate. I shall examine the fundamental flaws, and suggest ways to achieve the greater financial stability we all seek.

2| A FUNDAMENTAL DEFENSE OF COMPLEXITY

There is a commonly held belief that complex products are not needed, are socially useless and are only there to obfuscate and earn egregious fees for bankers.

There is no denying that some of this happens, but the anti-complexity argument is overdone. Risk management is not about avoiding risks as risks are all around us. It is about diversification, about placing risks where there is a capacity to absorb them, and where there is limited capacity for risk absorption or diversification, and no desire to take the risk, it is about matching liabilities to assets.

If I have sold insurance to someone and may need to come up with a lot of cash unexpectedly, I cannot invest the bulk of my portfolio in illiquid assets. I must seek highly liquid instruments. If I manage a young pension fund that will have to make a series of cash payments in twenty years time, it makes no sense for me to purchase instruments that are expensive (provide a low return) because they offer over-night liquidity, like Government bonds. To do so would appear safe but in fact increases the risk that I would need additional contributions to afford future payouts. Similarly, if my liabilities are complex and changing, forcing me to only buy simple assets will mean that I will have unmatched risks. This would be riskier than if I could use a complex instrument to match my complex liabilities more fully. Eschewing complex assets in a complex world, does not reduce risk, but creates it.

There are two other arguments against the banning of instruments that also argue against committees of wise regulators, sagely deciding which instruments to approve and which to ban. First, almost all complex derivative instruments are built using a combination of simple, seemingly safe, financial instruments. I have not yet come across an "exotic" option that cannot be derived by a series of puts and calls. As the effects of the "sum" are greater than the sum of all the parts, these exotic options are invariably cheaper than trying to recreate them by buying the underlying puts and calls separately. As in architecture, where there are also common building blocks, complexity and simplicity are not as easy to distinguish as might first appear.

Second, financial crises are generally not caused by people doing things they know are risky. They are caused by people doing things they believe are safe; so safe that they believe they can safely double up on their bets. Bankers didn't throw instruments of mass destruction into a crowd of bewildered customers, then to run away. They ran towards them; trying to stuff as many of these instruments into their own pockets as possible. The real problem of the originate and redistribute model for the banks that failed is that they didn't redistribute enough, but tried to hold on to as much of the credit instruments as possible, thinking they had found a form of alchemy in their computer models where there was return without risk. Banks created all manner of off-balance-sheet, special purpose vehicles to enable them to hold more of these instruments themselves and to do so in a more leveraged manner than their balance sheets would otherwise allow. Anointing instruments as "safe" or "bad" is not going to solve this underlying problem. It could make matters worse. Instruments are not born with original sin. They become dangerous through excessive, concentrated or distorted uses. This excessive behaviour is more likely to take place if some agency has previously announced that some instrument is in fact "safe".

3| Why we need OTC markets

Exchanges work best for instruments where the size of the trade is small relative to the market, and therefore the announcement of a bid to buy does not push the price higher, or the announcement of an offer to sell, does not push the price lower. This captures well, for the most part, the market for ordinary shares of large public listed companies. If I announce that I want to buy EUR 100 of Sanofi shares, I am not going to push the market price higher and away from me. It is why, without any initial regulatory mandate, the main venue for trading equities became public exchanges.

However, in markets where the instrument being traded is large relative to the market, where the announcement of a bid or offer would move the market away from the bidder or "offerer", trades are negotiated "over-the-counter". Imagine if you had an exchange that cleared every day for residential houses. There would be enormous swings in the price of houses depending on the daily match of supply and liquidity for houses of certain sizes, styles, condition, neighbourhood and more. It makes sense that the residential house market has developed as an over-the-counter market and not an exchange traded one. Of course, being OTC rather than exchange traded does not mean it has to be unregulated. Housing market regulation is extensive in many countries and this regulation is largely indifferent as to how a house is sold, whether it is by physical or on-line auction, through a negotiated trade or otherwise.

Bond and currency markets tend to be "over-the-counter" because, contrary to popular understanding, these markets are large when taken as a whole, but small with regard to specific instruments. While a company might issue one type of share, it may have several different bond issues outstanding, each with different maturities, coupons and tax treatment. While the market capitalisation for all bonds may be large, the market for each specific type of instrument – say bonds that mature in eighteen months with a 5.5% coupon paid semi-annually, gross of withholding taxes, in US dollars – may be small relative to the size of the instrument. In the case of Government bonds for instance, the vast majority of trades take place on a few benchmarks issues like those with 2-year, 5-year and 10-year maturities, but the vast majority of issues outstanding were once "benchmark issues" but are no longer. Last year's 10 year has become a 9-year bond. The market for these "off-the run" instruments is far less liquid. Consequently, these instruments are more likely to be negotiated, not exchange traded.

The currency markets as a whole are one of the largest in the world by daily turnover – exceeding USD 5 trillion a day – however, the majority of currency transactions are for a forward, futures or swap where a specified amount of foreign exchange is delivered on a specific date and time. These are negotiated over-the-counter. The market for you to receive a million Brazilian reals in return for Argentine pesos at close of business, next week Thursday afternoon, is best negotiated and not announced, lest others being aware of your need for Brazilian reals at that moment squeeze the supply against you.

Evidence for this little theory of trading venues can be found in the observation that within the same "market", like equities, or Government bonds, exchanges will be used for small trades that will have no price impact and large trades that will have price impact are traded off-exchange or over-the-counter and sometimes then reported through the exchange as a negotiated trade that is cleared and settled in the same way as an exchange trade. The negotiated market in equities can be as large as the exchange-traded market.

There have been many previous attempts to put bond and currency markets on an exchange that have not succeeded because of the issues discussed above. What has emerged instead are electronic venues where market-makers quote indicative prices for small trades as a signal that they are open to offers and bids for larger, negotiated trades that are then afforded the same electronic trail of confirmations and settlement as quoted trades.

The same argument applies to a derivative instrument designed, for instance, to hedge the near unique currency needs and risk-tolerances, of an exporter. It would be pointless to put this on an exchange and maybe worse than pointless. Forcing all instruments on exchanges will lead to increased volatility. Because of the uniqueness of demand and supply of certain trades, announcing bids and offers, would force the market to disappear even though there is a buyer and seller, if only one of each. The central point is that the liquidity preferences of consumers of different financial instruments are revealed by their choice of trading venues. Instruments are traded not where there is greatest opacity but where there is greatest liquidity. Where the instrument is large relative to its market, the greatest liquidity is not found on an exchange which would likely sap liquidity and could lead to missing markets. It would seem a mistake to force consumers away from their revealed preferences.

4| Promoting greater financial stability

These arguments above do not imply that nothing should be done to ensure derivative markets are not a source of financial instability. They suggest we should be harder on behaviour and softer on instruments and trading venues. Behaviour that uses any instruments, be they derivative, complex or not, to create false markets and undermine the integrity of markets should be banned. A lot of damage was done with the simple instrument of a mortgage. Further, in the crisis, regulators were blind-sided by the lack of information. Transparency should be a requirement, independent of whether instruments are traded on exchanges or not. Under the 2004 EU Markets in Financial Instruments Directive (MiFID) market-making firms are already required to report off-exchange trading in instruments that are also traded on regulated exchanges in the European Union. It would not be a large change to require *post-trade* reporting of **all** trades wherever they are traded. Failure to report could lead to large penalties including the future unenforceability of the contract.

It is possible that banks have a built-in preference for selling complex instruments with fatter profit margins that are not best traded on an exchange, when a simpler more liquid set of instruments would suffice. Many believe this is common practice. Complex instruments are harder to clear and settle centrally, limiting exposures. Consequently, they can make resolutions more difficult and therefore represent a systemic risk. We can internalise this social externality by requiring firms to set aside capital for holding instruments that are not centrally cleared and settled – irrespective of trading venues. This will act like a tax, but not a ban, on complexity. It will incentivise simplicity and as many instruments as possible to be centrally cleared, and will encourage banks and their customers to only trade complex instruments where necessary.

There is an important competition concern that with exchanges owning clearing houses, regulation to require or incentivise central clearing of instruments will allow exchanges to capture the market of trading venues. The authorities can boost both competition and financial stability by ensuring the "interoperability" of clearing houses, where counterparties choose where they clear their transactions independently of where they trade them, and in response clearers grant fair access to third party trading venues. This would deliver more financial stability by maximising the netting across a wide range of related instruments irrespective of where the best place to trade those instruments are at any one time. Forcing trading venues and clearers to fight separately for business will also deliver better services and lower costs to users. This would be competition-supporting horizontal integration of the industry as opposed to competition-reducing vertical integration.

Another way to limit "excessive" complexity of behaviour would be to have a small transactions tax that applied to all instruments, including OTC derivatives, issued within participating countries. The lesson of the last ten years is that low transaction costs are good, but that near-zero transaction costs may not be as it allows huge edifices of circular transactions to take place, many times the underlying transaction. These would always be hard to unwind in an orderly fashion. A small transaction tax, which focused minds on the underlying value of each transaction, would limit socially useless transactions and would be a small price to pay if it preserved innovation and risk-reducing complexity.

We set out the revealed preference for trading liquidity and a little theory of trading venues. Whether intentionally or not, the emerging regulatory regime for OTC derivatives is close to what theory would recommend – this is less common in regulation than may be imagined. Alongside other concerns and other initiatives, the emerging regime as it stands today strikes a good balance between trading liquidity, innovation, consumer protection and systemic risk.

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