

The Changing Landscape for Derivatives

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ABSTRACT

This paper describes the changes taking place in derivatives markets as a result of the 2007-2009 credit crisis. It discusses the developments of new platforms for trading, the use of central counterparties for clearing, the role of trade repositories, and the requirements for the posting of collateral. It explains the way in which the over-the-counter and exchange-traded derivatives markets are converging and argues that liquidity is becoming as important as capital to banks in their decision making.

The Changing Landscape for Derivatives

Prior to the 2007-2009 credit crisis, the over-the-counter (OTC) derivatives market was largely unregulated. Two market participants could agree to any transaction they liked and then reach any agreement they liked on how the transaction would be cleared. They were also free to choose any arrangements they liked for the posting of collateral. This is no longer the case. The OTC derivatives market is now subject to a great deal of regulation throughout the world. The extent to which the OTC derivatives market should be blamed for the crisis is debatable, but regulatory changes are having more effect on this market than on almost any other sector of the economy. This paper outlines the changes taking place and examines their impact.

1. Trading Requirements

One of the post-crisis goals of regulators is price transparency. In September 2009, the leaders of the G20 nations agreed that “all standardized OTC derivatives should be traded on exchanges or electronic platforms, where appropriate.” This has led most developed countries to look for ways of developing platforms for trading OTC derivatives.

The reforms are furthest along in the United States. Dodd-Frank Act, signed into law in the United States by President Obama in July 2010, requires all standardized derivatives transactions be traded on what are known as swap execution facilities (SEFs). These are very similar to exchanges. They are electronic platforms where any market participant can post a bid or an offer (or both). Furthermore, any market participant can accept the bid or the offer quote of another market participant.

SEFs are regulated by the Commodity Futures Trading commission (CFTC). The implementation of the rules mandating the use of SEFs started in October 2013. As time progresses the range of OTC derivatives that can be traded in the traditional way in the United States (i.e., directly over the phone or by calling an inter-dealer broker) will become progressively smaller. Some SEFs are operated by exchanges. For example, in November 2013, the CME Group announced: “CME Group's SEF will be available over CME Direct, and will offer customers the flexibility they need for executing swaps side-by-side with listed futures in

markets where we have a strong presence. CME Group will initially focus on commodity products, and will look to develop additional markets over time with the industry.”

Other jurisdictions are heading in roughly the same direction as the United States, but not as quickly. Also, at present they are not as dogmatic as the United States about requiring the use of electronic platforms for all trading. The European Union is introducing Organized Trading Facilities (OTFs). The rules surrounding the use of SEFs and OTFs are not exactly the same at present, but they both have the same objective: to facilitate the trading of OTC derivatives electronically and multilaterally.

The cost to the few large banks that pre-crisis controlled the lion’s share of the derivatives market will be huge. They have traditionally been market makers and have earned a spread on all derivatives when dealing with other financial institutions and end users. When SEFs and OTFs become fully established, they will lose a large part of that spread income because the number of market makers will increase and the number of trades that occur directly between market participants who want to take opposite sides of the market will also increase.

2. Clearing Requirements

There are two main ways in which OTC derivatives are cleared: bilaterally and centrally. These are illustrated schematically in Figure 1.

In bilateral clearing, each pair of market participants enters into an agreement describing how all outstanding transactions between them will be cleared. Typically this is an ISDA Master Agreement. An annex to the agreement, known as a credit support annex (CSA), defines any collateral arrangements. The main body of the agreement defines what happens if one side declares bankruptcy, fails to make payments as they are due, or fails to post collateral when required.

In central clearing, a central counterparty (CCP) handles the clearing. A CCP operates very much like an exchange clearing house. Suppose that two members of a CCP agree to an OTC derivatives transaction such as an interest rate swap. They can present it to a CCP. The CCP will require the members to provide initial margin and variation margin for the transactions being

cleared. It also requires its members to contribute to a default fund. If one or both parties to the transaction are not members of the CCP, they can clear the transaction through members.

If a member fails to post margin when required, the member is in default and its positions are closed out. There is then likely to be a loss. A waterfall defines who bears the loss. The order in which funds are accessed is usually as follows:

1. The initial margin of the defaulting member
2. The default fund contribution of the member
3. The default fund contributions of other members
4. The equity of the CCP

In some cases, the non-defaulting members are required to provide additional default fund contributions up to a predetermined limit..

Futures transactions are cleared in such a way that traders do not need to worry about the creditworthiness of the people they trade with. Similarly, OTC traders do not need to worry about the credit quality of their counterparties when they clear through CCPs. The CCP stands between the two sides and uses initial and variation margin to manage default risk.

Pre-crisis, about 25% of OTC transactions were cleared through CCPs and the remaining 75% were cleared bilaterally. This is changing. Regulators now require all standardized interdealer trades to be cleared through CCPs. Nonstandard transactions, some foreign exchange transactions, and transactions with non-financial end users can continue to be cleared bilaterally. When the dust settles, it is expected that the pre-crisis percentages will be reversed with 75% of new OTC transactions being cleared through CCPs and 25% being cleared bilaterally.

The increasing use of SEFs, OTFs, and CCPs is one factor that will tend to make the distinction between OTC and exchange-traded markets less clear cut than it has been in the past. Indeed, an OTC trade on an SEF or OTF that is passed immediately to a CCP is very similar to an exchange-traded futures or options transaction where an electronic system is used to match buyers and sellers and trades are cleared through the exchange clearing house.

Trades that are not cleared through CCPs (referred to as “uncleared” in the regulations) will continue to be cleared bilaterally. But new regulations will require dealers to post initial margin

and variation margin for bilaterally cleared transactions with all market participants except non-financial end users. The initial margin has to provide protection over a 10-day period of stressed market conditions with 99% confidence. The initial margin typically has to be posted with a third party. (If both sides posted initial margin with each other the two initial margins would cancel each other out.) Not surprisingly, organizations are being set up to facilitate the posting of margin on uncleared transactions. As a result, uncleared OTC transactions, as well as those OTC transactions cleared centrally, are beginning to look somewhat like exchange-traded transactions.

Pre-crisis it was relatively rare for initial margin to be required in the bilaterally-cleared OTC market. The new regulations will therefore greatly increase the amount of margin or collateral required from derivatives market participants worldwide. We will move from a world where 25% of OTC derivatives transactions required initial margin to be posted (because they were cleared centrally) to a world where initial margin is required for nearly all derivatives.

As discussed by Duffie and Zhu (2011) there is one potential partial offset to the huge increase in collateral requirements mandated by the new rules. Under central clearing there is the potential for more netting. In Figure 1, under bilateral clearing, a market participant has 7 different netting sets, one for each of the other market participants. Under central clearing there is only one netting set. Bank A can, for example, net its transactions where Bank B is the counterparty with its transactions where Bank C is the counterparty providing all go through the same CCP.

Figure 1, however, is a simplification. It suggests that the choice is between a 100% bilateral world and a world where all transactions are cleared through a single CCP. The reality is that a) there will be several CCPs and it is quite likely that they will not cooperate with each other to reduce initial margin requirements and b) some transactions will continue to be cleared bilaterally so that at least for a while we will be living in a world where part of a bank's derivatives portfolio is cleared centrally and part is cleared bilaterally. It is possible to come up with examples where the move to central clearing reduces netting because it breaks up existing netting sets.¹ (Pre-crisis a bank's nonstandard transactions could be netted with its standard transactions; this will not happen in the new world of derivatives.)

¹ See for example Hull (2010).

3. Reporting Requirements

Prior to the crisis, OTC derivatives trades were private transactions that did not have to be disclosed to an outside party. This has changed. Regulators in most jurisdictions now require all OTC derivatives transactions to be reported to a central trade repository. In Europe, the responsibility for this rests with the European Securities and Markets Authority (ESMA) under the European Markets Infrastructure Regulation (EMIR). In the United States the responsibility rests with the Commodity Futures and Trading Commission (CFTC) under the regulatory framework provided by Dodd-Frank. In 2011, the Depository Trust and Clearing Corporation (DTCC) was selected as the preferred service provider for building and managing a Global Trade Repository (GTR) for OTC derivatives (both those cleared centrally and those cleared bilaterally).

A central trade repository should increase transparency and provide regulators with a clearer view of what is going on in the market, enabling them to identify potential problems earlier than before. Regulators do not want a repeat of the situation in September 2008 when they were suddenly made aware of problems at the large insurance company AIG. This company had entered into many OTC derivatives transactions where it guaranteed the performance of AAA-rated tranches of ABS CDOs that were created from subprime mortgages. The agreement it had with its counterparties stated that it did not have to post collateral providing its credit rating was AA or above. On September 15, 2008, S&P, Moody's, and Fitch all downgraded AIG from AA to A. The OTC derivatives transactions were out of the money and AIG did not have the financial resources to meet the collateral demands of its counterparties. This led to an \$85 billion bailout by the US government.

4. Systemic Risks and CCPs

The key objective of regulators is of course to reduce systemic risks. Some commentators have criticized the new derivatives landscape as one where too-big-to-fail banks have been replaced by too-big-to-fail CCPs. It certainly would be a disaster for the financial system if a major CCP such as LCH Clearnet or CME Clearing were to fail. But it should be possible to design CCPs so that they are almost default-free. I will outline how the contract between a CCP and its members

can achieve this shortly. A key point is that CCPs are much simpler organizations than banks. They are therefore much simpler to regulate than banks. In essence, regulators need ensure only that the CCP follows good practices in a) choosing members, b) valuing transactions, and c) determining initial margins and default fund contributions. In the case of banks, there are a myriad of different much more complex activities that must be monitored. It is of course important for regulators to ensure that CCPs are not allowed to become more complex organizations by expanding outside their core activity of intermediating derivatives transactions.

It seems likely that over time CCPs will become more and more comfortable handling less standard transactions. (Indeed the definition of a “standardized transaction” is to all intents and purposes one that a CCP is prepared to clear.) A CCP currently has two main requirements before it accepts a transaction for clearing. It must be able to (a) value the transaction and (b) unwind the position of one side in the event of a default. Developments in the market might increase the range of transactions that satisfy these two requirements. Consider first valuation. If a CCP does not have the expertise to value a transaction, it could ask another dealer (ideally not one of the market participants doing the transaction) to act as a valuation agent.

Consider next the unwinding of the transaction. Hull (2012) discusses how a small change to the agreement between a CCP and its members might solve the problem that it does not have the expertise to unwind a transaction. If a defaulting member has a transaction with a CCP there must be other members of the CCP with opposite transactions of at least the same size as the transaction of the defaulting member. It could be a requirement that all members with opposite transactions agree to unwind all or part of their positions in the transaction at the most recent settlement price to effect the unwind of the defaulting member. A formula can then be used to determine how the defaulting member’s initial margin and the default fund is used to fully or partially compensate these members for any losses arising from market movements between a) the last settlement at which the defaulting member posted variation margin and b) the unwind date. Given the way CCPs operate, this period should be little more than one business day.

There are two key advantages of the proposal in Hull (2012). First, the CCP does not need to have any trading expertise in the products it accepts for clearing because the members take care of the unwind, The CCP is therefore likely to be prepared to clear a wider range of transactions.

Second, unwinding the transactions of a member will never cause a CCP to fail. Again, this is because the other members with opposite transactions always handle the unwind.

5. Liquidity

We have made the point that the new regulations will require derivatives market participants to post more collateral. Most of this collateral will have to be in the form of cash or government securities. An increasingly important consideration for all derivatives market participants is therefore liquidity. Not only will the collateral already posted be a drain on liquidity but banks will have to keep a sufficient quantity of liquid assets on hand to ensure that they are able to meet any margin calls they receive immediately. Basel III has recognized the importance of liquidity by proposing two new liquidity ratios that banks must adhere to. Capital has in the past been the key metric in determining the profitability of different business units and different projects at a bank. In the future a two-dimensional metric involving capital and liquidity is likely to be used. Often there will be a trade off between capital and liquidity.

Liquidity pressures are likely to increase because of another post-crisis change. Rehypothecation was common in some jurisdictions (particularly the UK) pre-crisis. It involved a dealer using collateral posted with it by one counterparty to satisfy a collateral demand by another counterparty. It is estimated that pre-crisis about \$4 trillion of collateral was required in derivatives markets, but that because of rehypothecation only \$1 trillion of new collateral was posted. In other words, each item of collateral was used on average four times.²

Rehypothecation will be restricted under new rules developed by the Basel Committee and IOSCO.³ These rules allow initial margin to be rehypothecated once, but only if certain conditions are satisfied.

6. Conclusions

Post-crisis regulations have caused OTC markets to become more like exchange-traded markets. Also exchanges are increasingly trying to offer less standard products to institutional investors in

² See Singh and Aitken (2010)

³ See Basel Committee and IOSCO (2013)

an attempt to take business away from the OTC market. As a result exchange-traded markets are to some extent moving in the direction of becoming more like OTC markets. Many CCPs and exchanges have a common ownership and will find areas for cooperation on margin requirements and business practices. Whether a transaction is being cleared through an exchange or a CCP may not be important in the future because it will be handled in the same way by the same organization.

What will the derivatives world look like in 15 or 20 years? As just mentioned, present trends indicate that there will be a convergence between OTC and exchange-traded markets and the distinction between the two will become blurred. But it should be acknowledged that there is no certainty that this trend will continue. The OTC market as it existed before the crisis was very profitable for a few large banks. It is possible that they will chip away at the regulations so that they are able eventually to find a way of creating a new OTC market somewhat similar to the one that existed before the crisis. A battle is likely to take place pitting the determination of regulators against the ingenuity of banks.

References

Basel Committee on Banking Supervision and IOSCO (2013), “Margin Requirements for Non-Centrally Cleared Derivatives,” September.

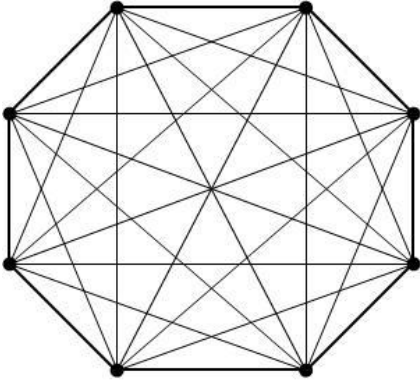
Duffie, Darrell and Haoxiang Zhu, “Does a Central Counterparty Reduce Counterparty Risk?” *Review of Asset Pricing Studies*, 1 (2011), 74-95.

Hull, John (2010), “OTC Derivatives and Central Clearing: Can All Transactions Be Cleared?” *Financial Stability Review*, 14 (July 2010), 71-89.

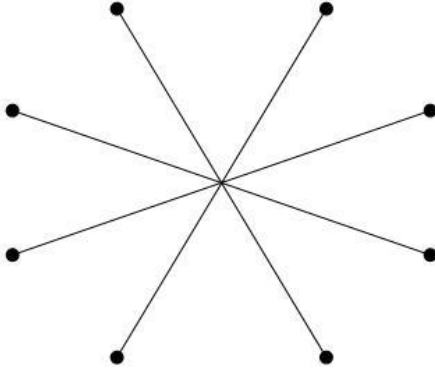
Hull, John (2012), “CCPs, Their Risks, and How They Can Be Reduced” *Journal of Derivatives*, 20, 1 (Fall 2012), 26-29

Singh, Manmohan and James Aitken (2010). “The (sizable) Role of Rehypotheication in the Shadow Banking System,” Working Paper, International Monetary Fund.

Figure 1: Bilateral and Central Clearing When There Are Eight Market Participants



Bilateral Clearing



Clearing through a single CCP