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Counterparty risk and contract volumes in the credit default swap market[1]

After more than a decade of rapid growth, the volume of outstanding credit default swaps peaked at almost $60 trillion at the end of 2007. Since then it has nearly halved, while turnover has continued to rise. The decline in volumes outstanding reflects intensified efforts to reduce counterparty risk, which have eliminated more than $65 trillion of offsetting positions.

JEL classification: G23, G28.

After rapid growth, the outstanding volume of CDS fell sharply …

The notional amount of outstanding credit default swaps (CDS)[2] grew rapidly from the market's beginnings in the mid-1990s to a peak of almost $60 trillion at the end of 2007,[3] but then declined sharply to just over $30 trillion at the end of the first half of 2010 (Graph 1, left-hand panel). This feature argues that the decline did not occur because CDS lost some of their appeal in the light of the recent financial crisis. Indeed, trading volumes have continued to rise. New trade volumes at the major CDS dealers were almost twice as high in the first nine months of 2010 as in the same period in 2007, according to Markit. Instead, the sharp drop in the volume of outstanding CDS is due to trade compression and the move to central counterparties in the CDS market.

… reflecting concerns about counterparty risks …

Perceptions of counterparty risk can explain both the rise and subsequent fall in the volume of outstanding CDS. Until the onset of the subprime mortgage

[1] I thank Claudio Borio, Stephen Cecchetti, Jacob Gyntelberg and Christian Upper for helpful comments. The views expressed are those of the author and do not necessarily reflect those of the BIS.

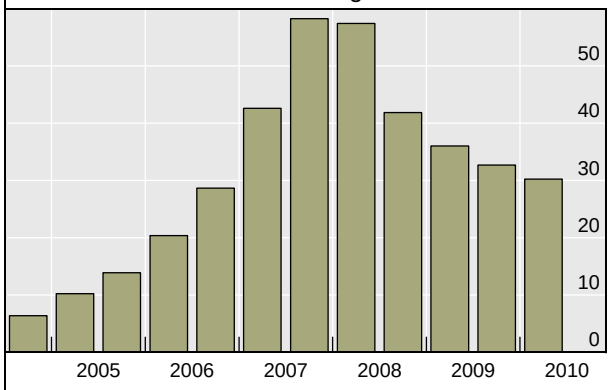
[2] CDS provide protection against default losses. In case of a credit event – a default on scheduled payments or a debt restructuring – the seller of protection makes a payment equal to the losses on specified debt obligations. The protection buyer, in turn, pays regular premiums for this protection. Notional amounts are the principal amounts of the debt obligations referenced by CDS. The market value of outstanding CDS, which is the cost of replacing contracts at prevailing market prices, shows a similar pattern of rapid growth followed by a substantial decline in the past few years (Graph 1, right-hand panel).

[3] Reasons for this growth are described in Packer and Suthiphongchai (2003), Amato and Gyntelberg (2005), Ledrut and Upper (2007) and Fender and Scheicher (2008).

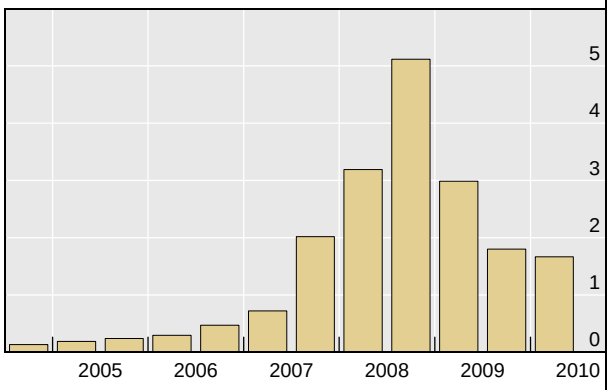
Measures of the size of the CDS market

In trillions of US dollars, end of period

Notional amounts outstanding[1]



Gross market values[2]



[1] Principal amount of debt insured by outstanding CDS. [2] Cost of replacing outstanding CDS at prevailing market prices from the standpoint of counterparties with positive market value.

Source: BIS.

Graph 1

crisis in 2007, market participants perceived counterparty risks to be small. As a result, if a party to a CDS wished to exit its position, it would often establish a new offsetting position rather than try to negotiate early termination of the original CDS with its counterparty.[4] This would leave existing counterparty exposures in place while adding new ones. Concern about counterparty risk then surged in the second half of 2007 and in 2008, when major CDS dealers incurred substantial valuation losses on financial contracts linked to subprime mortgages. There were also fears of significant credit losses arising from the default of counterparties to undercollateralised subprime-linked contracts.

… which are interdependent

A significant aspect of counterparty risk concerns was that the major CDS dealers were important counterparties to one another. Although inter-dealer exposures were often small on a net basis, they were frequently large in gross terms, and there were fears that any agreement to net obligations across contracts might not be enforceable in the event of default. Furthermore, the value of these exposures grew substantially as credit spreads widened during the crisis. The fates of major CDS dealers were therefore perceived to be somewhat intertwined.[5] This limited the scope for shifting CDS business from weaker to stronger dealers. Box 1 discusses the manifestation and measurement of CDS counterparty risk in more detail.

The remainder of this feature describes the main actions that have been taken to mitigate counterparty risk in the CDS market in the light of the crisis. These include shifts in trading patterns, which market participants were able to implement quickly, as well as structural changes, which required coordination. Structural measures have helped to locate and tear up more offsetting

[4] This would allow quotes from several possible new counterparties to be compared, potentially delivering better value than dealing with the single counterparty to the original CDS.

[5] Fender et al (2008) describes in more detail how the crisis affected major dealers and how emergency measures were taken to reduce the chance of knock-on failures after the default of Lehman Brothers.

Box 1: Measuring counterparty risk exposures in the CDS market

The notional amount of a CDS is the principal amount of debt "insured" by the contract. This is the maximum amount that a seller of protection might have to pay to the buyer. Such an obligation would arise if the entity referenced in the contract defaulted and the recovery rate on its debt was zero. Notional amounts therefore reflect the maximum potential future counterparty exposure of the protection buyer to the protection seller.

The market value of a CDS records the cost of replacing the contract with an equivalent new contract at current market prices. As such, it provides an indication of current counterparty exposure. Market values are typically much smaller than notional amounts. This is because they reflect the difference between the present values of anticipated future premiums and default-linked payments, and the likelihood of default-linked payments is often small.

Neither notional amounts nor market values, however, are comprehensive measures of counterparty risk exposures, as they ignore netting arrangements and collateral. Most outstanding CDS contracts include "closeout netting" provisions, which have proved legally enforceable in the past. This means that current exposures can generally be netted in the event of a counterparty default. Since CDS market participants often hold with the same counterparty some contracts with positive market value and some contracts with negative market value, current counterparty exposures tend to be much lower than gross market values. Gross credit exposures, as reported in the BIS semiannual over-the-counter derivatives statistics, take this into account. They record the sum of market values of all outstanding contracts from the point of view of counterparties with positive market value, after allowing for legally enforceable netting. Credit exposures still overstate current counterparty risk exposures, however, as market participants with positive market value often demand collateral from their counterparties. This would offset losses should the counterparty default.

positions. Indeed, over $65 trillion of CDS have been eliminated in this way since the end of 2007. After allowing for some offsetting upward influences, such as continued growth in trading volumes, this explains the decline of almost $30 trillion in the volume of outstanding CDS during this period.

Shifts in trading patterns in the light of counterparty risk concerns

Immediate responses ineffective in systemic crisis

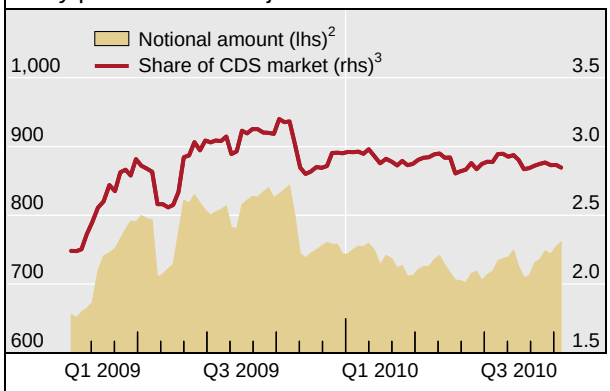
Market participants responded to increased concern about counterparty risk by buying protection on CDS dealers and shortening the maturity of their new contracts. But none of these trading responses represented a comprehensive solution to the problem. Buying protection on one dealer from another dealer is of limited value if there are systemic concerns about the robustness of counterparties in the market. Similarly, shortening maturities may be worth little if potential new counterparties represent as great a risk as the incumbent when it comes to replacing maturing contracts.

Attempts to hedge counterparty risk through CDS were reflected in major CDS dealers moving up the rankings of the most popular individual reference entities on which to buy credit protection, as reported in Fitch Ratings' Global Credit Derivatives Surveys. Seven major dealers were among the top 25 reference entities in 2008, for example, up from just two in 2006.[6] Data from

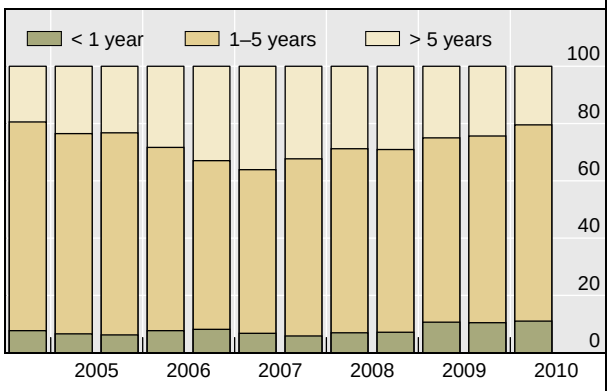
[6] Major CDS dealers were defined as Bank of America–Merrill Lynch, Barclays Capital, BNP Paribas, Citi, Credit Suisse, Deutsche Bank, Goldman Sachs, HSBC, JPMorgan Chase, Morgan Stanley, Royal Bank of Scotland, Société Générale, UBS and Wells Fargo Bank, as well as Lehman Brothers before its failure in 2008.

Trading responses to counterparty risk concerns in the CDS market

Buy protection on major CDS dealers[1]



Shorten maturities[3, 4]



[1] Outstanding notional amount of CDS referencing Bank of America–Merrill Lynch, Barclays Capital, BNP Paribas, Citi, Credit Suisse, Deutsche Bank, Goldman Sachs, HSBC, JPMorgan Chase, Morgan Stanley, Royal Bank of Scotland, Société Générale, UBS and Wells Fargo Bank. [2] In billions of US dollars. [3] In per cent. [4] Distribution of notional amounts of outstanding CDS by maturity.

Sources: DTCC; BIS. Graph 2

the Depository Trust & Clearing Corporation (DTCC) then show that the notional amount of outstanding CDS contracts referencing major CDS dealers increased into 2009, rising from around $660 billion (2.2% of all outstanding CDS) at the start of the year to $840 billion (3.1% of outstanding CDS) in the third quarter (Graph 2, left-hand panel). Although this response to increased concern about counterparty risk boosted, rather than reduced, the volume of outstanding CDS, its effect was small relative to other influences that have pulled down this volume.

Another response was to shorten maturities

The move to shorter maturities can be seen in the right-hand panel of Graph 2. This shows that the proportion of outstanding CDS contracts with maturities of less than one year has increased since the end of 2007, while that of contracts with maturities in excess of five years has fallen. As long as maturing CDS are replaced with new contracts, however, shortening maturities will not affect the outstanding volume of CDS.

Structural changes to mitigate counterparty risks

Structural measures have also been introduced

The most important structural measures implemented in the CDS market to reduce counterparty risk were to accelerate the pace of trade compression and to introduce central counterparties (CCPs). The effect of both measures is to allow contracts on offsetting positions to be torn up. The scope for such tear-ups, however, greatly depends on how far CDS contracts are standardised.

Standardisation

These measures have been aided by standardisation …

Standardisation is a low-cost way to increase the number of offsetting CDS by equalising more of the cash flows that they generate.[7] This, in turn, makes it

[7] Initiatives to ensure that contract cash flows are clearly defined and readily available for comparison are further prerequisites for a high volume of tear-ups. The Reference Entity Database (Markit (2009)) and the Trade Information Warehouse (DTCC (2007)) are examples of such initiatives.

easier to locate and tear up contracts, thus reducing counterparty risk. The degree of standardisation varies among product types. For example, CDS indices, which offer protection against default losses on portfolios of reference obligations, are highly standardised. They pay standard coupons on particular dates, and any default-contingent payments are generated by a fixed pool of reference obligations, which is determined on a consistent basis. Index tranches, which offer protection conditional on default losses on CDS index portfolios falling within certain ranges, are similarly standardised. Until last year, however, "single-name" CDS, which insure the debt of individual reference entities, were much less standardised. But then a "Big Bang" of numerous changes to contract documentation brought standardisation for single-name CDS up to a level comparable to that applied to CDS indices and index tranches. The Big Bang and its implications for the standardisation of single-name CDS are discussed in more detail in Box 2.

… which facilitates netting …

Additional offsetting of cash flows is a benefit of standardisation that has helped to reduce counterparty risk in the CDS market without affecting the volume of outstanding contracts. Cash flows may be offset when a pair of counterparties has multiple contracts that require payments to be made in opposite directions on the same day. In general, such contracts cannot easily be torn up because they do not insure the same risks. Netting can significantly reduce payment volumes and, hence, reduce the likelihood of counterparty defaults due to cash flow shortages. In 2009, for example, the contracts recorded in DTCC's Trade Information Warehouse generated 557,000 payments, whereas 10.9 million payments would have been required if netting had not taken place. The warehouse also provides timely data to regulators on the CDS positions of market participants.[8]

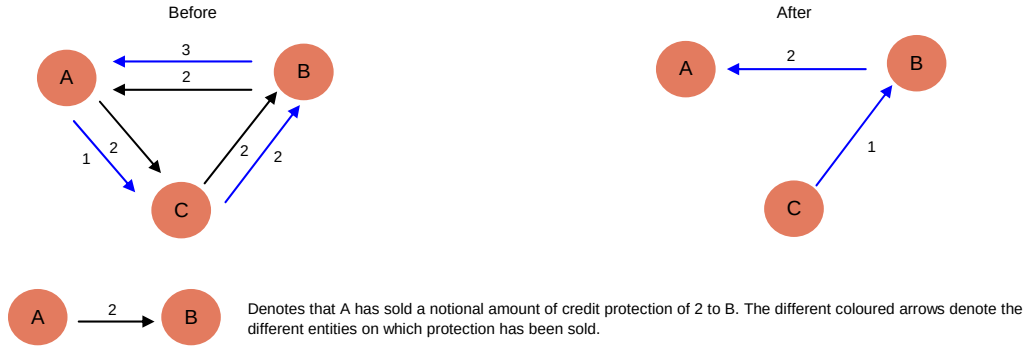
Trade compression

… and trade compression …

Standardisation has also greatly assisted trade compression, which eliminates counterparty risk in offsetting contracts by tearing them up. Some tear-ups have been arranged bilaterally, but multilateral solutions tend to be more effective in identifying offsetting contracts. Such services input the portfolios of users into an algorithm that reproduces the same portfolio risk exposures for each participant using a smaller volume of contracts while complying with any limits on counterparty exposures specified by users. The redundant contracts may then be torn up, as illustrated in Graph 3. Contracts can simply be eliminated or be replaced with new contracts with smaller notional amounts. Even greater volumes of contracts can potentially be torn up if users of trade compression services agree to minor changes in the risk profiles of their portfolios in exchange for compensating payments. The precise outcome depends on the users, since they can accept or reject proposals created by the algorithm, with acceptance by all users required for a proposal to be implemented.

[8] Coverage of the DTCC data is reported and compared with BIS data in Gyntelberg et al (2009).

An illustrative example of trade compression

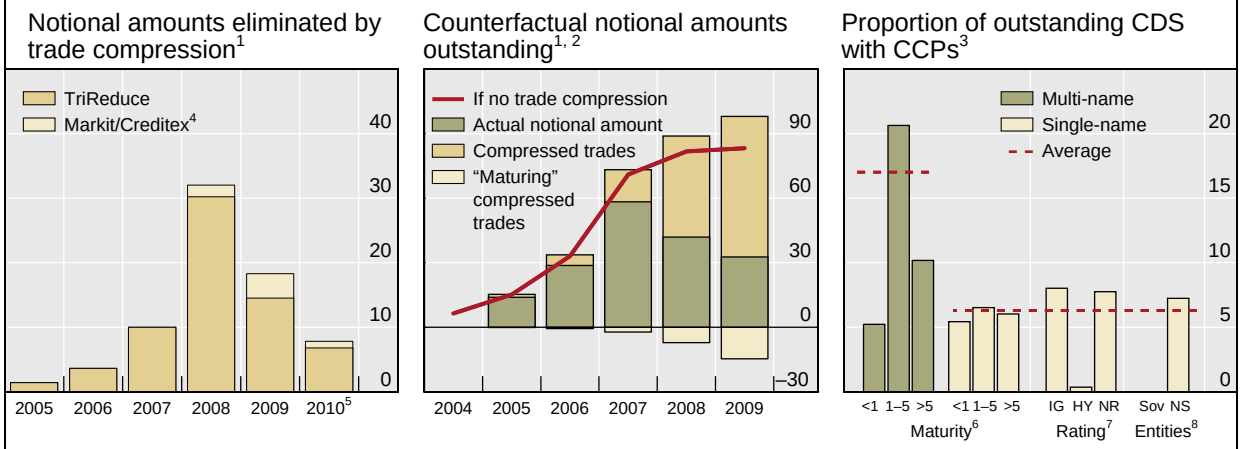


Source: BIS. Graph 3

... which has eliminated $72 trillion of CDS

TriOptima became the first company to offer CDS portfolio compression when it extended its TriReduce service from interest rate swaps to the CDS market in 2005. In the CDS market, TriReduce has compressed mainly portfolios of CDS indices and index tranches, but single names have accounted for an increasing share of its compression volumes since standardisation in 2009. In total, TriReduce has eliminated a notional amount of CDS in excess of $66 trillion. Of this amount, $30 trillion was eliminated in 2008, when concerns about counterparty risk were at their highest. In August 2008, Markit and Creditex jointly launched a trade compression service for single-name CDS. Since then, this has eliminated a notional amount of CDS contracts in excess of $6 trillion. The left-hand panel of Graph 4 shows time series of the notional

Trade compression and CCPs in the CDS market



[1] In trillions of US dollars. [2] The beige bars show estimates of the notional amounts of compressed trades that would have matured if they had not been eliminated by trade compression. These were produced by assuming that the contracts compressed during each year had the same maturity distribution at the start of that year as the distribution of maturities of all outstanding CDS contracts at the start of 2010, as reported by DTCC. The projections of outstanding notional amounts in the absence of trade compression, denoted by the red line, are over-estimates to the extent that compressed trades would have terminated for reasons other than reaching maturity, such as due to the default of the underlying or one of the counterparties, if they had not been eliminated by compression. [3] In per cent, as of end-June 2010. [4] Estimates based on public sources. [5] As of end-Q3 2010. [6] Maturities of less than one year, one to five years and more than five years. [7] Rating categories are investment grade (IG), high-yield (HY) and not rated (NR). [8] Underlying reference entities are split into sovereigns (Sov) and non-sovereigns (NS).

Sources: IMF; Creditex; DTCC; *Risk* magazine; TriOptima; BIS. Graph 4

Box 2: The "Big Bang" in the CDS market

To help standardise single-name CDS contracts, the International Swaps and Derivatives Association (ISDA) introduced a number of documentation changes in its "Big Bang" of April 2009. These helped to standardise both the regular coupon payments made by single-name CDS and the default-contingent payments. The changes are summarised in Table A.

One major change that helped to standardise coupon payments was the introduction of a small number of standard coupon rates. In combination with standard contract sizes, these fixed the size of coupon payments, which were already paid on standard dates (20 March, 20 June, 20 September and 20 December). To compensate for any differences between the appropriate premium and the chosen standard coupon rate, counterparties exchange an upfront payment. A change was also made to the first coupon. Previously, this was either a small coupon paid on the first coupon date or a large coupon paid on the second coupon date, depending on when contracts became effective. Now, first coupons are full coupons, and upfront payments are adjusted accordingly.

To help standardise default-contingent payments, the Big Bang harmonised across contracts the triggers of credit events and their consequences. For example, it established Determinations Committees for determining whether a credit or succession event has occurred as the standard condition in contract documentation. This has reduced the scope for different contracts on the same reference entity to disagree about whether such events have occurred. The Big Bang also hardwired into documentation that the size of payments following credit events would be determined by an auction process. The prices emerging from such auctions ensure that all protection sellers transfer the same value to protection buyers. Finally, the Big Bang changed the dates on which contracts are considered to have become effective from the business day following the trade to a set of standard dates. This ensures that all outstanding contracts are affected by the same events, even when these are reported with a lag.

CDS contract standardisation measures introduced in the Big Bang

Measure	Implication
Standard coupon rates	In combination with standard contract sizes, help to equalise the size of cash flows across contracts
Full first coupons	In combination with standard contract sizes, equalise the size of first coupons on different contracts
Determinations Committees	Consistent treatment of contracts in the light of credit and succession events[1]
Auction protocol	Determines unique prices for settlement of contracts in the light of credit events
Standard effective dates	All outstanding contracts on a given reference entity affected by the same events

[1] Succession events describe situations, such as corporate acquisitions, in which a new entity succeeds to the obligations of the previous reference entity. Table A

amount of CDS eliminated by both trade compression services. After eliminating slightly more than half of the notional amount of outstanding CDS in 2008, the volume of trade compression has necessarily slowed in 2009 and 2010. This also reflects the fact that CCPs began to tear up CDS from early 2009. Nevertheless, in the absence of trade compression, the outstanding volume of CDS would have continued to grow – to an estimated $80 trillion, which is 2½ times the actual value (Graph 4, centre panel).[9]

[9] The effect of trade compression on the notional amount of outstanding CDS contracts is also discussed in Gyntelberg and Mallo (2008).

Central counterparties

Central counterparties have been introduced …

CCPs further boost the scope for netting and trade compression. Trades are placed with CCPs by replacing bilateral CDS contracts between a protection buyer and a protection seller with a contract between the protection buyer and a CCP and another contract between the same CCP and the protection seller. As illustrated in Graph 5, this initially doubles the volume of outstanding contracts. As the graph also illustrates, however, the substitution of multiple counterparties for the central counterparty also generates more offsetting bilateral positions, which may be torn up. It also generates more bilateral positions that do not fully offset but whose cash flows may offset at particular points in time, and hence may be netted. Counterparty risk is further reduced if the CCP is an especially robust counterparty to remaining contracts. CCPs aim to ensure that this is the case by imposing strict collateral requirements on counterparties and by maintaining an emergency fund to draw on in the event of counterparty defaults.[10]

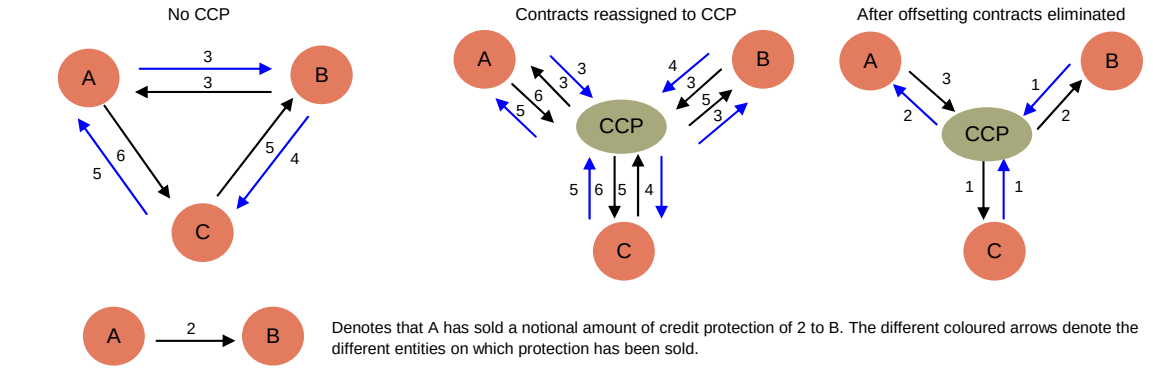
… which have cleared $11 trillion of CDS

Several firms currently operate central counterparty clearing facilities for CDS, but ICE Trust US and ICE Clear Europe have done the vast majority of such clearing to date. Together they have cleared a notional amount of contracts in excess of $11 trillion since their respective launches in March and July 2009. Both institutions initially offered clearing of CDS indices but have subsequently extended this to single-name CDS. Clearing has also been extended from inter-dealer trades to trades involving hedge funds and other buy-side investors, although a notional amount of only $4 billion of such contracts has been cleared to date.[11]

CCPs have eliminated five sixths of cleared volumes …

Table 1 shows new BIS data on the proportion of outstanding CDS contracts held with CCPs as of the end of June 2010. Across the market, CCPs were counterparties to a notional amount of $3.2 trillion of outstanding CDS at

An illustrative example of clearing with a CCP in the CDS market



Source: BIS. Graph 5

[10] The advantages and disadvantages of central clearing in OTC derivatives markets and its implications for financial stability are considered in more detail in Cecchetti et al (2009).

[11] Cecchetti (2010) makes a case for greater use of CCPs by non-dealers, including non-financial firms, especially via segregated accounts.

Proportion of outstanding CDS with CCPs

By notional amounts and gross market values[1]

	CDS	Total outstanding ($ trillions)	With a CCP ($ trillions)	Proportion with CCPs (in per cent)
Notional amounts	All	30.3	3.2	10.5
	Single-name	18.4	1.2	6.3
	Multi-name	11.9	2.0	17.0
Gross market values	All	1.67	0.06	3.8
	Single-name	0.99	0.03	2.7
	Multi-name	0.67	0.04	5.5

[1] As of end-June 2010.

Source: BIS. Table 1

that time.[12] The total volume of CDS that had been cleared by CCPs by the end of June 2010 was around $9 trillion, generating positions of $18 trillion between CCPs and market participants. This suggests that CCPs have eliminated around five sixths of the contract volumes assigned to them. However, this may overrepresent the amount of counterparty risk eliminated from the market by CCPs, as the contracts with CCPs had lower market values than the market average. The new BIS data show that while the outstanding contracts held with CCPs at the end of June 2010 accounted for 10.5% of the notional amount of outstanding CDS, they accounted for only 3.8% of the outstanding gross market value. This at least partly reflects the lower price volatility of indices, which account for a greater volume of contracts cleared by CCPs than single-name contracts.

… focused on CDS indices

Both notional amounts and market values suggest that a higher proportion of CDS indices, index tranches and other "multi-name" CDS are held with CCPs than single-name CDS. This reflects the longer and more complete acceptance of CDS indices than of single-name CDS by CCPs, which in turn proceeds from the generally superior liquidity of CDS indices and index tranches. Superior liquidity may also explain the relatively greater use of CCPs for contracts with one- to five-year maturities and investment grade single-name CDS than for high-yield single-name CDS, as shown in the right-hand panel of Graph 4. The greater use of CCPs for non-rated and non-sovereign single-name CDS may reflect the underlying risk of these contracts, which is often greater than for rated and sovereign contracts respectively. Market participants may have been particularly keen to clear such contracts with CCPs in anticipation of higher chances of large movements in market value that would result in significant counterparty exposures.

[12] This is very similar to the amount of $3.3 trillion as of end-July 2010 reported by DTCC and published in the table on page 24 of FSB (2010).

Conclusion

The near halving of the outstanding volume of CDS since the end of 2007 does not reflect any broad-based loss of appeal by CDS. Indeed, trading volumes have grown strongly during this period. Instead, it reflects intensified efforts to mitigate counterparty risk, notably via trade compression and central counterparties. Trade compression has eliminated contracts with a notional amount of more than $58 trillion since the end of 2007, and CCPs have torn up at least a further $7 trillion. Looking ahead, tear-ups may further reduce outstanding contract volumes, especially for single-name CDS, which have only recently benefited from standardisation. As outstanding volumes have already halved, however, the pace of any further decline must soon slow.

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