
Changing post-trading arrangements for OTC derivatives²

The post-trading infrastructure of OTC derivatives markets has not always kept up with the rapid growth in trading volumes. Recent years have seen some initiatives that seek to introduce multilateral elements that facilitate flows of information between market participants while preserving the decentralised nature of the transactions. While central counterparties lead to the highest degree of mutualisation, other services, such as central information depositories or multilateral terminations, could deliver similar benefits in terms of information management.

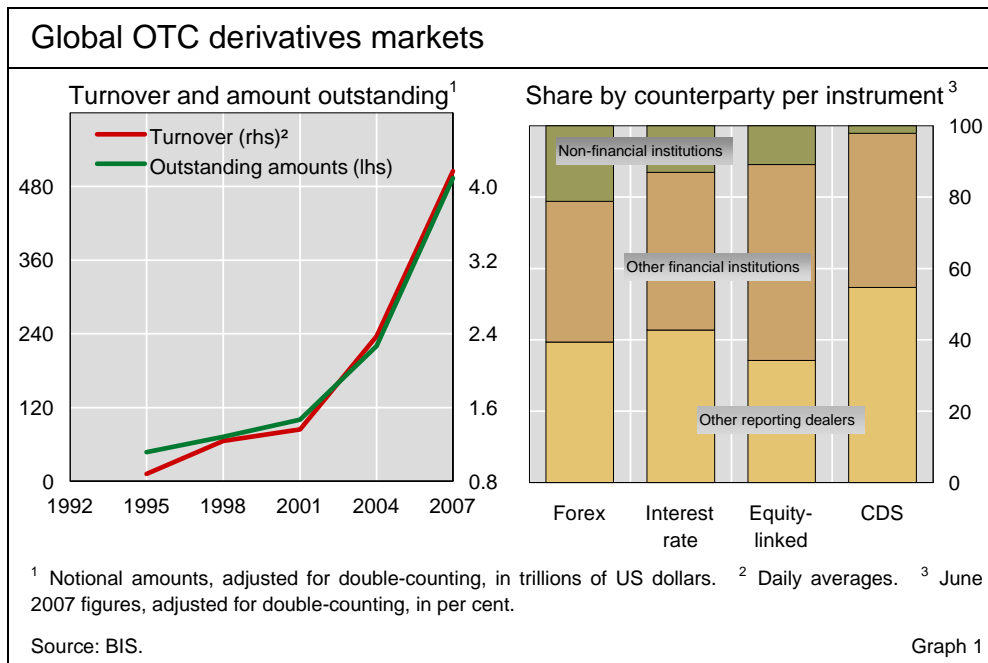
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Over-the-counter (OTC) derivatives markets have grown rapidly in terms of both size and complexity since the BIS started surveying the market in 1995. Daily turnover in OTC foreign exchange and interest rate contracts increased from \$0.9 trillion in April 1995 to over \$4 trillion in April 2007 (Graph 1, left-hand panel). Notional amounts outstanding of OTC derivatives of all types increased more than tenfold between 1995 and 2007, to \$500 trillion at the end of June 2007, which corresponds to an average rate of growth of over 20% per year. While most of this growth was driven by increasing volumes in fairly standardised (“plain vanilla”) contracts, there has also been a proliferation of new products, some of which are highly complex.

The increase in size and complexity of the OTC derivatives markets naturally raises the issue of whether the risks emanating from such contracts are being properly managed. One area which has repeatedly given cause for concern is the post-trading infrastructure of the market, which has often not matched the rise in volumes and the continued development of new and increasingly complex products. The most visible indicator of deficiencies in post-trading processes has been the backlog in trades pending confirmation.

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This feature discusses how the bilateral nature of OTC derivatives contracts affects clearing and settlement. It first offers a brief discussion of the main characteristics of OTC derivatives and their implications for post-trade processes. It then reviews the problem of confirmation backlogs and unnotified novations in credit derivatives and other contracts that brought post-trade processing into the spotlight three years ago. Finally, drawing on a recent report by the Committee on Payment and Settlement Systems (CPSS (2007)), it reviews recent developments in the market for post-trade services and considers how multilateral elements such as central counterparties, data warehouses or multilateral terminations can improve the management of information flows between market participants.³

Characteristics of OTC derivatives and implications for post-trade processing

OTC derivatives have a number of characteristics that have important implications for post-trade processing. First, while OTC transactions may take place on multilateral trading platforms, clearing and settlement is by its very nature bilateral. Information on each trade is often not stored centrally, as in the books of an exchange, but separately at each of the counterparties. Ensuring that this information is consistent is a major challenge.

Second, OTC derivatives are bilateral contracts, not assets that can be traded freely. Contracts with different counterparties are usually not fungible, which makes it difficult for traders to close positions. One way to circumvent

Clearing and settlement complicated by the bilateral nature ...

... lack of fungibility ...

³ Clearing and settlement of exchange-traded derivatives is reviewed in CPSS (1997).

this problem, the novation⁴ of trades to another party, was a major factor behind the confirmation backlog and is discussed in more detail below.

... long maturities ...

Third, contracts often have long maturities,⁵ and counterparties remain exposed to each other until the contract expires. This makes counterparty risk a much greater concern in OTC derivatives markets than in securities markets. Market participants have developed a variety of measures to handle counterparty risk, for example collateral arrangements, which add to the complexity of post-trade processing.

... and complexity of OTC derivatives

Fourth, OTC derivatives contracts may themselves be very complex, involving repeated, often state-contingent,⁶ payments. Furthermore, many contracts are non-standard, often tailored to the needs of a specific customer, which is reflected in the fact that templates for defining OTC derivatives may require up to 10,000 fields in order to be able to handle different contract specifications.⁷ By contrast, the templates used to define a typical securities transaction require only half a dozen fields.

Managing flows of information

Information flows after a trade has been concluded

After a deal has been concluded, information on the precise conditions of the contract needs to flow within the firm, from the front office to the middle and back offices, and between counterparties. Errors made during this process, in particular those resulting in discrepancies in the information stored at different counterparties, can result in so-called payment or collateral breaks, when the payments or collateral transfers made by one party do not coincide with those expected by the other party. Even if these breaks are resolved quickly, they do add to the burden of already strained back offices.

Trade capture

Several steps are necessary to capture and confirm trades (see figure overleaf). First, the details of the trade have to be entered (“captured”) into each counterparty’s internal system in order to be passed on to the middle and back offices for processing. This is usually done automatically for trades that were executed electronically, but may involve a substantial amount of paperwork for transactions negotiated over the phone.

Trade confirmation

After the trade has been captured, counterparties exchange information on the terms of the trade in order to weed out any discrepancies that could result in payment or collateral breaks at a later point in time. This step is called “confirmation”. A confirmation describes all the details of the trade and refers to the master agreement, which sets out the general terms and conditions related

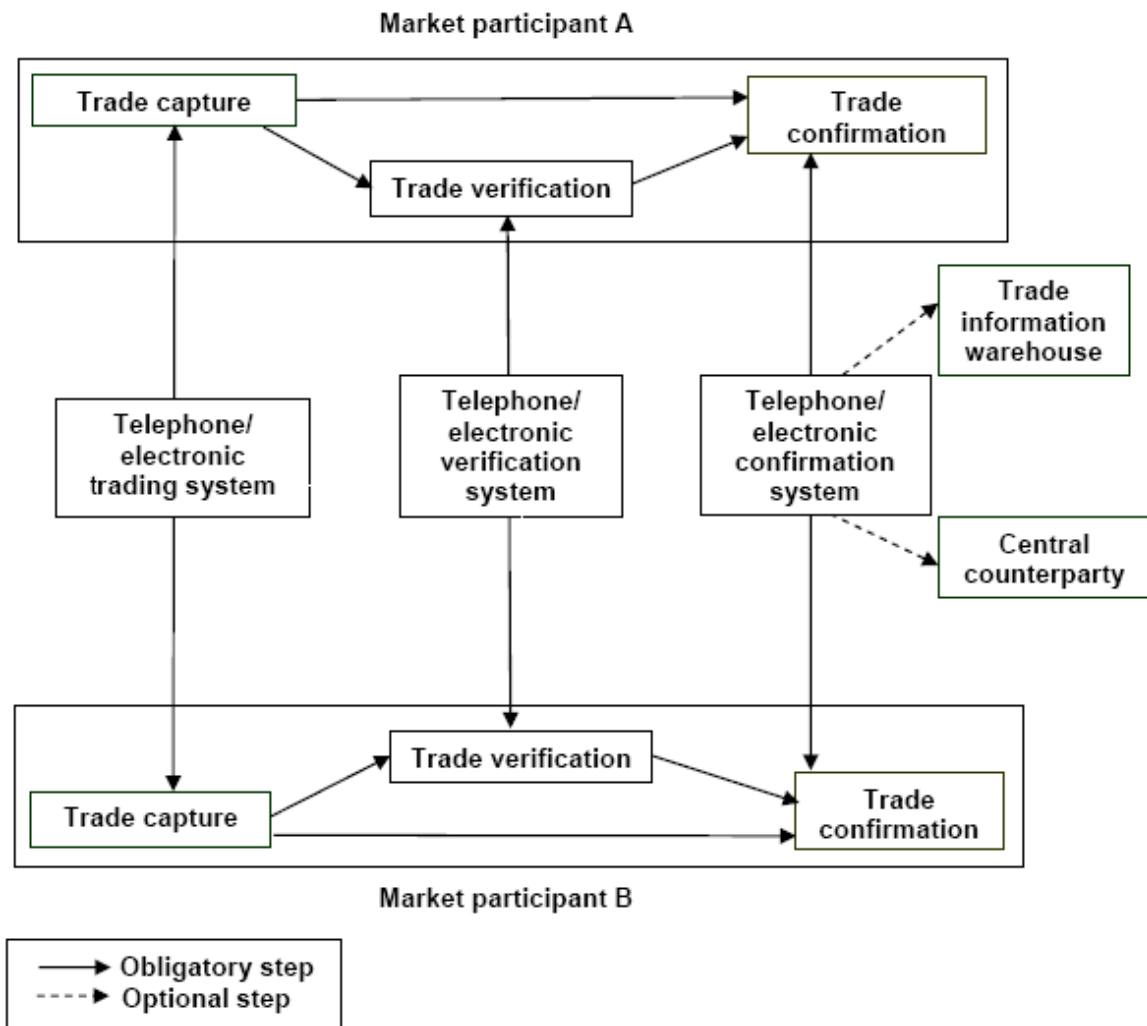
⁴ Novation refers to the replacement of contracts between two initial counterparties with a contract between the remaining party and a third party (the transferee). It is also referred to as assignment or give-up.

⁵ The market for interest rate swaps in the major currencies is reported to be liquid for maturities of up to 30 years, but longer-dated contracts are not unheard of.

⁶ Payments that depend on the prices of other assets, possibly in non-linear ways.

⁷ Of these 10,000 fields, only about 100 actually appear in any individual contract. See “Technology upgrades improve derivatives”, 18 June 2007, www.financetech.com.

Flows of information in OTC derivatives transactions



to OTC derivatives trades between these two counterparties. A confirmation proposal may either be prepared by both counterparties and then matched (most common for inter-dealer trades), or prepared by only one and affirmed by the other (for trades with investing institutions such as hedge funds). Once counterparties agree on the content of the confirmation, it will serve as the final record of the trade.

Since the confirmation process may take some time, in particular for more complex contracts, some counterparties exchange information on the major terms of the trade before preparing a full confirmation document ("trade verification", also referred to as "economic affirmation"). As with trade capture, the verification and confirmation processes may involve a substantial amount of manual intervention, in particular for trades executed over the phone.

Trade verification

The problem of confirmation backlogs

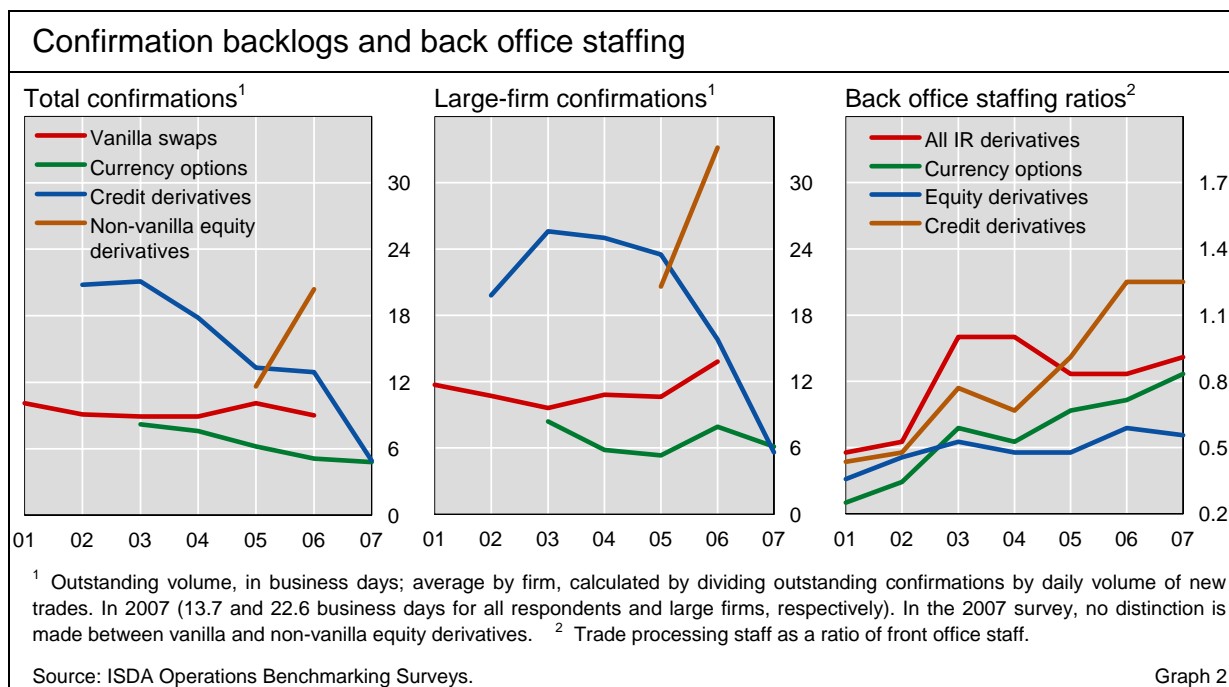
The high number of unconfirmed trades a few years ago was perhaps the most visible sign of deficiencies in the flows of information related to the post-trade

Confirmation backlog ...

processing of OTC derivatives. Confirmation backlogs had already been flagged in CPSS (1998), which noted that a significant amount of confirmations remained outstanding for 90 days or more, yet their number continued to increase. The yearly ISDA Operations Benchmarking Surveys subsequently showed that in 2003 the average derivatives dealer had a confirmation backlog of 21 business days for credit derivatives, and nine days for vanilla interest rate swaps (Graph 2, left-hand panel). In 2004, the share of unconfirmed credit derivatives trades declined at small and medium-sized firms, but it remained stubbornly high at 25 days at the larger dealers (centre panel).⁸

... increases risk

Why should a high number of unconfirmed transactions be a concern? For market participants, the lack of confirmation represents an increase in uncertainty with regard to the exact terms of a trade and their exposure to their counterparties. While unconfirmed trades are legally binding in most jurisdictions, potential disagreement about their precise terms can result in lengthy and costly litigation. Similarly, knowledge of a firm's precise positions is a precondition for successful risk management. Such worries are borne out by previous experience. For example, in the 1960s, problems in the clearing and settlement of securities transactions caused sizeable losses to market participants (see box).



⁸ Some market participants even referred to a "wall of outstanding confirmations". This could be taken quite literally, given the low degree of automation at the time. For example, the 150,000 confirmations outstanding for credit derivatives transactions in September 2005 (United States Government Accountability Office (2007)) correspond to a total of approximately 2,250,000 sheets of paper (assuming an average document length of 15 pages), which is equivalent to a pile at least 225 metres high!

The US paper crunch, 1967–1970^①

The current information management issues related to OTC derivatives transactions bear some resemblance to the US paper crunch in the late 1960s, when the back offices of US securities brokers were not able to handle the sharp increase in trading volumes. The number of “fails”, ie failures to deliver securities on the settlement date, soared in consequence, and so did losses from errors at brokerages. Some firms tried to resolve the problems by abruptly switching to computerised systems, with generally disappointing results. Ironically, instead of providing relief, the fall in volumes that accompanied the decline in stock prices in 1969 and 1970 added to the burden on already weakened firms. Declining revenues at a time when costs continued to rise resulted in the failures of many brokerage houses. According to Seligman (2003), approximately 160 members of the New York Stock Exchange failed during that period, and roughly the same number were either taken over or disbanded.

The Securities and Exchange Commission (SEC) initially reacted to the back office problems by shortening the trading day in August 1967 and in early 1968, but with little effect. In the 1970s, the SEC imposed a compulsory surcharge on the commissions paid on small trades in order to prop up the income of brokerages, but even so expenses of the leading securities firms substantially exceeded income and sizeable backlogs remained. In the end, the back office problems seem to have been “resolved” by private investors shunning the stock market for a variety of reasons, including bad experiences with back office procedures. A 1973 report by the New York Stock Exchange found that three out of 10 investors had experienced lost or late-delivered securities.

Notwithstanding the similarities between the paper crunch and the current situation in the OTC derivatives markets, there are also notable differences from today’s backlogs. First, the back office problems of the late 1960s concerned broker-dealers which were organised as partnerships and were by an order of magnitude smaller and less sophisticated than the large banks that dominate the OTC derivatives markets today.^② As a consequence, the broker-dealers of the 1960s had much less financial muscle to fund an overhaul of their back office procedures. Second, operational risk was arguably much less well understood in the 1960s than today, which resulted in less willingness to address such risks. That said, the paper crunch of the 1960s serves as a reminder that weak back office procedures could have serious implications not only for market efficiency but also for the financial health of firms active in the market.

^① The discussion is based on SEC (1971) and Seligman (2003). ^② The discrepancies were also very large relative to their capital base. For example, SEC (1971) reports that the number of untraceable securities owed to customers exceeded capital by a factor of two at several firms!

The apparent inability of large derivatives firms to reduce their confirmation backlogs, in particular in credit derivatives, triggered regulatory action. In February 2005, the UK Financial Services Authority (FSA) sent a letter to all financial institutions under its supervision that were active in the credit derivatives market. The FSA voiced its concerns about the level of unconfirmed trades, calling for industry initiatives to solve this problem (FSA (2005)). In the summer of the same year, an industry grouping, the Counterparty Risk Management Policy Group II, drew attention to the problem and urged a reduction in the backlogs, along with various other recommendations (CRMPG II (2005)). In September, the Federal Reserve Bank of New York convened a meeting of representatives of 14 major dealers and their regulators where they committed to reducing the number of confirmations outstanding in credit derivatives (FRBNY (2005)). In the following year, the CPSS set up a working group to analyse existing post-trade arrangements and risk management practices in OTC derivatives markets more

Responses by
regulators

generally, and to evaluate ways to enhance the infrastructure of the market (CPSS (2007)).

Reduction in confirmation backlog due to increased staffing ...

These initiatives have borne fruit. The number of outstanding credit derivatives confirmations at large firms fell from 25 business days in 2004 to six days at the end of 2006 (ISDA (2007)).⁹ This reduction in the number of unconfirmed trades was, to some extent, the result of an increase in the resources dedicated to back office operations. The number of personnel involved in processing trades went up from 0.67 per trader in 2004 to 1.25 in 2006 and 2007 (Graph 2, right-hand panel).

... new protocol on novations ...

In addition, market participants removed a major stumbling block for more timely confirmations, namely the large number of unnotified novations. Novations, which involve the transfer of trades to a third party, are routinely used by hedge funds to exit positions, in particular in credit derivatives.¹⁰ Some dealers estimate that roughly 25% of their credit derivatives trades and 5% of their interest rate derivatives trades involve novation (CPSS (2007)). While the International Swaps and Derivatives Association's (ISDA) master agreements have always required traders to seek the consent of their original counterparties before novating a trade, this was often not adhered to in practice. As a consequence, many dealers were kept in the dark as to who precisely their counterparty was. Indeed, they sometimes found out about novations only after payments were returned or were received from a different counterparty. The issue of novations seems to have been solved by the introduction by the ISDA in 2005 of a novation protocol that sets out precise deadlines for obtaining counterparty consents before novating a trade. The protocol has since been widely adopted by the industry.

... and increased use of electronic trading platforms

Finally, market participants have shifted much of their trading activity to electronic platforms. This, in turn, has resulted in an increase in electronic trade processing, as most trading platforms provide the ability to capture trade data directly to firms' internal databases and offer a link to an electronic confirmation service such as the Depository Trust and Clearing Corporation's (DTCC) Deriv/SERV.¹¹

While much has been achieved in addressing the confirmation backlog in credit derivatives, similar progress has not been made in other instruments. Indeed, in 2006 the number of unconfirmed trades in non-vanilla equity derivatives averaged 30 days (large firms) and 20 days (all firms), prompting regulators to call for a similar effort to the one made for credit derivatives (FRNBY (2006, 2007), CPSS (2007)).

⁹ Data provided by the major dealers to the Federal Reserve indicate that the number of outstanding confirmations increased considerably in the first half of 2007, but remained far below the levels seen in previous years (Markit (2007)).

¹⁰ Novations allow parties wishing to exit a contract to seek quotes from several dealers. In contrast, terminating a contract would force them to accept the quotes of their initial counterparty, putting them in a weak bargaining position.

¹¹ Annex 5 of CPSS (2007) describes the most important trading platforms and the extent to which they are linked to systems for post-trade processing.

Replicating the success achieved in reducing the backlog of unconfirmed credit derivatives transactions will not be easy in other market segments. The market for credit derivatives is highly concentrated and market participants tend to trade frequently, which facilitates investment in sophisticated trade processing systems. Other markets are less concentrated and feature a more heterogeneous set of traders. For example, BIS data indicate that only a third of all transactions in equity derivatives take place between 55 reporting dealers, compared to more than one half in the case of credit default swaps (Graph 1, right-hand panel). Electronic trading is also less widespread in other market segments. Data provided by major dealers show that large dealers electronically confirm almost 90% of their trading volume in credit derivatives. The corresponding figures for other market segments are far lower, in particular in the equity segment (Markit (2007)).

Success difficult to replicate in other market segments

The market for post-trade services

Dedicating sufficient resources to back office processes and solving the problem of unnotified novations were clearly very important in reducing the confirmation backlog in credit derivatives. Ultimately, however, any lasting solution to delays in confirmations of OTC derivatives transactions and the management of life-cycle events, for example payments or collateral transfers, will probably also involve some degree of standardisation of market conventions and the establishment of mechanisms that facilitate the flow of information between institutions. This is bound to introduce some centralisation into the market for post-trade services.

Increased presence of multilateral arrangements in clearing and settlement

This section discusses how the flow of information between market participants can be improved through a variety of multilateral arrangements.¹² The most radical measure would be to novate all trades to a central counterparty (CCP), which would also centralise information on contract terms and manage life-cycle events. However, the prevalence of non-standardised contracts and uncertainty about valuations that characterise some segments of the OTC derivatives market could limit the scope for such arrangements. Market participants have therefore searched for other ways of overcoming the information problems associated with a fragmented market. These include introducing mechanisms such as central information depositories or portfolio reconciliation services that reap some of the benefits of CCPs without involving the novation of contracts to a new entity.

Central counterparties

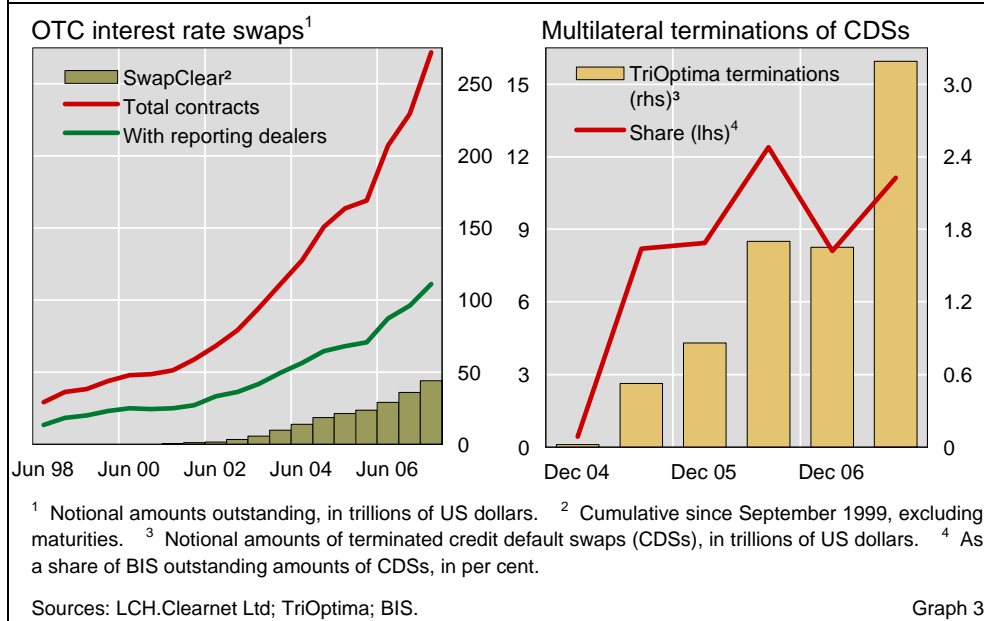
CCPs have been an important feature of commodity and derivatives exchanges for a long time but are a relatively recent phenomenon in OTC derivatives markets.¹³ The most important provider of central counterparty services for

Central counterparties new to OTC derivatives

¹² A broader overview of post-trade services is given in Annex 6 of CPSS (2007).

¹³ Central counterparties were introduced at several European commodity exchanges in the 19th century. In the United States, the Chicago Board of Trade (CBOT) set up a clearing house in 1883, but it did not become a true CCP until the 1920s (Moser (1998), Kroszner (2006)).

Central counterparty arrangements and multilateral terminations



OTC derivatives, LCH.Clearnet Ltd, launched its CCP service for interest rate swaps, SwapClear, in September 1999.¹⁴ By the end of June 2007, the cumulative notional amounts of interest rate swaps cleared through SwapClear totalled \$44 trillion, which compares to roughly 40% of total inter-dealer positions at that point in time (Graph 3, left-hand panel).¹⁵

Under CCP arrangements, the two counterparties of a transaction replace the claims and obligations vis-à-vis each other with separate claims and obligations against the clearing house. The CCP manages its risk by requiring traders to post collateral (“margin”) on their positions, which is adjusted on a daily basis or at even higher frequencies, if necessary. Should any of the counterparties of the CCP be unable to meet their obligations, then their position is liquidated and any shortfall is covered by the posted margin.

Benefits

The establishment of a CCP can provide two major benefits: multilateral netting and a reduction of counterparty risk. Multilateral netting is achieved by making contracts between different counterparties fungible so that they can be offset against each other. Traders can therefore fully close a position by entering an offsetting contract with any other member of the clearing house. Multilateral netting, in turn, reduces counterparty risk since it reduces the volume of open positions. The counterparty risk of a particular contract may also be reduced by the replacement of a claim on a derivatives house by a

¹⁴ Prior to 1999, CCP arrangements for interest rate swaps were common only in Scandinavia. More recently, several derivatives exchanges have begun clearing OTC derivatives through their clearing houses by converting them into equivalent exchange-traded contracts. See CPSS (2007), p 25.

¹⁵ The two figures are not strictly comparable since the numbers supplied by LCH.Clearnet do not account for the expiration of contracts. Nevertheless, they do illustrate a rough order of magnitude.

claim on a CCP, since the latter tends to be more creditworthy than all but the highest-rated derivatives traders.¹⁶

The role of CCPs is not limited to managing counterparty risk or ensuring fungibility; they also play an informational role. Once transactions have been accepted by the CCP, the clearing house takes charge of managing information, of setting margins, and of ensuring that payments are made. In addition, high access standards by CCPs can serve as a catalyst for improvements in back office processes. For example, SwapClear only accepts trades that have been affirmed or confirmed through electronic services such as SWIFT or SwapsWire, which arguably spurred the development of electronic trade confirmation systems for interest rate swaps.

The benefits of CCP arrangements are greatest if there is a single CCP for all types of contracts. In practice, CCPs in the OTC derivatives market are restricted to plain vanilla contracts which are easy to value. For example, SwapClear has not yet attempted to clear interest rate options, in part because of valuation issues.¹⁷

Limitations

Central information depositories

Given that CCP services have been limited to a restricted set of contracts, market participants have explored other avenues to obtain some of the benefits of CCPs. These include the centralisation of information or multilateral netting, through mechanisms that do not rely on the existence of accepted and unambiguous valuations. One possibility is to centralise the management of information without transferring counterparty risk. In practice, such trade information warehouses are often linked to electronic confirmation services. For example, SwapsWire maintains a database of all trades confirmed by its system, which allows market participants to reconcile their database to the SwapsWire records on a regular basis. SwapsWire also offers a link to SwapClear's CCP and TriOptima's triReduce services (see below). A trade information warehouse for credit default swaps has been set up by the DTCC, which automatically stores all trades confirmed through Deriv/SERV. Traders are also able to enter previous trades into the system. SWIFT offers an archive of trades confirmed by the system. Such information could be linked to services managing life-cycle events such as payments or collateral transfers.

Centralisation of information ...

¹⁶ See CPSS (2007), Bliss and Papathanassiou (2006) and Bliss and Steigerwald (2006) for a more comprehensive discussion of CCPs. For various reasons, the role of CCPs is limited to the inter-dealer market. However, other players such as hedge funds may obtain similar benefits through prime broker arrangements. In such a relationship, institutions conduct trades with multiple executing brokers and novate them to a prime broker. Prime brokers thus take over the counterparty credit risk vis-à-vis the hedge funds' counterparties, similar to the role of CCPs in the inter-dealer market. In addition, transactions with a prime broker can be netted bilaterally, which decreases the amount of collateral needed.

¹⁷ Pirrong (2006) argues that the fact that more complex contracts are not cleared centrally is related to the existence of asymmetric information between dealers and the CCP. The access to a better pricing model may encourage dealers to transfer riskier trades to the CCP and keep less risky trades on their books. The fact that not even all standardised contracts are centrally cleared could be explained by economies of scale between these contracts and more complex derivatives for which CCP arrangements do not exist.

... or regular
portfolio
reconciliation

Portfolio reconciliation and termination services

Storing information on contract terms in a central database clearly facilitates the reconciliation of portfolios between market participants, but it is not strictly necessary. An alternative is a multilateral portfolio reconciliation service such as triResolve, offered by TriOptima for a variety of instruments. Dealers provide TriOptima with contract by contract information on their derivatives positions through a central website. TriOptima then checks whether each individual contract is reported by both counterparties with identical terms.

Multilateral portfolio reconciliation can also be used to achieve at least some degree of fungibility of trades concluded with different sets of counterparties if combined with a multilateral termination (tear-up) service. For example, TriOptima's triReduce service uses the information provided by the individual dealers to compute a set of bilateral contracts between participants that provides the same net exposures but lower gross exposures than the original positions. This could significantly reduce counterparty risk, which depends on gross rather than net exposures. TriOptima's termination cycles have had a substantial effect on the size of the CDS market. In the first half of 2007, terminations of CDS contracts reached \$3.2 trillion, which shaved approximately 11% off the rate of growth in that product category (Graph 3, right-hand panel). TriReduce is also available for interest rate swaps, but the impact of terminations on the amounts outstanding has been smaller than in the CDS market.

Conclusion

While market documentation practices and clearing and settlement processes are easily taken for granted, especially when they function well, they are in constant need of upgrade to keep up with increasing volumes and continuing innovation in markets. Infrastructure malfunction can result in a whole market grinding to a halt, while uncertainty about the confirmation and settlement of trades can drain market liquidity and discourage counterparties. A functioning market infrastructure can be seen as a public good, which highlights the positive role of public policy in ensuring that the necessary investments are made and in coordinating the response of private market participants. The way the backlog in confirmations of credit derivatives was addressed provides an interesting case study showing how regulators and private sector firms can work together. By helping to overcome the coordination problem inherent in investing in a public good, regulatory intervention served as a catalyst for private sector efforts to solve the problem.

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