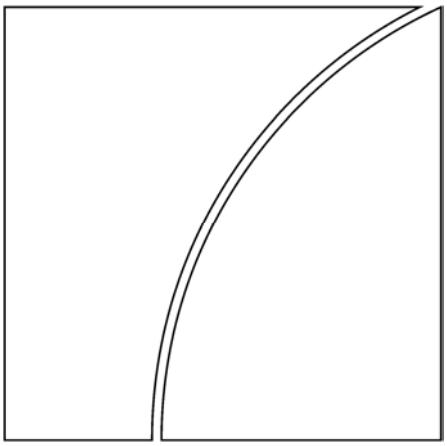
Committee on Payment and Settlement Systems



New developments in clearing and settlement arrangements for OTC derivatives

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Foreword

Since the publication by the BIS in 1998 of a report on OTC derivatives: settlement procedures and counterparty risk management, the markets for OTC derivatives have continued to expand and develop rapidly, while risk management practices have evolved and significant changes in market infrastructures have occurred.

In early 2006, the CPSS set up a Working Group, comprising representatives of its member central banks and prudential supervisors of major derivatives dealers, to analyse existing arrangements and risk management practices in the broader OTC derivatives market and evaluate the potential for risks to be mitigated by greater use of, and enhancements to, market infrastructure. This project complemented an earlier supervisory initiative that at the time was focused primarily on confirmation backlogs in the credit derivatives markets.

The Working Group conducted interviews with some 35 major dealers in OTC derivatives in the G10 countries and Hong Kong SAR. It also met with industry groups and providers of post-trade processing services. Finally, upon completion of the report, it discussed its findings in a roundtable with these entities.

The report focuses on six issues, of which three had already been discussed in 1998 and three others have caught the Group's attention during its discussions with OTC derivatives dealers and service providers: (1) the risks created by delays in documenting and confirming transactions; (2) the implications of the rapidly expanding use of collateral to mitigate counterparty credit risks; (3) the potential for expanding the use of central counterparty (CCP) clearing to reduce counterparty risks; (4) the implications of OTC derivatives prime brokerage; (5) the risks associated with unauthorised novations of contracts; and (6) the potential for significant market disruptions from the closeout of OTC derivatives transactions following the default of a large market participant.

The report concludes that, since 1998, the clearing and settlement infrastructure of OTC derivatives markets has been significantly strengthened. But further progress is needed in some areas:

- institutions need to extend the successful efforts to reduce confirmation backlogs in credit derivatives to other OTC derivative products, using automated systems whenever possible. To mitigate the risks of remaining backlogs, more systematic use of economic affirmations is appropriate and over time dealers should work toward daily portfolio reconciliations with their most active counterparties;
- market participants should identify steps to mitigate the potential market impact of replacing contracts following the closeout of one or more major participants.

In addition, as the market infrastructure moves further in the direction of centralised processing of trades and post-trade events, several issues will assume greater importance:

- providers of essential post-trade services for OTC derivatives should provide open access to their services and should aim to achieve convenient and efficient connectivity with other systems;
- central banks and supervisors will need to consider whether certain existing standards for securities settlement systems, CCPs or systemically important payment systems should be applied to providers of clearing and settlement services for OTC derivatives that are not already subject to those standards.

Interested parties are welcome to send comments on the report to the CPSS Secretariat (cpss@bis.org); please mention *OTC derivatives* in the subject line of your email. Comments will be made available on the website of the BIS.

The CPSS is grateful to the members of the Working Group and to its chair, Patrick Parkinson of the Board of Governors of the Federal Reserve System, for their excellent work in writing this report.

Timothy F Geithner, Chairman
Committee on Payment and Settlement Systems

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Executive summary

In September 1998 the BIS published a report entitled *OTC derivatives: settlement procedures and counterparty risk management*. The report, which was prepared by a study group created by the Committee on Payment and Settlement Systems (CPSS) and the Committee on the Global Financial System (CGFS), summarised and analysed the practices at that time for processing OTC derivatives trades and managing counterparty risks. Since 1998 the OTC derivatives markets have continued to expand and evolve rapidly. In February 2006 the CPSS created a Working Group on Clearing and Settlement Arrangements for OTC Derivatives, comprised of representatives of prudential supervisors of major derivatives dealers as well as representatives of the CPSS member central banks. The CPSS asked the Working Group to follow up on the 1998 report by revisiting issues identified in that report and identifying and analysing any new issues raised by changes since 1998 in risk management practices or the post-trade processing infrastructure for OTC derivatives. This new report has been prepared in response to the request by the CPSS.

The 1998 report focused on three issues: (1) the risks created by delays in documenting and confirming transactions, (2) the implications of the rapidly expanding use of collateral to mitigate counterparty credit risks and (3) the potential for expanding the use of central counterparty (CCP) clearing to reduce counterparty risks.

On the basis of a series of meetings with industry groups and service providers and a survey of risk management practices at derivatives dealers in the G10 countries, the Working Group identified and analysed three new issues raised by developments since 1998: (1) the implications of OTC derivatives prime brokerage, (2) the risks associated with unauthorised novations of contracts and (3) the potential for significant market disruptions from the closeout of OTC derivatives transactions following the default of one or more large market participants.

This report analyses each of the six issues. It also offers an overall assessment of progress since 1998 in strengthening the clearing and settlement infrastructure, highlights some areas where additional progress is needed, and identifies some issues that could assume greater significance as the infrastructure continues to evolve.

Documentation backlogs

The 1998 report observed that dealers typically had policies requiring the use of master agreements to manage the legal and credit risks associated with derivatives, but some dealers had large backlogs of unsigned master agreements. Similarly, while dealers sought to confirm individual transactions promptly, some reported large numbers of outstanding confirmations, with a small but significant portion outstanding for 90 days or more. The report cautioned that the practice of executing transactions before signing a master agreement may create legal risk by jeopardising a dealer's ability to close out and net transactions in the event of a counterparty's default. Failure to confirm a trade can exacerbate market risks and credit risks if it allows material errors in a dealer's records of its transactions to go undetected.

Dealers report that they have greatly reduced backlogs of unsigned master agreements since 1998. Exposures to counterparties without a signed master agreement now represent a small proportion of dealers' total credit exposures from OTC derivatives, ranging from an "insignificant" share to 3%. Many dealers require a master agreement to be signed before the first transaction with riskier counterparties and before the second transaction (that is, before netting is a relevant issue) with others. Where a master agreement has not been completed, dealers seek to mitigate the risk of being unable to close out and net transactions by incorporating by reference the industry standard form of master agreement into a confirmation (a long-form confirmation).

By contrast, until recently backlogs of outstanding confirmations continued to increase, as documented in the annual Operations Benchmarking Surveys conducted by the International Swaps and Derivatives Association (ISDA). These surveys indicated that by 2004 average confirmation backlogs at large dealers represented more than 23 trading days for credit derivatives, and from 10 to 20 trading days for the other major types of OTC derivatives (interest rate, equity and commodity).

Early in 2005 prudential supervisors began to express increasing concern about the size and rapid growth of confirmation backlogs for credit derivatives. In February 2005 the UK Financial Services Authority sent a letter to the chief executive officers of major dealers in London expressing concerns about the risks posed by those backlogs. Around the same time, Federal Reserve examiners learned that the backlogs in the confirmation of credit derivatives were being compounded by the risky practice of novating trades without the prior consent of the remaining original counterparty (novations are discussed in detail below). Concerns about confirmation backlogs were one of the factors motivating private market participants to form the Counterparty Risk Management Policy Group II (CRMPG II). The CRMPG II report, entitled *Toward greater financial stability: a private sector perspective*, which was released in July 2005, highlighted the serious and growing backlogs in the credit derivatives markets and called for an industry roundtable to be convened to address them.

In September 2005, prudential supervisors took the lead and called 14 leading credit derivatives dealers to the Federal Reserve Bank of New York, where the supervisors collectively made clear their concerns about the risks created by the backlogs of outstanding confirmations and risky novation practices. By September 2006 these firms had made very substantial progress in reducing existing backlogs and in preventing new backlogs from arising by moving towards an automated processing environment and dedicating appropriate resources to the back office. The total number of confirmations outstanding had been reduced by 70%. The percentage of trades confirmed electronically had doubled, exceeding 80% of total trade volume.

Furthermore, the firms worked with the Depository Trust & Clearing Corporation (DTCC) to develop and implement a trade information warehouse that would provide a comprehensive trade database for credit derivatives and a central support infrastructure to facilitate automation and centralised processing of post-trade events (for example, cash flows, novations and terminations) over the life of a credit derivatives contract. The warehouse was launched in November 2006. The warehouse has the potential to substantially reduce operational risk and enhance operational efficiency in the credit derivatives markets and, over time, in other OTC derivatives markets. However, it is critical that DTCC follows through on its stated intent to allow other service providers to connect effectively to the warehouse, so that competition and innovation in post-trade processing are not impaired by the centralisation of trade information.

There is evidence that some progress was also made in 2006 with respect to backlogs for most other types of OTC derivatives. Nonetheless, the same focus and energy that were brought to bear on credit derivatives confirmation backlogs need to be extended to other OTC derivative products, so that all OTC derivatives trades are accurately captured and confirmed promptly. In this regard, it is very encouraging that an expanded group of 17 dealers has agreed to work over time to reach a common set of goals for the confirmation of equity, interest rate, currency and commodity derivatives. For vanilla products (products that can be confirmed electronically), the goal is to issue confirmations by T+1 (the first business day after execution) and to complete confirmations by T+5. For non-vanilla products, the goal is to issue confirmations by T+10 and complete confirmations by T+30. These dealers have agreed to work towards a further goal of affirming the principal economic terms of non-vanilla products by T+3. In addition to these efforts, active market participants should focus on the goal of daily portfolio reconciliation (verification of the existence of all outstanding trades and comparison of their principal economic terms) with their most active counterparties.

Use of collateral to mitigate counterparty credit risk

In 1998 collateral was used extensively by dealers in the United States and the United Kingdom, but its adoption by dealers in other European countries, Canada and Asia was limited. Since then, the use of collateral has been adopted in major jurisdictions worldwide. ISDA's annual Margin Surveys show that the percentage of OTC derivatives trades and exposures that are covered by a collateral agreement has been increasing and reached about 60% in 2005. The collateral typically posted has shifted from primarily government securities to cash, a shift that has largely been driven by operational convenience.

The 1998 report concluded that the use of collateral can significantly reduce counterparty credit risks and thereby enhance the stability of OTC derivatives markets. However, it cautioned that collateral does not eliminate credit risk and entails funding liquidity, legal, custody and operational risks, and that these risks need to be managed effectively if the benefits of collateral are to be realised. Dealers' responses to the Working Group's questionnaire confirm that collateral is used extensively to mitigate counterparty credit risks to other dealers and to hedge funds. Furthermore, significant progress has been made since 1998 to reduce legal, custody and operational risks in collateralisation arrangements. The effectiveness of market participants' efforts to manage funding liquidity risks associated with the use of collateral is more difficult to assess, in part because significant liquidity risks crystallise only in stressed market conditions.

CCP clearing

At the time of the 1998 report, clearing of OTC derivatives through a central counterparty was quite limited. Consequently, the report's discussion of the potential effects of CCP clearing on counterparty risks was necessarily speculative and based largely on experience with CCP clearing for exchange-traded derivatives. With respect to systemic risk, the report noted that a CCP concentrates risks and responsibilities for risk management. The critical issue is how effectively a CCP for OTC derivatives can manage the risks to which it is exposed. CCPs for exchange-traded derivatives generally manage their risks quite effectively. The key question is whether the risk controls employed by CCPs for exchange-traded derivatives would be equally effective when applied to OTC derivatives, which generally are less liquid and more difficult to value accurately than exchange-traded derivatives.

In September 1999 LCH.Clearnet Ltd launched SwapClear, a CCP for interest rate swaps between dealers. SwapClear has proven to be quite successful. As of December 2006, USD 35.5 trillion of swaps were cleared through SwapClear, or approximately 40% of the global inter-dealer market for interest rate swaps. SwapClear has recognised the unique features of OTC derivatives, particularly their illiquidity, and has adapted its default procedures accordingly. Ultimately, however, SwapClear, its participants, and authorities cannot be certain how effective these procedures are until they are tested by an actual default. Market participants must recognise that there are important differences between the default procedures adopted by SwapClear, or likely to be adopted by any future CCP for OTC derivatives, and traditional procedures employed by CCPs for exchange-traded derivatives. These differences should be taken into account when managing exposures to such an entity or its participants.

Prime brokerage

An important recent development is the extension of prime brokerage arrangements to OTC derivatives. While to date only a handful of firms act as OTC derivatives prime brokers and those prime brokers have relatively small numbers of clients, those clients are hedge funds that are among the most active market participants in certain segments of the OTC market. In such arrangements, a prime broker agrees to intermediate specified eligible transactions between a hedge fund client and any of a list of approved executing dealers. Once the

executing dealer and the fund have agreed to a trade, the fund and the executing dealer must each notify the prime broker of the terms. If the prime broker accepts the trade it becomes counterparty to two back-to-back trades, one with the fund and one with the executing dealer.

Much like CCP clearing, prime brokerage tends to concentrate risks and responsibilities for risk management. So it is critical that prime brokers manage those risks effectively. For the most part, the prime broker manages the counterparty risks of OTC derivatives transactions executed under a prime brokerage agreement in the same way that it manages the risks of other OTC derivatives transactions. However, the clarity of the underlying documentation of the prime brokerage relationship is critical. So too is the prime broker's capacity to monitor and control the flow of new transactions. Some prime brokers establish limits per product, per day, on the amount a single client can trade with a particular executing dealer, as well as aggregate limits. Thus, the prime broker relationship places large demands upon back office systems.

Supervisors should continue to monitor potential legal issues and the robustness of the back office systems of the firms that offer prime brokerage services. Market participants engaged in prime brokerage transactions should carefully assess the legal documentation so that they have a complete understanding of their rights and responsibilities.

Novations

A novation (or assignment) is the replacement of a contract between two initial counterparties to an OTC derivatives trade (the transferor, who steps out of the deal, and the remaining party) with a new contract between the remaining party and a third party (the transferee). At the time of the 1998 report, dealers reported that novations were rare. Since then, the hedge fund sector has grown enormously, and hedge funds are now among the most important participants in some segments of OTC derivatives markets, including credit derivatives markets. When a hedge fund seeks to get out of an OTC derivatives position it often does so through a novation rather than by negotiating a termination of the contract or entering into an offsetting contract.

Master agreements require a transferor to obtain the prior written consent of its original counterparty to effect a novation. However, the CRMPG II report called attention to the fact that dealers frequently accepted novations of credit derivatives without such prior consent. As noted above, this practice contributed to the growth of backlogs of unconfirmed trades. Even more importantly, it was creating confusion about the identities of counterparties to outstanding trades and thereby undermining the effectiveness of counterparty credit risk management. Among other problems, this resulted in more frequent disagreements about collateral requirements and failures to make timely payments on credit derivatives contracts.

After prudential supervisors raised their concerns about these risky novation practices in September 2005, the dealers quickly announced their support for a novation protocol that had been crafted by ISDA for the credit and interest rate derivatives markets. The protocol requires written consent for all novations by close of business on the date the novation is struck. If consent for the novation is not obtained within that time frame, the transferor is deemed to have two contracts, one with its original counterparty and one with the transferee. Adherence to the policy of obtaining consent mitigates the risks from novation activity, and the protocol has been effective in achieving prompt notification and consent. If novations become common for instruments other than credit and interest rate derivatives, it will become essential to extend the coverage of the protocol to ensure that the risky practice of novating trades without the prior consent of the remaining counterparty does not re-emerge for those products. The industry has also taken steps to automate the consent process, but use of the available services so far has been limited and the process is still largely manual. Greater use of automation is desirable to ensure that notifications and consents continue to be timely.

Closeout

In 1998, dealers identified closeout netting provisions in master agreements as a powerful tool for mitigating counterparty credit risk. Some dealers were concerned about the enforceability of netting provisions at that time, but the subsequent passage of legislation supporting closeout netting in many jurisdictions has diminished those concerns. Since 1998, however, two new concerns have emerged about closeout netting. First, experiences with defaults and closeouts in the late 1990s demonstrated that certain methods for valuing contracts with a defaulting counterparty could be very difficult to implement in conditions of market stress. Reflecting on these experiences, the CRMPG II report suggested that use of the "Market Quotation" or "Loss" methods in master agreements rather than the "Closeout Amount" method could significantly impede the orderly termination and closeout of affected transactions during conditions of severe market stress. Second, the near failure of the hedge fund managed by Long-Term Capital Management (LTCM) in September 1998 prompted concerns about the potential for the closeout of a major market participant to result in significant market disruptions, especially if it occurs at a time when markets are already under stress.

Closeout in the case of the insolvency of one or more major market participants or in circumstances of extreme market stress would unquestionably be a complex and difficult exercise. But it is not clear why use of Market Quotation or Loss would be more likely to impede the orderly termination and closeout of affected transactions than use of Closeout Amount. Regardless of the valuation method specified in the master agreement, the surviving party would have a strong incentive to terminate and replace its contracts with an insolvent counterparty as soon as possible; to delay would expose the surviving firm to the risk of additional losses. As the CRMPG II report acknowledged, what is most important is that counterparties reach agreement on the methodology to be used in the event of a closeout. In addition, counterparties should also discuss bilaterally ex ante how they would implement the particular closeout methodology which they have agreed. Market associations are in a good position to develop and publish a common understanding within the industry regarding the use of these methodologies, taking into account existing practices and law.

But achieving greater clarity about methods for determining the value of contracts in a closeout situation with the defaulting participant would not by itself fully address concerns about the potential market impact of a default by a major market participant. Individually and collectively, market participants may be able to take further steps that can help mitigate the impact. In discussions with the Working Group, market participants have identified two such steps. First, market participants should ensure that they have timely, accurate and comprehensive information on their counterparty credit exposures to major participants, so that they can make informed decisions at the time of default. Regular portfolio reconciliation can help to facilitate this. Second, market participants should routinely identify trades that could be voluntarily terminated, so as to reduce to the extent possible the positions that would need to be replaced following a default. To that end, they should expand their use of new services that facilitate multilateral voluntary termination of trades. Finally, market participants should work together to identify whether further steps can and should be taken to mitigate the potential market impact of the closeout of one or more major market participants.

Overall assessment

In some respects the clearing and settlement infrastructure of the OTC derivatives markets has been significantly strengthened since 1998:

- Dealers have greatly reduced backlogs of unsigned master agreements.
- Considerable progress has also been made in the automation of post-trade processes; particularly since September 2005, the use of automation has been instrumental in reducing confirmation backlogs in credit derivatives.

- Expanded use of collateral now significantly mitigates counterparty credit risks, and the legal and operational risks associated with reliance on collateral have been reduced by changes in national law and enhancements to dealers' collateral management systems.
- A CCP now manages the risks of a significant portion of inter-dealer single currency interest rate swaps; this is perceived by its participants as reducing both operational and counterparty credit risks.
- Similarly, derivatives prime brokerage, another new feature of the OTC derivatives landscape, delivers some of the benefits of a CCP to the hedge fund community.
- There has been increasing use of multilateral termination services, which allow market participants to reduce counterparty credit, funding liquidity and operational risks.
- A trade information warehouse has been created, which offers the potential for enhancements to the efficiency and reliability of processing of post-trade events throughout the life cycle of OTC derivatives contracts.

But further progress is needed in some areas:

- The same focus and energy that were brought to bear on credit derivatives confirmation backlogs need to be extended to other OTC derivative products, so that over time all vanilla OTC derivatives trades are confirmed by T+5 and non-vanilla trades are confirmed by T+30, at the latest. To that end, efforts should be made to use automated systems to confirm trades for all OTC derivative products that are eligible. Risks of unconfirmed trades should be further reduced by broader use of economic affirmations and, over time, daily portfolio reconciliations with market participants' most active counterparties.
- Market participants should identify steps to mitigate the market impact of replacing contracts following the closeout of one or more major participants.

The market infrastructure for the OTC derivatives markets will undoubtedly continue to evolve. Through a trade information warehouse or otherwise, market participants may seek to achieve the operational benefits of CCP clearing while preserving decentralised counterparty credit risk management. CCP clearing may also expand over time to encompass additional instruments, especially relatively non-complex instruments, or to include tiered clearing arrangements that would allow clearing to extend beyond the inter-dealer market.

Whatever path the evolution takes, as the market infrastructure moves further in the direction of centralised processing of trades and post-trade events, several issues will assume greater importance:

- Providers of trade information warehouses, CCP services, and other essential post-trade services for OTC derivatives should provide open access to their services and should aim to achieve "interoperability", that is, to structure their systems or products so that they can be used in conjunction with other systems or products without imposing unnecessary costs on the users.
- Central banks and supervisors will need to consider whether the CPSS-IOSCO standards for the operational reliability of securities settlement systems and CCPs should be applied to providers of clearing and settlement services for OTC derivatives that are not already subject to those standards.
- If payments associated with OTC derivatives come to be settled on a multilateral net basis by an entity other than a CCP, central banks and supervisors will need to consider whether the Core Principles for Systemically Important Payment Systems should be applied to such an entity.

1. Introduction

Background on the 1998 report

Based on a survey of 30 leading derivatives dealers in the G10 countries, the 1998 BIS report on *OTC derivatives: settlement procedures and counterparty risk management* concluded that practices for processing trades and managing counterparty risks were broadly similar in all of the G10 countries. Standard legal agreements and confirmation templates were used to document most transactions. Transaction processing, from data capture to confirmation and settlement, was becoming increasingly automated, but more structured transactions usually required manual intervention. Netting and, to a growing but still limited extent, collateral agreements were used to mitigate counterparty credit risks. The vast majority of OTC transactions were settled bilaterally between the counterparties rather than through a central counterparty.

The study group had been asked to identify any weaknesses in existing practices and to consider the potential for new services to mitigate risks. To that end, the report focused on three issues: (1) the risks created by delays in documenting and confirming transactions; (2) the implications of the rapidly expanding use of collateral to mitigate counterparty credit risks; and (3) the potential for expanding the use of central counterparty (CCP) clearing to reduce counterparty risks.

The survey revealed that although dealers typically had policies requiring the use of master agreements to manage the legal and credit risks associated with derivatives, some dealers had large backlogs of unsigned master agreements. Similarly, while dealers sought to confirm individual transactions promptly, some reported large numbers of outstanding confirmations, with a small but significant portion outstanding for 90 days or more. The report cautioned that the practice of executing transactions before signing a master agreement may jeopardise a dealer's ability to close out and net transactions in the event of a counterparty's default. Likewise, the failure to confirm a transaction may create legal risk by jeopardising the enforceability of the transaction or the right to net it against other transactions. Failure to confirm may also exacerbate market risks and credit risks if it allows material errors in a dealer's records of its transactions to go undetected. Dealers typically had in place policies and procedures that in principle mitigated these risks but the survey results were not sufficiently detailed to reliably assess their effectiveness. The report recommended that derivatives counterparties and prudential supervisors review the backlogs, assess the risks entailed, and take appropriate steps to ensure that the risks are adequately controlled.

The 1998 survey revealed that the use of collateral had been growing rapidly. The study group concluded that the use of collateral can significantly reduce counterparty credit risks and thereby enhance the stability of OTC derivatives markets. However, it cautioned that collateral does not eliminate credit risk and entails funding liquidity, legal, custody and operational risks, and that these risks need to be managed effectively if the benefits of collateral are to be realised. The study group recommended that counterparties carefully assess these risks and that prudential supervisors consider developing guidance on the use of collateral.

The study group concluded that the use of a CCP has the potential to mitigate each of the types of counterparty risk associated with OTC derivatives, although potential reductions in credit risk would be limited by the growing use of collateral in bilateral credit relationships and by limits on the scope of transactions that could be cleared. It also concluded that, from a systemic perspective, a CCP concentrates risks and responsibilities for risk management. Thus, the critical issue is how effectively a CCP for OTC derivatives manages the risks to which it is exposed. CCPs for exchange-traded derivatives generally manage their risks quite effectively. The key question is whether the risk controls employed by CCPs for exchange-traded derivatives would be equally effective when applied to OTC derivatives, which are inherently less liquid and more difficult to value accurately than exchange-traded derivatives.

The study group recommended that counterparties assess the benefits of CCP clearing, that national authorities ensure that there are no unnecessary legal or regulatory impediments to a CCP, and that any CCPs for OTC derivatives adopt effective risk management safeguards.

Developments since 1998

According to global surveys coordinated by the BIS, the total size of OTC derivatives markets, as measured by notional amounts outstanding, increased at an average annual rate of about 20% from the end of 1998 to the end of 2005. As shown in Table 1, by end-June 2006 a further spurt of very rapid growth had pushed the total notional amount of contracts outstanding to nearly USD 370 trillion. Interest rate swaps and other interest rate contracts accounted for more than 70% of the total. Other instrument categories in the survey included foreign exchange, credit, equity and commodity derivatives. The growth and maturation of the credit derivatives markets has been especially noteworthy. Credit derivatives were in their infancy in 1998; by the end of June 2006 the notional value of these instruments had exceeded USD 20 trillion. Market values of OTC derivatives are usually a small fraction of the notional values. Table 1 shows that at the end of June 2006 gross market values totalled about USD 10 trillion, about 2¾% of the total notional values of the contracts.

In 1998 hedge funds had already emerged as important participants in the OTC derivatives markets. Indeed, as the 1998 report was going to press global financial markets were being rocked by the near failure of a hedge fund managed by Long-Term Capital Management (LTCM). Concerns that closeout of LTCM's positions in OTC derivatives and other financial instruments would significantly disrupt financial markets were an important factor in the decision by a consortium of its counterparties to recapitalise the troubled firm. The hedge fund sector has grown enormously since the LTCM episode, and hedge funds are now among the most important participants in some segments of OTC derivatives markets, including the credit derivatives markets. Hedge funds tend to manage their derivatives portfolios more actively than other market participants. Furthermore, when a hedge fund seeks to get out of a position it often does so by novating the contract (essentially stepping out of its contract with one dealer and substituting another dealer as the counterparty to the first dealer) rather than by negotiating a termination of the contract or entering into an offsetting contract. In recent years traditional asset managers have also played an increasingly important role in some OTC derivatives markets, including those for credit derivatives.

While the OTC derivatives markets grew rapidly, new products were introduced and new trading practices emerged, but clearing and settlement arrangements evolved more slowly until 2005. New services that permit automated confirmation of interest rate and credit derivatives were introduced, but relatively few trades were confirmed using those services. A service that allows multilateral early terminations of vanilla interest rate and credit derivatives was introduced in 2003, and by 2005 was being used by many dealers. Perhaps the most significant development was the introduction in September 1999 of SwapClear, a CCP for interest rate swaps. Although limited to single currency interest rate swaps between dealers, by end-2006 it was clearing approximately 40% of all such inter-dealer swaps. Another important recent development is the extension of prime brokerage arrangements to OTC derivatives. In such arrangements a prime broker agrees to intermediate specified transactions between a hedge fund client and any of a list of approved executing dealers. While to date only a handful of firms act as OTC derivatives prime brokers and those prime brokers have relatively small numbers of clients, those clients are among the most active market participants in certain segments of the market.

With markets continuing to grow and the use of automation in transaction processing still relatively limited, market participants struggled to reduce backlogs of outstanding confirmations. Prior to 2005 the backlogs were reportedly especially large in the credit derivatives markets. In part, this reflected the very rapid growth of these markets. But it also reflected the risky practice of novating credit derivatives trades without the prior consent of

the remaining original counterparty. Although master agreements require a transferor to obtain the prior written consent of its original counterparty to effect a novation, dealers were accepting novations without such prior consent. This practice not only delayed the confirmations of the trades between the original dealer and the dealer to which the contract was assigned but also created confusion about populations of outstanding trades between counterparties. In turn, this confusion led to disagreements about collateral requirements and failures to make timely payments on credit derivatives contracts.

In early 2005 prudential supervisors began to express increasing concern about the size and rapid growth of confirmation backlogs for credit derivatives. In February the UK Financial Services Authority sent a letter to the chief executive officers of major dealers in London expressing concerns about the risks posed by those backlogs. Around the same time, Federal Reserve examiners learned that the backlogs in the confirmation of credit derivatives were being compounded by the risky novation practices described in the previous paragraph. The industry was also beginning to pay increasing attention to the issue. Concerns about confirmation backlogs were one of the factors that motivated private market participants to form the Counterparty Risk Management Policy Group II (CRMPG II). The release in July 2005 of CRMPG II's report entitled *Toward greater financial stability: a private sector perspective* highlighted the serious and growing backlogs in the credit derivatives markets and called for convening an industry roundtable to address them.

Prudential supervisors took the lead and in September 2005 called 14 leading credit derivatives dealers to the Federal Reserve Bank of New York, where the supervisors collectively made clear their concerns about the risks created by the backlogs of outstanding confirmations and risky novation practices. The industry promptly adopted the ISDA novation protocol for credit and interest rate derivatives, which requires written consent for all novations by close of business on the date the novation is struck. By September 2006 the 14 firms had made very substantial progress in reducing existing credit derivatives backlogs and in preventing new backlogs from arising by moving towards an automated processing environment and dedicating appropriate resources to the back office. The total number of confirmations outstanding had been reduced by 70%. The percentage of trades confirmed electronically had doubled, exceeding 80% of total trade volume.

Finally, with the encouragement of supervisors, the industry has worked with ISDA to address concerns that physical settlements of credit derivatives contracts following a credit event (eg a default) by an underlying reference obligor could disrupt markets for the obligor's debt. ISDA has developed a protocol that allows market participants to elect to settle in cash at a price determined in an auction of the obligor's debt rather than settle through physical delivery of debt issued by the obligor. If experience with the protocol continues to be favourable, ISDA will include the protocol in standard documentation for credit derivatives, effectively moving the market from a physical settlement to a cash settlement basis.

Table 1

The global OTC derivatives market[1] (end-Jun 2006)

	Notional amounts outstanding		Gross market values		
			Total		Percentage of notional amounts outstanding
	In USD billions	Share in per cent	In USD billions	Share in per cent	
Grand total (including credit default swaps - CDSs)	**369,906**		**10,074**		**2.72**
A. Foreign exchange contracts	**38,111**	**10.30**	**1,134**	**11.26**	**2.98**
Outright forwards and forex swaps	19,415	5.25	436	4.33	2.25
Currency swaps	9,669	2.61	533	5.29	5.51
Options	9,027	2.44	166	1.65	1.84
Memo: Exchange-traded contracts[2]	*188*				
B. Interest rate contracts[3]	**262,296**	**70.91**	**5,549**	**55.08**	**2.12**
Forward rate agreements	18,117	4.90	25	0.25	0.14
Swaps	207,323	56.05	4,944	49.08	2.38
Options	36,856	9.96	579	5.75	1.57
Memo: Exchange-traded contracts[2]	*76,838*				
C. Equity-linked contracts	**6,783**	**1.83**	**671**	**6.66**	**9.89**
Forwards and swaps	1,423	0.38	147	1.46	10.33
Options	5,361	1.45	523	5.19	9.76
Memo: Exchange-traded contracts[2]	*7,389*				
D. Commodity contracts[4]	**6,394**	**1.73**	**718**	**7.13**	**11.23**
Gold	456	0.12	77	0.76	16.89
Other	5,938	1.61	641	6.36	10.79
Forwards and swaps	2,186	0.59	…	…	…
Options	3,752	1.01	…	…	…
E. Credit default swaps[5]	**20,352**	**5.50**	**294**	**2.92**	**1.44**
Single-name instruments	13,873	3.75	186	1.85	1.34
Multi-name instruments	6,479	1.75	109	1.08	1.68
F. Unallocated[6]	**35,969**	**9.72**	**1,707**	**16.94**	**4.75**
Gross credit exposure[7]			**2,032**		
Memo: Exchange-traded contracts[2, 8]	*84,415*				

[1] All figures are adjusted for double-counting. Notional amounts outstanding have been adjusted by halving positions vis-à-vis other reporting dealers. 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. [2] Sources: FOW TRADEdata; Futures Industry Association; various futures and options exchanges. [3] Single currency contracts only. [4] Adjustments for double-counting partly estimated. [5] Data on total CDS and gross market values are shown on a net basis. [6] Includes foreign exchange, interest rate, equity and commodity derivatives of non-reporting institutions, based on the triennial central bank survey of foreign exchange and derivatives market activity. [7] Gross market values after taking into account legally enforceable bilateral netting agreements. [8] Excludes commodity contracts.

Note: … - not available.

Source: BIS, *OTC derivatives market activity in the first half of 2006*, November 2006.

Purpose and organisation of this report

This project is intended to complement the September 2005 supervisory initiative with respect to credit derivatives by taking a comprehensive view of existing arrangements and risk management practices in the broader OTC derivatives markets.

The Working Group first sought to develop a thorough understanding of market infrastructure by meeting with industry groups, trade organisations and entities that provide post-trade processing services. These included providers of services for affirmation or matching of confirmations, affirmation of the economic terms of contracts, coordinated terminations of outstanding contracts, portfolio reconciliation and CCP clearing. It then developed a comprehensive survey of market practices and collected responses to the survey from about 35 large OTC derivatives dealers. Members of the group also met with some hedge funds and traditional asset managers.

The CPSS had asked the Working Group to revisit the three issues analysed in depth in the 1998 report (documentation backlogs, the use of collateral to mitigate counterparty credit risks and CCP clearing) and to identify new issues raised by changes since 1998 in risk management practices or the post-trade processing infrastructure for OTC derivatives. On the basis of the meetings it held and the survey of dealers, the Working Group identified three new issues, which were all mentioned above in the discussion of developments since 1998: (1) the implications of OTC derivatives prime brokerage; (2) the risks associated with unauthorised novations; and (3) the potential for significant market disruptions from the closeout of OTC derivatives transactions following the default of a large market participant and, further, whether some methods for calculating the value of defaulted contracts increase the likelihood and potential severity of such market disruptions.

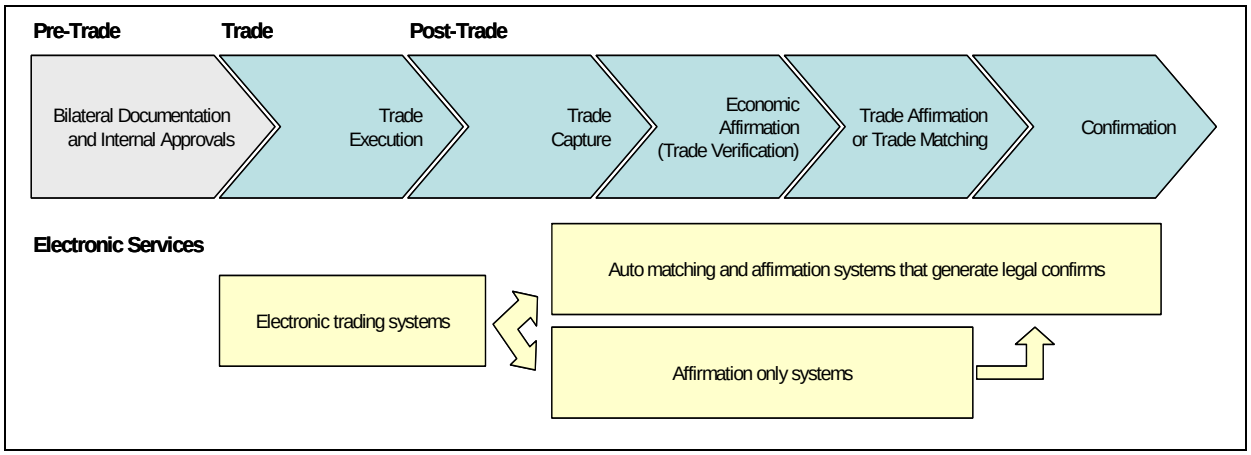
The remainder of this report analyses each of these six issues in turn. As further background to the discussion, the next section provides an overview of the post-trade processing infrastructure, organised around the key events in the life cycle of an OTC derivatives trade. Section 4 revisits the issues identified in the 1998 report and section 5 discusses and analyses the new issues. Section 6 offers an overall assessment of progress since 1998 in strengthening the clearing and settlement infrastructure, highlights some areas where additional progress is needed, and identifies some issues that could assume greater significance as the infrastructure continues to evolve.

2. Life cycle of an OTC derivatives trade

An OTC derivatives trade goes through several processing steps from the point at which two parties agree to a trade to the point where the transaction has been confirmed (Figure 1). Typically, before a trade is executed between two parties, they will establish the parameters of their trading activities through a bilateral master agreement and other supporting documentation such as a collateral agreement (a Credit Support Annex). Internally, dealers will conduct counterparty credit reviews and establish credit lines and trading limits.

Figure 1

An OTC derivatives transaction from trade to confirmation



Trade execution occurs when two counterparties agree to a transaction. In OTC derivatives trading, this traditionally takes place over the telephone directly between two parties or through a broker. More recently, electronic trading systems have become available for counterparties to trade some of the more standardised OTC derivative products (information on electronic trading platforms is available in Annex 5).

Once a trade has been executed, the parties must capture the trade details in their internal systems for post-trade processing and risk management. *Trade capture* can be manual, where trade tickets prepared by traders are passed to the middle office for processing, or automated, where the trader enters the information directly into a front office trading system and the trade details flow through to downstream systems with limited or no manual intervention. Data on trades completed over third-party electronic trading systems can often be transferred into internal systems through a file transfer or direct link with the electronic trading platforms.

Before the two parties to the trade begin the process of reviewing the full terms of the trade that would result in a trade being confirmed, the counterparties may choose to go through an additional step of verifying a dozen or so key economic details of the trade.[1] This process is commonly called *economic affirmation* but is also known as *trade verification*. Economic affirmations are accomplished through a variety of methods. For brokered trades, the broker check-out serves as an economic affirmation. For non-brokered trades, counterparties communicate bilaterally via telephone, fax, e-mail or messaging systems (eg Bloomberg,

[1] A discussion on why market participants engage in the practice of obtaining economic affirmations is provided in Section 3.1.

Markit Connex etc). Electronic trade affirmation systems (described below) also serve to carry out this process.

There are two types of operational processes that support the creation of the final record of the transaction that is agreed upon by both parties (ie *confirmation*, which can be in paper or electronic form). One model uses *trade affirmation*, whereby one party provides trade details to the other, who then verifies the information, resulting in a finally agreed trade. The second model uses *trade matching*, where both parties submit records of the trade to each other. When both sides agree that the trade details match, they have a finally agreed trade.

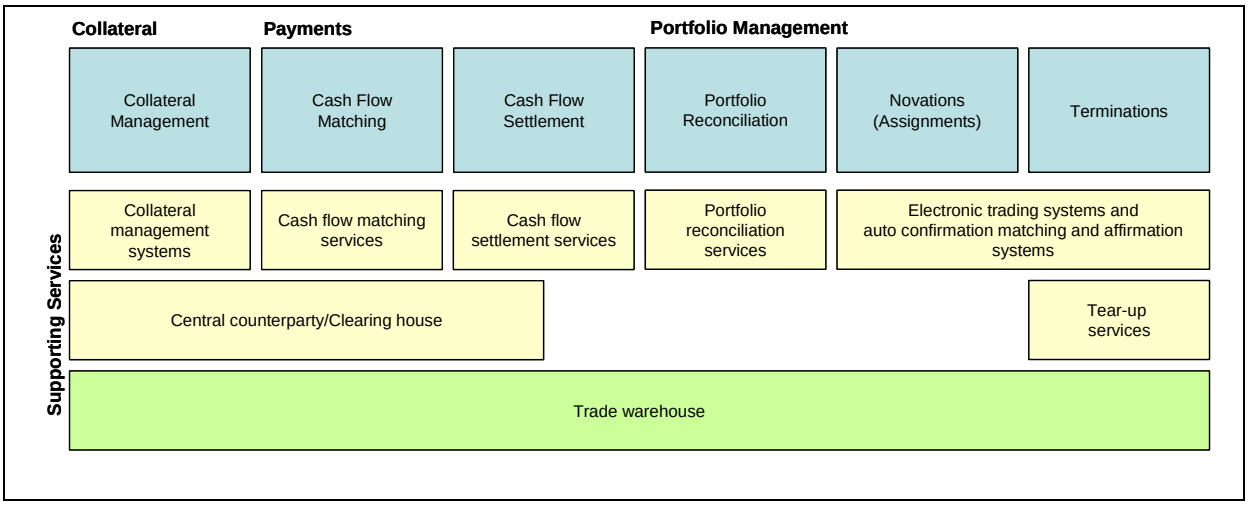
With paper-based confirmations, the trade affirmation model is used for trades between dealers and clients; the dealers issue the confirmations to clients for them to sign and return. Similarly, in the inter-dealer market for credit derivatives, the dealer selling credit protection typically drafts the confirmation and sends it to the counterparty for review and agreement. In contrast, in the inter-dealer market for interest rate swaps, the trade matching model is more commonly used, where both dealers prepare a confirmation, and the two confirmations are then matched by the counterparties for final agreement. These individually prepared confirmations are passed between counterparties by fax, e-mail and messaging systems. Most dealers have internal systems that facilitate the creation and sending of confirmations, but some manual intervention might be required, depending on the complexity of the transaction.

Third-party service providers now offer electronic platforms to generate and complete confirmations in many OTC derivative products. The electronic processing platform offered by SwapsWire is an example of the affirmation model, and Deriv/SERV is an example of the confirmation matching model (see Box 1 for a detailed discussion of the two automated models).

The underlying tenure of an OTC derivatives transaction is typically long-term and as such, these transactions have recurring events (eg periodic payments) and one-time events (eg novation) that must be managed during the life of the trade (Figure 2).

Figure 2

Lifecycle elements of an OTC derivatives transaction



Box 1

Automating the confirmation process

The automated trade affirmation model is a front-end approach in which both sides agree on a single record at trade capture. Because the full details of the trade are agreed upon and captured electronically at the beginning of the life cycle of the transaction, amendment and transaction rejection rates are typically low and final confirmation of the trade can be achieved quickly. Indeed, 99% of inter-dealer confirmations generated through the SwapsWire platform are completed on T+0. The challenge in implementing this type of model is that it requires a change to existing systems and processes designed to handle OTC trades. Traditionally, the front office hands off trades to the middle office for downstream processing after traders have agreed to a trade. In the upfront affirmation model, the front office personnel must enter the trade information into the trade affirmation system or affirm the transaction that has been captured in the system by the counterparty. Although this model eliminates the potential for errors to occur when information is passed between the front and middle offices, the process requires extra upfront work by the traders and potentially a change to a firm's IT systems.

In contrast, the trade matching model allows for the middle or back office staff to enter trade details into the matching system, which is comparable to the traditional post-trade processing approach. There are two records of the trade (one at each party to the trade) that are processed through two different internal systems before the information is entered into the central matching system. Both the timing and accuracy of the information entered into the matching system by the two parties to the trade become elements that can contribute to delays in completing the trade confirmation.

Additional services are being built to connect systems and address deficiencies in the matching model. For example, in credit derivatives, T-Zero provides workflow services to facilitate the transmission of trade data among different systems in the post-trade process. A trade executed on the electronic trading platform Creditex can be affirmed in T-Zero and then matched and confirmed in Deriv/SERV. In this example, T-Zero provides the connection between the trading platform and the confirmation matching engine. Similarly, in 2006 DTCC launched an affirmation service called AffirmXpress in cooperation with some inter-dealer brokers, which allows front office traders to review and affirm inter-dealer brokered trades before the information is sent to Deriv/SERV for matching and confirmation. Markit Trade Processing also offers workflow solutions for a wide range of OTC derivative products, which centralise back office processing and connect customers to different post-trade processing systems. Markit's services were initially developed for buy-side firms but are now provided to the dealer community as well.

As described in Section 3.2, collateral is frequently used to mitigate counterparty credit risk arising from OTC derivatives transactions, and collateral management is an important function that includes calculating collateral requirements and facilitating the transfer of collateral between counterparties. Collateral management systems (usually developed internally but sometimes provided by third-party vendors) are used to manage this operationally complex process. Central counterparties (CCPs) also perform collateral management services for the transactions they clear.

Payments are periodically exchanged between counterparties under many different types of OTC derivative contracts. Payment obligations are calculated using a wide variety of methods and some firms will confirm or match upcoming payment obligations with counterparties prior to the settlement date. Cash flow matching may be accomplished by telephone, spreadsheet exchange, or through automatic advices sent by one counterparty to the other. For credit derivatives, which have standard quarterly payment dates, DTCC Deriv/SERV offers a cash flow matching service that results in an agreed net payment amount between counterparties for the quarterly payment date. The settlement of cash flows (ie the actual transfer of cash due to counterparties) is typically based on standard settlement instructions, but the methods used to effect payments for settlement vary. Some central counterparties (eg SwapClear) offer cash flow settlement-related services, but these services are restricted to payments associated with the transactions cleared by the CCP.

Portfolio reconciliation, ie verification of the existence of all outstanding trades and comparison of their principal economic terms, is considered good market practice but does not occur routinely with OTC derivatives portfolios. Problems such as disagreements over collateral obligations or missed payments may prompt a portfolio reconciliation between counterparties. Still, most market participants argue that without an automated process for reconciling the details of some or all outstanding transactions, the process is too costly relative to the perceived benefits. TriOptima has been testing a portfolio reconciliation service (triResolve) and other service providers (eg Markit and Algorithmics) are reported to be developing similar services.

Section 4.2 describes the industry practice of *novation* (also referred to as *assignment*), where one counterparty (the transferor) steps out of a trade and is replaced by another party (the transferee), who becomes the new counterparty to the remaining party. Several electronic trading platforms have introduced a functionality that facilitates the initiation of a trade novation and the request for consent from the remaining party. Some trade affirmation and matching systems also provide a similar functionality.

For a variety of reasons, counterparties may seek to terminate trades before the transaction maturity date. Such trade *terminations* typically occur bilaterally but tear-up services such as triReduce, which is offered by TriOptima, have allowed for the systematic cancellation of hundreds of trades at one time by a group of counterparties.

A central *trade information warehouse* can serve as the repository for the most up-to-date record of each confirmed OTC derivatives contract. Information needed for the processing of payments and other post-trade events over the entire life cycle of a contract could be obtained from this centralised location of all trade records. With all market participants using the same trade record for post-trade operations, the opportunity for payment or other processing problems would, in theory, be greatly diminished. In addition, others providing automated services in the various processing stages would be able to connect to the trade information warehouse and base their services on the warehouse's trade records.

Information on several of the vendor services mentioned above can be found in Annex 6.

3. Issues analysed in the 1998 report

3.1 Delays in documenting and confirming transactions

Unsigned master agreements

Dealers typically require that trades be documented using a master agreement in order to ensure that they can close out and net or set off these trades in the event of a counterparty's default. Where enforceable, netting can substantially reduce the credit exposure from dealings with a counterparty.[2] But if a counterparty assumes that exposures can be netted and netting proves not to be enforceable, counterparty losses could substantially exceed expectations.

In 1998, dealers reported unsigned master agreements with a substantial number of counterparties (5 to 20%). Since then, dealers have generally greatly reduced backlogs of unsigned masters. Virtually all dealers have now signed masters with each other. Dealers also report that counterparties without a signed master agreement represent a small proportion of their credit exposures, ranging from "insignificant" to 3%.[3] As was the case in 1998, many remaining unsigned masters are with clients who have only executed one trade (and thus there are no benefits in netting).

In both the United States and the United Kingdom, laws provide a strong case for the non-defaulting party to close out and net swap agreements in the event of a counterparty insolvency, even in the absence of a signed master agreement. In other major jurisdictions, a signed master agreement must be in place (Canada and France) or specific conditions have to be met (Japan, Germany, Switzerland) to achieve the benefits of netting when a counterparty defaults.

Currently, dealers report using the same techniques to mitigate the risks associated with unsigned masters as were mentioned in 1998. The key is to limit the number of transactions the dealer is willing to perform without a master in place. Many dealers require a master agreement to be signed before the first transaction with riskier (non-investment grade) counterparties, and before the second transaction with others.

Master agreements can often take months to negotiate and, during this period, the market practice is to incorporate by reference the industry standard form of master agreement in a confirmation often referred to as a long-form confirmation.[4] Such a confirmation, if enforceable, would mitigate the risk of being unable to close out and net transactions during the period before the master agreement negotiation is completed and the document is signed. However, while some interviewed dealers feel that long-form confirmations provide the same protection as masters, many others emphasise that there is greater legal certainty in having a master agreement in place. Some firms also mitigate risk by including language in long-form confirmations that gives the firm the right to terminate outstanding transactions with the counterparty if a master is not signed within a designated time frame (often 90 days). Nonetheless, in computing exposures, dealers typically do not assume that trades can be netted until a master agreement is in place.

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[2] Reports filed by US commercial banks indicate that as of end-June 2006, the aggregate ratio of net counterparty credit exposures to gross exposures on OTC derivatives was 15 percent, implying that counterparty exposures were reduced by 85% through netting.

[3] It should be noted that two small dealers said that their transactions under unsigned master agreements reach 14 to 15% of gross market value.

[4] Market participants also use the term "long-form confirmation" to refer to a confirmation that contains all the economic provisions of a trade and the full language of the ISDA Master Agreement.

Backlogs of unsigned masters are routinely monitored and reported to senior management. Dealers have procedures to prioritise efforts to complete documentation, generally based upon the risk of and exposure to the counterparties. The higher the risk or the longer the exposure, the higher the priority attached to completing documentation. In addition, firms always have the option to suspend trading with a counterparty that has not signed a master.

Assessment

Overall, dealers recognise the risks posed by unsigned masters. Since 1998 they have greatly reduced the total number of and exposure from unsigned masters. Furthermore, they are making effective use of the various mechanisms available to mitigate risks from remaining unsigned masters.

Outstanding confirmations

In 1998 dealers reported hundreds of outstanding confirmations, with a significant portion outstanding for 90 days or more. Over the years, the backlog of outstanding confirmations continued to grow. In its July 2005 report, CRMPG II highlighted the continuing industry-wide nature of the problem.[5] According to the ISDA 2006 Operations Benchmarking Survey, which reflects OTC derivatives activity for the 2005 calendar year, large firms reported that the "volume of confirmations that have been sent to a counterparty but are not yet finalized or signed" had been growing in almost all product types (see Table 2). This growth was evident when compared to the previous year but trends over time also reflected an upward pattern of growth. The only asset class that showed an improvement in business days' worth of outstanding confirmations was credit derivatives, which began to receive targeted industry attention in September 2005.

Table 2

Outstanding confirmations at large firms in business days

Calendar year	2002	2003	2004	2005
Commodity derivatives	9.6	13.5	20.2	23.3
Credit derivatives	25.6	25.0	23.5	16.2
Equity derivatives - vanilla	12.0	13.9	15.3	20.7
Equity derivatives - non-vanilla	…	…	20.6	30.5
Swaps - vanilla	9.6	10.8	10.6	13.6
Swaps - non-vanilla	12.9	12.4	16.4	18.0

Source: ISDA 2006 Operations Benchmarking Survey.

Note: … - not available.

If data were available on the number of outstanding confirmations at large dealer firms, they would undoubtedly show that the numbers outstanding in 2005 were far larger than those in 2002 across all product categories; the 2006 ISDA Survey shows that average total deal

[5] *Toward greater financial stability: a private sector perspective*, report of the Counterparty Risk Management Policy Group II, 27 July 2005, Section IV.

volume in 2005 was more than twice that in 2002, and that average deal volume for credit derivatives had increased by more than 600%.

The failure to confirm a transaction may jeopardise its enforceability or the ability to net it against other transactions. In 1998, it was noted that verbal contracts are legally enforceable in many jurisdictions, so the failure to confirm a transaction in writing would not necessarily make it unenforceable. However, details of a trade may later be in dispute with a counterparty, in which case the ability to prove the details of the transaction become important.[6] Another risk associated with unconfirmed trades is that they may allow for errors in the books and records of a firm to go undetected. This will cause market or counterparty credit risks to be measured incorrectly and mismanaged. Inaccurate management information systems can also lead to margin and payment breaks and other problems later in the trade life cycle.

Clearly, the best way to mitigate the risk from unconfirmed deals is to clear the backlogs and put in place procedures to ensure that they do not reappear. Nonetheless, there will always be some unconfirmed trades. Market participants must therefore recognise and manage the risks that accompany these unconfirmed trades. One step that firms can take to mitigate the risks associated with outstanding confirmations is to monitor the backlog and appropriately prioritise efforts to reduce it. All dealers have procedures in place to track and prioritise outstanding confirmations. Age, mark to market values and the occurrence of payment breaks are some of the metrics monitored and used to set priorities for contacting counterparties about unconfirmed trades. Moreover, individual institutions periodically inform senior management about progress being made in reducing confirmation backlogs.

Many dealers verify the key economic terms of a transaction shortly after the trade and prior to final confirmation, to minimise risk while the confirmation is outstanding. The handful of key economic terms verified include information such as who is selling versus buying, the notional amount, the rate (price) and the tenure of the transaction. This practice of obtaining economic affirmations (also referred to as trade verification) has gained ground, although industry views vary as to the practice's efficacy and importance. Some firms feel that it is extremely important to get the terms of the trade correct as close to the trade as possible, and they always seek to affirm key economic terms. Other firms believe that completing the confirmation as soon as possible is more beneficial because important non-economic terms can lead to problems at other stages of the trade life cycle. The dealers interviewed report that discrepancies are found in roughly 5 to 15% of economic affirmations, and can be as high as 30% of confirmations. The discrepancies in confirmations typically concern technical details such as holidays, business day conventions, customised language, etc, which are not part of the economic affirmations.

Notwithstanding the divergent views on the merits of economic affirmations, this process can serve as a critical risk mitigation tool if confirmation is not expected to occur promptly. In particular, for complex products such as non-vanilla credit derivatives, for which confirmation often is not achieved until T+30 or later, obtaining an economic affirmation would seem prudent. Furthermore, some dealers, hedge funds and other active market participants frequently novate, terminate or amend trades after they have been confirmed (and sometimes before they have been confirmed). To ensure that books and records of trades and, therefore, that measures of market risk and counterparty credit risk are accurate, active market participants should work over time towards the goal of routine daily portfolio reconciliation (verification of the existence of all outstanding trades and comparison of their principal economic terms) with their most active counterparties.

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[6] Forms of evidence that can be used to prove a transaction include recordings of conversations, e-mails and information from brokers (when a broker is used to facilitate the transaction). Dealers noted that the exchange of payments or margin collateral associated with a transaction can also be used as evidence.

Tackling the backlogs

In September 2005, 14 major derivatives dealers met with supervisors to discuss the high level of unsigned confirmations outstanding between counterparties for credit derivatives transactions. Since then, these dealers have been working towards improving industry practices and reducing the number of outstanding confirmations of credit derivatives transactions. In the most recent update in September 2006, the dealers reported that in aggregate they had reduced the number of all outstanding credit derivatives confirmations by 70% and confirmations outstanding more than 30 days by 85% (measured over the period 30 September 2005 to 31 August 2006). The dealers have also been working on a number of initiatives to achieve a stronger industry "steady state" in credit derivatives, such as developing processing guidelines for confirming trades and embracing the use of electronic confirmation platforms.[7] The percentage of trades confirmed electronically doubled between September 2005 and August 2006, and exceeded 80% of total trade volume in the latter month. Acknowledging that the problem of confirmation backlogs exists in other OTC derivative products, the dealers now plan to focus efforts on reducing the levels of unconfirmed trades in equity derivatives.

Indeed, in July 2006, the 14 major derivatives dealers began collecting data on outstanding confirmations in other OTC derivative products using the same metrics they have been reporting to their prudential supervisors for credit derivatives.[8] The data for December 2006 (summarised in Table 3) suggest that, with the exception of equity derivatives, confirmation backlogs for other products seem to have fallen over the same period in which progress was made with respect to credit derivatives, when outstanding confirmations are measured in terms of business days. In terms of the absolute number of outstanding confirmations, however, the average number appears to have fallen for commodity derivatives but continued to increase for both equity derivatives and interest rate swaps.

Table 3

Outstanding confirmations - December 2006[1]

	Business days	Average number
Commodity derivatives	7	1,157
Credit derivatives	7	1,933
Equity derivatives	24	4,429
Interest rate derivatives	13	5,870

[1] August 2006 for commodity derivatives.

Sources: Markit and 17 firms submitting data to prudential supervisors; for commodity derivatives, Markit and 14 firms submitting data to prudential supervisors.

In the longer term, efforts to bring greater automation to each step in the confirmation process will improve processing efficiency and eliminate factors contributing to the backlogs. In 1998, few electronic services supported the confirmation process. SWIFT's Accord matching service, which was already offered at that time, is still used today to match

[7] See http://www.newyorkfed.org/newsevents/news/markets/2006/an060313.html.

[8] These 14 firms are not identical to the large firms reporting data in the ISDA Operations Benchmarking Survey. Although there is substantial overlap, comparisons of the two sets of data are problematic.

confirmations of interest rate derivatives. Over the past few years, other electronic services have been launched. SwapsWire is an upfront trade affirmation service, primarily for interest rate swaps, which results in the confirmation of a trade.[9] Deriv/SERV offers a confirmation matching engine that is the dominant platform for credit derivatives. In the commodities markets, the eConfirm system provided by the Intercontinental Exchange matches and confirms various types of OTC commodity derivatives trades.[10] An expanded group of 17 dealers has committed itself to use these and other electronic services to reach the goal of issuing confirmations for vanilla products by T+1 and completing confirmations by T+5.

Despite the promise of automated processing platforms, they are used primarily to confirm plain vanilla trades that have only a few differences from trade to trade. The terms and templates for some products are not sufficiently standardised to be amenable to automated processing. For structured, complex trades, for example, automated processes are less prevalent, confirmations are handled manually and dealers must take other steps to mitigate risks. In addition, counterparty take-up of confirmation processing systems has been uneven in different product types. Some users cite startup costs as well as the lack of critical mass on systems as obstacles. Buy-side clients often prefer one system for all products; thus some are taking a "wait and see" approach, while dealers are supporting multiple processes.[11] Notwithstanding these obstacles, the 17 dealers have agreed to work over time towards issuing confirmations for non-vanilla products by T+10 and completing confirmations by T+30. Further, they will focus on the goal of economic affirmation of non-vanilla trades by T+3.

At the same time, the industry is seeking to streamline the confirmations process by developing product-specific Master Confirmation Agreements. The trade-specific confirmations would then reference the product-specific terms included in the Master Confirmation Agreement, thereby simplifying and accelerating post-trade processing.

Many market participants argue that more can also be accomplished by focusing on the initial capture of trade data. In principle, electronic trading enables data to be captured at the point of the trade. Furthermore, electronic trading platforms can be directly linked to a firm's systems for straight through processing, or data can easily be extracted from the trading systems and passed on to downstream systems with limited manual intervention (eg file transfers). [12] Despite the perceived benefits of capturing trade data at the point of trade, e-trading has not taken off in the OTC derivatives market. A challenge in this area is the existence of multiple platforms, which have failed to reach the critical mass necessary to make a system cost-effective.[13]

Assessment

In summary, backlogs of outstanding confirmations have grown on an industry-wide basis in the years since the last report. The same commitment made to reduce backlogs in, and improve the processing of, credit derivatives confirmations needs to be extended to other

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[9] Dealers who are using SwapsWire report that 10 to 35% of their eligible (plain vanilla) interest rate swaps volume are confirmed through SwapsWire.

[10] Additional information on SWIFT, SwapsWire, Deriv/SERV and eConfirm is provided in Annex 6.

[11] Some buy-side firms are opting to use providers such as Markit Trade Processing, which collect trade information from the firm's trade capture system and submit trade details to the relevant confirmation processing systems on behalf of the buy-side firm.

[12] We define straight through processing as the capture of trade details directly from front-end trading systems and complete automated processing of confirmations and settlement without the need for rekeying or reformatting data.

[13] See Annex 5 for a description of these platforms.

OTC derivative products, so that all OTC derivatives trades are accurately captured and confirmed promptly after the trade date. The 17 dealers that are now working with supervisors have acknowledged the need for progress over time across the full range of products and have set common goals for issuing and completing confirmations.

The continued use and expansion of electronic processing services and dedication of appropriate back office resources will be essential if these goals are to be achieved. Sustained efforts to ensure increased participation and use of these services should be further encouraged. Additionally, in order to minimise processing time, rapid standardisation of terms and templates is important as new products are introduced to the market. Finally, further development of electronic trading, which can capture trade details at trade execution, can in principle contribute to increased processing efficiency in the long run.

Even with these industry efforts to improve the processing of OTC derivatives, there will be non-vanilla products and even some plain vanilla transactions where confirmation is not achieved promptly. For these transactions, economic affirmations are critical tools for reducing potential risks.

In the case of active counterparties that frequently novate, terminate or amend trades, market participants should work over time towards the goal of routine daily portfolio reconciliation with their most active counterparties, so as to ensure accurate measures of market risk and counterparty credit risk.

3.2 Use of collateral to mitigate counterparty credit risk

Usage of collateral[14]

Since the last study, the use of collateral to mitigate counterparty credit risk has increased dramatically. In 1998, collateralisation was used most extensively by dealers located in the United States and the United Kingdom, but its adoption by dealers in other European countries, Canada and Asia was limited. Over the last eight years, collateralisation has been adopted in major jurisdictions worldwide. At the end of 2005, in excess of USD 1.3 trillion in collateral had been posted to support OTC derivatives exposures, compared to some USD 200 billion in 2000. More dramatically, the number of collateral agreements grew from 12,000 to 110,000 over this time period. Around 60% of trade volume and exposures are currently collateralised, compared to about 30% in 2003.[15]

The rationale for collateral agreements has changed little over the years. The use of collateral frees up bilateral counterparty credit lines, making it possible to continue trading activity. In addition, collateralisation may permit a reduction in economic or regulatory capital. All the interviewed dealers reported using collateral for bilateral risk mitigation. However, the extent of its use varies considerably among individual dealers.

Some practices around the use of collateral agreements have, however, changed. Most noteworthy is a change in the form of collateral posted; in 1998, government bonds were the predominant form of collateral, whereas today cash is most frequently posted (around 75%, according to the ISDA Margin Survey 2006). The shift from securities to cash has largely been driven by operational convenience. Cash collateral is more fungible than securities collateral and therefore easier to mobilise and transfer. Specifically, it was noted that there are no corporate actions for cash collateral, settlement deadlines during the day tend to be later than for securities and the reuse of cash collateral is simpler. Hedge funds active in

[14] For additional details on the structure of collateral agreements, see the 1998 CPSS report, pp 22-24.

[15] See ISDA Margin Survey 2006.

OTC derivatives markets tend to prefer cash; for example, a fund might have a goal to limit its holdings of government securities to a certain percentage of assets and thus it would not have a large pool of securities to use as collateral. In addition, low interest rate environments, which reduce opportunity costs for cash collateral, might have facilitated the shift to cash. Nonetheless, securities remain an important form of collateral.

Another change compared to 1998 is that two-way[16] collateral agreements have become more prominent. Only a small minority of collateral agreements is one-way[17], typically in the dealer's favour with hedge funds. One-way arrangements are in the counterparty's favour, however, if it is a special purpose entity (for example, a securitisation structure) or government, supranational and other sovereign entity. The reuse[18] of collateral has grown and today it is routine among almost all large dealers. [19]

A shift also is slowly under way in the manner in which initial margin requirements are determined in OTC derivatives markets. A handful of dealers now offer select clients the option of portfolio margining, often as part of a prime brokerage arrangement, as described in Section 5.1). The term "portfolio margining" is not used in a consistent way in financial markets. For the purposes of this report, the term refers to the practice of determining the initial margin requirement for a group of positions using stress tests or statistical techniques that calculate the largest potential loss on the value of the entire portfolio. In this procedure, positions can offset each other and correlations between the values of positions in different instruments are implicitly recognised; there is no specific initial margin requirement attached to an individual position. Take-up of the practice is reportedly limited, even among the most sophisticated clients. Some dealers report that clients like the simplicity and transparency of a requirement determined position by position.

As noted in the 1998 report, margining procedures stipulated in collateral support agreements are operationally demanding for dealers. At that time, many dealers called for collateral only weekly or monthly because of their inability to calculate collateral requirements quickly. Today, most dealers report that they conduct daily calls and one of the interviewed dealers reported that it calculates intraday collateral requirements and makes intraday collateral calls in specific circumstances.

Market participants and industry groups report that the largest dealers have been centralising their collateral management and integrating it more closely with their funding liquidity management. In these firms, collateral is often centrally managed across various product categories such as repos, securities lending and borrowing, and OTC derivatives.[20]

The firms that were early adopters of collateral agreements generally developed proprietary software that allowed them to value positions, track collateral requirements and collateral posted, make and receive margin calls, and monitor the receipt of collateral. Over the years, vendors have offered (or discussed offering) a wide range of collateral management services to facilitate dealers' and clients' collateralisation processes.

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[16] In two-way collateral agreements, both counterparties to the trade are required to post collateral whenever they generate an exposure that exceeds a certain agreed threshold, which can be set at zero.

[17] In one-way collateral agreements, only one of the counterparties is required to post collateral. The other counterparty is usually of much higher credit standing.

[18] The reuse of collateral refers to the use of collateral deposited by one counterparty to meet collateral demands from other counterparties or to obtain funding, for example in the repo market. When the reused collateral takes the form of securities that have been obtained as collateral under a pledge agreement, the reuse of that collateral is often called rehypothecation.

[19] Ibid.

[20] The 2006 CPSS report on *Cross-border collateral arrangements* finds that a number of internationally active banks are also centralising collateral and liquidity management globally.

Specific examples of such services are outsourcing solutions for collateral management offered by international central securities depositories (ICSDs) and several large custodian banks, typically building on existing tri-party repo services. Outsourcing vendors generally offer to maintain collateral agreement details, calculate collateral adequacy, make and receive margin calls, and settle collateral amounts. According to the interviews, the dealers' take-up of such outsourcing services for OTC derivatives has been limited so far. Issues that may arise when using collateral management services offered by vendors include the possible loss of control and the fact that these services can only partially replace in-house processes.[21]

Implications for risks

The increased use of collateral offers the potential to further reduce counterparty credit risks and thereby enhance the stability of OTC derivatives markets. Nonetheless, the use of collateral does not eliminate credit risk entirely and entails legal, custody, operational and funding liquidity risks.[22]

Collateral provides ready access to assets that can be used in the event of a counterparty's default, but there is always a potential for market movements leading to uncollateralised exposures. In addition, collateral arrangements sometimes include uncollateralised thresholds, minimum transfer amounts, or delays in mark to market valuations and margin calls that lead to temporary uncovered exposures. The effects of these factors have been reduced (but not eliminated) by the higher frequency of mark to market valuations and of margin calls that are a feature of collateral agreements today.

The potential for disputes related to collateral calls also constrains somewhat the risk mitigation benefits from using collateral. Indeed, some dealers note that disputes about the amount of collateral owed tend to increase when market volatility rises, which is when the risk mitigation benefits of collateral are most needed. Dealers report that disputes frequently arise for a variety of operational reasons: small differences in calculations of collateral requirements can result from the use of different underlying reference entities or when prices are calculated in different market centres, while larger differences can arise from disagreements regarding the population of trades covered by the collateral agreement (owing, for example, to novations or the booking of trades in different legal entities) or regarding the valuation of complex products. ISDA's standard documentation includes a dispute resolution process.[23] However, some of the interviewed dealers report that this process is not applied in practice. For amounts below an internal non-dispute threshold, the contested amount is often simply split between the two parties.

The legal framework is evolving to provide greater legal certainty for holding securities, including dematerialised securities, through intermediaries and central securities depositories. The level of assurance that collateralisation arrangements are on solid legal ground has also been bolstered. Prior to publication of the 1998 report, the European Union enacted a directive on settlement finality.[24] Subsequently, the European Union enacted the

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[21] For example, the calculation of mark to market values for OTC derivatives transactions and the investigation and resolution of collateral disputes are usually done in-house.

[22] For a thorough discussion of how collateralisation arrangements affect risks, see the 1998 CPSS report.

[23] Counterparties transfer the uncontested amount. To agree on the remaining amount, ISDA's Credit Support Annex establishes that four actual quotations at mid-market from market-makers are obtained to calculate the mark to market value. If four quotations are not available, then fewer may be used. And if no quotations are available, the original valuation agent's calculation is used as the mark to market value.

[24] Directive 98/26/EC of 19 May 1998. This directive harmonised the rules of the EU member states, protecting the enforceability of collateral provided in payment and securities settlement systems as well as the rules for determining the applicable law in relation to participants' rights to that collateral.

Financial Collateral Directive,[25] which has been implemented by law in all EU member states. It modernises and simplifies the procedures for financial collateral arrangements and for determining the applicable law. The Hague Securities Convention seeks to identify on a global basis which law determines legal rights related to securities held through financial intermediaries.[26] Further, since September 2002, the International Institute for the Unification of Private Law (UNIDROIT) has been preparing a draft convention, "Substantive rules regarding intermediated securities", which provides for harmonised legislation on the cross-border holding and transfer of securities held through intermediaries. Market associations regularly update legal opinions on the enforceability of collateral agreements, and the interviewed dealers report a high degree of confidence as to the legal enforceability of collateral arrangements in G10 countries.[27] In addition, individual firms have conducted due diligence on the enforcement of agreements, especially to address non-standard provisions or specific circumstances.

The market liquidity risk of securities collateral is typically addressed by adequate haircuts and frequent mark to market valuations. However, collateralisation can be a source of funding liquidity risk because counterparties have to provide collateral at relatively short notice. The more widely and intensively collateralisation is used, the more relevant this risk becomes. Linking margin requirements to downgrades in credit ratings in particular can give rise to extraordinary demands for collateral. The same holds true for large market movements, which can affect both the exposure of OTC derivatives and the value of collateral posted. Firms need to anticipate such liquidity strains by looking at the effects of price moves or credit downgrades through stress tests. The Working Group's discussions with dealers do not provide a way for it to come to any judgment about whether firms are adequately assessing their funding liquidity risk through stress testing. Supervisors examine dealers for their ability to cope with unexpected liquidity demands, and these firms also have superior access to liquidity through securities lending and borrowing markets as well as repo markets. Hedge funds, however, might have more limited possibilities to raise cash at short notice, so they need to devote special attention to quantifying potential liquidity demands and ensuring that they have adequate cash to meet them.[28]

Assessment

The use of collateralisation has expanded rapidly since 1998. If done properly, collateralisation is an effective way to mitigate the credit exposures from OTC derivatives transactions, although it can potentially contribute to other risks. Dealers' responses to the Working Group's questionnaire indicate that the widespread use of collateral significantly mitigates counterparty credit risks. Furthermore, since 1998 significant progress has been made to reduce legal, operational and custody risk in collateralisation arrangements. The degree of funding liquidity risk in collateralisation is difficult to assess, as this would require taking a broader perspective to include the different liquidity demands that dealers and clients might face under normal conditions and under stress, as well as the liquidity management tools applied and liquidity sources used by these institutions. Incorporating demands for collateral into a firm's overall liquidity risk management is an issue that deserves continued attention from market participants.

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[25] Directive 2002/47/EC of 6 June 2002 on financial collateral arrangements.

[26] Two countries have signed and are working towards ratification.

[27] See, for example, the 2005 ISDA Collateral Guidelines.

[28] See Managed Funds Association, *MFA's 2005 sound practices for hedge fund managers*, Section IV, p 5.

3.3 Development of a central counterparty

At the time of the 1998 report, the clearing of OTC derivatives was quite limited. OM Stockholm cleared some standardised and some tailored OTC contracts. LCH.Clearnet Ltd (LCH) had plans to begin clearing forward rate agreements and interest rate swaps. It launched its service for interest rate swap contracts, SwapClear, in September 1999. In the intervening years, the use of CCPs has expanded in financial markets generally, spurred by increasing use of electronic trading systems. Some CCPs have also developed services that enable products traded over the counter to be submitted for clearing. In most instances, the OTC products are converted into equivalent exchange-traded contracts to facilitate clearing and to allow for offsetting with exchange-traded products.[29] The direct clearing of OTC derivatives contracts in SwapClear has also proven to be quite successful. As of December 2006, USD 35.5 trillion in swaps were cleared through SwapClear, or approximately 40% of the global inter-dealer market in interest rate swaps.[30, 31]

The 1998 report discussed potential benefits from the creation of a CCP for OTC derivatives. It also noted challenges to clearing OTC derivatives that are not typically faced by clearing houses for exchange-traded products. Subsequent experience with SwapClear permits a reassessment of these benefits and challenges on the basis of actual experience.

Benefits of a CCP

The use of a CCP has the potential to mitigate the various risks associated with OTC derivatives. With respect to credit risk, a CCP allows members to achieve multilateral netting of credit exposures on the contracts cleared. It also typically employs robust margining procedures and other risk management controls so that it is more creditworthy than most, if not all, of its participants. A CCP has the potential to reduce liquidity risks by broadening the scope of payment netting. Its default procedures are often supported by specific provisions of national law, which would tend to reduce legal risk. Finally, CCPs tend to establish stringent operational requirements for back office operations, including automated submission of trade information and business continuity planning, leading to reductions in operational risk.

One of the key benefits cited for a CCP is the potential to reduce clearing members' credit exposures, relative to those that exist in bilateral relationships, through multilateral netting.[32]

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[29] Examples include:

- Bclear, an exchange service launched by EuroNext.Liffe at the end of 2005, which brings equity derivatives transactions initially conducted OTC to LCH.Clearnet for trade confirmation, administration and clearing. The original transaction is replaced by an exchange contract through novation;
- the OTC Trade Entry Facility provided by Eurex Clearing AG;
- Clearing 360, a similar service offered by the Chicago Mercantile Exchange (CME) for OTC interest rate derivatives. In operation since April 2006, Clearing 360 takes a bilaterally negotiated OTC swap trade and converts it into a strip of futures contracts, which are then submitted to CME for clearing;
- Converge, a service launched on 19 October 2006 by the Canadian Derivatives Clearing Corporation, a wholly owned subsidiary of the Montreal Exchange. This service clears OTC equity options; and
- the New York Mercantile Exchange's ClearPort facility, which transforms OTC natural gas and other energy derivatives into exchange-traded and cleared futures.

[30] All LCH figures from December 2006. Market share calculated using BIS notional outstanding data from June 2006.

[31] Based upon the data from the BIS, the inter-dealer market makes up approximately 40% of the worldwide market in interest rate swaps. SwapClear's activity accounts for about 40% of the inter-dealer market, suggesting that about 16% of the worldwide market is cleared.

[32] The reduction in counterparty credit exposures may be reflected in a reduction in economic or regulatory capital beyond that achieved through bilateral netting and collateralisation.

However, in the 1998 interviews, some dealers argued that these benefits are significantly attenuated because no CCP clears the full range of OTC derivative products. Transactions outside a CCP are documented under master agreements with bilateral netting and collateral agreements, and dealers are thus likely to have efficient internal risk management systems covering these transactions. Indeed, analysis by ISDA suggests that more than 80% of the counterparty credit risk in bilateral arrangements is mitigated by bilateral netting and collateralisation. Furthermore, the effect that splitting portfolios into centrally cleared and bilateral portions will have on the measurement of the credit exposure of the bilaterally cleared deals is unpredictable and will vary from dealer to dealer depending upon its type of business, the type of contracts cleared and the participants in the clearing house. In recent interviews, most dealers indicated that the limited coverage of SwapClear and the resultant splitting of portfolios did not materially affect their perception of the benefits of using its services.

Access criteria are adopted both to manage the probability of a member default and facilitate the closeout of a defaulting dealer's positions. In SwapClear's case, members must have a swap portfolio of USD 1 trillion outstanding. In addition, they must have a minimum of USD 5 billion of Tier 1 capital or, alternatively, a parental guarantee and a credit rating of A or higher. LCH reports that it periodically reviews its membership criteria, but that it has elected to maintain current standards in large measure because these standards are more compatible with its default management procedures, described in more detail below.

A CCP has the potential to reduce liquidity risk through payment netting; in addition, it can sharply reduce payment breaks for member firms. Market participants report that most payments associated with bilaterally documented OTC derivatives are currently settled gross. Although the value of these payments is small compared to dealers' overall payment flows, their large number is an operational concern. SwapClear thus offers clearing members benefits as a result of the netting of settlement payments and the regularisation of payment procedures. The clearing of OTC derivatives could affect liquidity risks in other, more complex ways, however. The margin requirements that are a critical risk management tool for a CCP place liquidity demands on members. Compared with bilateral netting and collateralisation, the effect of CCP clearing on liquidity pressures faced by members is ambiguous, and depends upon each clearing member's share of centrally cleared contracts and on the margin requirements of both the CCP and the counterparties to bilateral agreements. A CCP also can offer cross-margining of exchange-traded and OTC contracts, possibly reducing liquidity demands, but this is not currently a feature of SwapClear.

In most jurisdictions, clearing houses are subject to insolvency regimes that protect their actions from challenge in a default and provide explicit support for the application of default rules. This potential reduction in legal risk has generally been recognised as a large benefit of a CCP. At the time of the 1998 report, it was particularly compelling because legal work to assure the enforceability of netting provisions in master agreements and the enforceability of collateral agreements was still under way in many jurisdictions. This latter work has been completed in all the major jurisdictions, and now there is little, if any, difference in legal risk from clearing a trade through a CCP versus bilateral arrangements.

From the perspective of its members, a CCP has the potential to reduce operational risk through the imposition of requirements for automation of deal submission and for operational reliability. It can further improve data integrity by providing a database of trades, which facilitates portfolio reconciliation and the processing of margin and settlement payments. Indeed, some market participants expressed the view that the primary benefit of a CCP is operational rather than credit-related. When SwapClear was created, members were required to submit trades using SWIFT Accord, a notable change from standard industry practice at the time, which relied on faxes or paper mail. SwapsWire was subsequently added as another approved trade submission facility.

Many operational benefits could, however, be realised without trades being legally novated to a third party, that is, without the "central counterparty" feature of the clearing house. Firms derive operational benefits from the use of SWIFT Accord or SwapsWire independently of their use of SwapClear because trades in electronic form can be more easily fed into various risk management and back office systems. A trade information warehouse, such as the one DTCC has introduced, could facilitate the development of infrastructure for various post-trade processes such as position recordkeeping and cash flow processing that could reduce operational risk. TriReduce, which can eliminate deals completely through its tear-up service, also offers the potential for very large operational gains. Deals removed from a portfolio no longer have to be margined (no margin breaks), and there are no further payments (no payment breaks).

Challenges associated with a CCP

From a systemic perspective, a clearing house concentrates risk and risk management. The key issue is how effectively a clearing house manages the risks to which it is exposed. Compared to a CCP for exchange-traded products, a CCP for OTC derivatives faces two particular risk management challenges: 1) more complex OTC derivatives contracts require the use of more complex pricing models that involve model risk and; 2) the default procedures for OTC contracts must accommodate the relative illiquidity of the instruments being cleared. Some interest rate swaps and other OTC derivatives are fairly standardised, but some OTC products can be highly customised. These latter OTC products are illiquid and often difficult to value. But even the valuation and liquidity of plain vanilla OTC products may also be challenging in market conditions such as those that might occur if a clearing member were to default.

A key risk management challenge for an OTC derivatives clearing house is that valuation issues place limits on the extension of clearing to more complex products. This challenge was noted in the 1998 report. As part of its decision on participation in a CCP, a participant must be comfortable with the valuation model used to price positions. Margin requirements will be based upon prices derived from those models, affecting both the cost and the risk of participation in the CCP. The importance of valuation issues is reflected in SwapClear's choice of contracts that can be submitted for clearing - single currency vanilla interest rate, basis or compounding swaps in major currencies. These are easiest to value. SwapClear has not yet attempted to clear interest rate options, in part because of valuation issues.

Markets for OTC derivatives are generally are less liquid than markets for exchange-traded derivatives, and traditional procedures for a CCP to handle a default may not be effective. When a participant defaults, the CCP terminates all of its contracts with the defaulting participant. The traditional procedures for handling a default, which are used by CCPs for most exchange-traded derivatives, call for the CCP to promptly enter the market and replace the contracts, so as to hedge against further losses on the open positions created by termination of the defaulter's contracts. But if the markets for the contracts cleared by the CCP are illiquid, entering the market may induce adverse price movements, especially if the defaulting participant's positions are large. Consequently, the application of traditional default procedures to illiquid OTC contracts may entail significant risk to the CCP.

SwapClear recognises the risk posed by clearing relatively illiquid products. Its rules do not require it to bear all of the risk of replacing contracts with a defaulting participant. Rather, some of the risk is effectively allocated to SwapClear's participants. Until recently, all of the risk of replacing contracts was allocated to the original counterparties of a defaulting participant through a procedure termed "invoicing back". Under this procedure, which was developed for clearing physical commodities for which there is sometimes an illiquid market, SwapClear would hedge the open positions created from the termination of a defaulting participant's contracts by terminating its contracts with the original counterparties to the defaulting participant. In effect, contracts with a defaulting participant would be "de-cleared" and the original counterparties would be forced to bear the risks of hedging the open

positions created by the termination of the defaulting participant's contracts. Initial margin posted by the defaulting member (and that member's default fund contribution if the initial margin proves inadequate) would be made available to the original counterparties of the defaulter to offset (at least in part) any losses that they may incur in entering the market to hedge their positions.

SwapClear has now implemented a new default management process that replaces invoicing back.[33] The initial goal of the default management process is to reduce and mitigate the risk exposure of the CCP in the event of default by a clearing member. If initiated, the process would be monitored and managed by a default management group, comprising senior LCH staff and representatives from member institutions. (Over time, membership in the default management group will rotate among SwapClear members.) Traders from clearing members would be seconded to SwapClear to manage the defaulter's portfolio. They would be charged with neutralising the risk in the portfolio by entering into new OTC derivative contracts with non-defaulting clearing members. Once neutralised as much as possible, the portfolio would be divided by currency and auctioned to surviving members. The default management group would determine a reservation price for the auction, and if a surviving clearing member's bid exceeds that reservation price, the auction would be deemed successful. If not, the auction would fail. In the event of a failed auction, the portfolio would be divided equally among surviving clearing members active in that currency and novated, at a price determined by SwapClear, to those members. Under the new procedure, a non-defaulting SwapClear participant would bear the risks of entering the markets to hedge open positions created by a default only if it is a successful bidder for one or more currencies at the auction or if one or more auctions fail and it is assigned its share of contracts because it has outstanding positions with SwapClear in those currencies.

A key concern related to the procedure is its effectiveness if the defaulting participant's portfolio of positions is large and unbalanced, so that neutralising the portfolio would require large transactions that could not be executed quickly without significant losses to the CCP. SwapClear's margin procedures call for margin multipliers to be assessed automatically against large positions, as much as twice the initial margin. These margin multipliers create disincentives for participants bringing large unbalanced positions to SwapClear. Even if those incentives proved insufficient, the CCP would nonetheless have the additional collateral to cover the neutralisation of the position over what could be a longer time period.

A CCP concentrates responsibility for risk management; thus, its potential to reduce systemic risk depends upon the effectiveness of its risk management procedures. In the absence of sound risk management, a CCP theoretically could increase systemic risk by increasing the potential for contagion rather than mitigating it. For this reason, CCPs are subject to more extensive supervision than non-CCP service providers, and supervisory authorities have attempted to harmonise their approach to CCPs through, for example, the CPSS-IOSCO *Recommendations for central counterparties.*

An evaluation of the risk mitigation potential of a CCP cannot be done in the abstract. It will depend upon the key risk management procedures implemented at each CCP - membership standards, margin requirements, financial resources and default procedures. The Working Group has not carried out a thorough evaluation of SwapClear. Nonetheless, it notes that SwapClear has enhanced its default procedures to accommodate the features of OTC derivatives.

Another concern is the potential for tension between the need for effective default management procedures and the maintenance of fair and open access to a CCP's

[33] These default management changes were implemented on 18 September 2006.

services.[34] For instance, given the contingent liabilities imposed by SwapClear's default management procedures, membership has been limited to very large dealers: those meeting a certain threshold value of outstanding swap portfolio. However, a few smaller dealers who are not participants are of the opinion that SwapClear's current participation requirements and fee structure are inconsistent with fair and open access. SwapClear's supervisors are discussing these comments with supervisors of the firms that have expressed this view.

Assessment

Experience with SwapClear permits a reassessment of the benefits and challenges of clearing OTC derivatives, which were discussed in the abstract in the 1998 report. One of the likely key benefits of a CCP is the potential to reduce clearing members' credit exposures, relative to those that exist in bilateral relationships, through multilateral netting. In 1998 some dealers believed that these benefits would be significantly attenuated because a CCP was unlikely to clear the full range of OTC products. Although SwapClear only clears single currency interest rate swaps, in recent interviews most dealers indicated that the limited coverage of SwapClear and the resultant splitting of portfolios did not materially affect their perception of the benefits of using its services. In any event, some market participants expressed the view that the primary benefit of a CCP is operational rather than credit-related.

With respect to the challenges of clearing OTC derivatives, SwapClear has recognised the unique features of OTC derivatives, particularly their illiquidity, and has adapted its default procedures accordingly. Ultimately, however, SwapClear, its participants and the authorities cannot be certain how effective these procedures are until they are tested by an actual default. Market participants must recognise that there are important differences between the default procedures adopted by SwapClear, or likely to be adopted by any future CCP for OTC derivatives, and traditional procedures employed by CCPs for exchange-traded derivatives. These differences should be taken into account when managing exposures to such an entity or its participants.

[34] CPSS and IOSCO Technical Committee, *Recommendations for central counterparties*, November 2004, Recommendation 2.

4. New issues and concerns

4.1 OTC derivatives prime brokerage

Prime brokerage is a service offered by banks and broker-dealers to buy-side investors (typically hedge funds[35]), and is built around financing funds' positions and facilitating clearing and settlement of their trades. Traditionally, prime brokerage involved financing and securities lending services used by market participants taking long or short equity positions. Over time, the services extended to fixed income and foreign exchange markets. Most recently, a form of prime brokerage known as OTC derivatives prime brokerage has been developed and marketed almost exclusively to hedge funds.

Under a derivatives prime brokerage arrangement, a hedge fund is able to use multiple dealers to execute trades while clearing and settling those trades through a single prime broker. For each eligible transaction, the prime broker interposes itself between the executing dealer and the hedge fund, becoming the counterparty to two separate back-to-back transactions, one with the executing dealer and one with the hedge fund (the mechanics of OTC derivatives prime brokerage are described in Box 2). The prime broker thereby assumes potential counterparty exposure vis-à-vis both the executing dealer and the client hedge fund.

Hedge funds are motivated to use prime brokers for several reasons. First, with all eligible trades given up to a prime broker, offsetting trades will typically be subject to bilateral netting, thereby reducing potential liquidity demands on the hedge fund to meet variation margin requirements.[36] For the hedge fund, the economic effect is similar to the multilateral netting that might be achieved by a CCP. Furthermore, some prime brokers offer portfolio margining, which recognises offsets and correlation properties of the fund's OTC derivatives positions when determining initial margins. In some cases, portfolio margining regimes also take into account offsets between cash market positions and OTC derivatives positions (eg a fund might purchase credit protection and hold the bond in the same underlying name). Second, a prime brokerage arrangement can reduce operational costs and increase operational efficiency by reducing the number of the fund's counterparties to one (or a few) prime broker(s).

Despite these benefits of concentrating activity with a prime broker, hedge funds often enter into multiple prime brokerage arrangements. This enables the hedge fund to negotiate favourable fees and services and to better conceal its trading strategy. Using multiple prime brokers also diversifies a hedge fund's counterparty credit risks and keeps it from being dependent on one entity for its liquidity and operations.

Only a handful of firms currently offer OTC derivatives prime brokerage services, although several more are attempting to enter the business. As of mid-2006, the number of clients using these services at each firm was generally 30 or less. The types of OTC derivatives covered by prime brokerage product offerings vary and may include credit default swaps (single name, indexes and tranches), interest rate swaps, swaptions, caps/floors or some types of commodity derivatives.

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[35] Traditional asset managers have not historically used prime brokers, largely due to the low leverage in their investment activities. Operationally, such asset managers tend to rely on custodians to process their OTC derivatives positions.

[36] If offsetting trades were held with different dealers, each would remain open and be subject to initial margin requirements that did not reflect the fact that the trades were offsetting. As the values of the positions fluctuated, the fund would owe variation margin to one dealer and be owed variation margin by the other dealer.

Box 2

Mechanics of an OTC derivatives prime brokerage relationship

Step 1: Documentation

Typically, the prime broker first enters into a give-up agreement with each client, setting forth each party's rights and obligations. Specifically, the agreement details the prime broker's parameters for accepting trades from the executing dealer and the client. The prime broker will also have a master agreement, with Credit Support Annex, and a service agreement with each client, as well as give-up and master (with Credit Support Annex) agreements with each executing dealer, of which there may be as many as 20. [37]

Step 2: Trade execution

The hedge fund negotiates a trade with an executing dealer. For example, a hedge fund seeks to purchase USD 10 million worth of credit protection on Company X from the executing dealer.

Step 3: Trade notification

Once the executing dealer and the fund have agreed on a trade, they must each submit a notification to the prime broker detailing the terms of the trade. Notification methods and policies vary among OTC derivatives prime brokers. For instance, executing dealers and buy-side clients may communicate transaction information to the prime broker through an automated vendor service, over a direct link to a proprietary system, in a spreadsheet attached to an e-mail or via paper-based notification.

Step 4: Acceptance/rejection of trades

Having received the trade information, the prime broker either accepts or rejects the "give-up". In some cases, the prime broker is deemed to have accepted any trade that is eligible and submitted within the agreed time frame. In other cases, a trade is deemed rejected unless positively accepted by the prime broker. If it accepts the give-up, the prime broker becomes counterparty to two trades: in our example, it is simultaneously a seller of protection on Company X at the previously negotiated price to its buy-side client and a buyer of protection from the executing dealer at the same price. The client and the executing dealer never enter into a transaction with each other if the trade is accepted. If the prime broker rejects the give-up, depending on the documentation in place the client and executing dealer may either keep the trade, performing their obligations under a signed ISDA Master Agreement, or tear up the trade and calculate damages pursuant to a side letter or compensation agreement.

Management of the risks associated with offering prime brokerage

In offering OTC derivatives prime brokerage, a dealer acquires counterparty relationships with both the client hedge fund and the executing dealer chosen by the fund. For the most part, the prime broker manages the counterparty risks of OTC derivatives transactions executed under a prime brokerage agreement in the same way that it manages the risks of other OTC derivatives transactions. However, the prime brokerage relationship entails some special issues and challenges.

The prime broker relationship, as noted above, results in back-to-back deals with the client and the executing dealers. Dealers offering prime broker services reported that they manage their counterparty risks with the executing dealers as part of their overall relationship with these firms. That is, the prime broker typically already has many transactions with the executing dealer, and they have negotiated a master agreement and a collateral agreement

[37] Upon commencing the prime brokerage relationship, a prime broker may agree to intermediate a book of existing trades between an executing dealer and the prime broker's client. This broadens the operational and margining benefits available to the prime brokerage client.

that provide for netting and daily collateral calls. Trades arising from prime brokerage would typically be only a small portion of the total population of trades between the prime broker and the executing dealer.

Counterparty relationships with the clients of prime brokers do, however, pose additional challenges. To control transaction flow, the prime broker may establish limits on the amount a single client can trade with a particular executing dealer, per product, per day, as well as aggregate limits. These limits may be set at the onset of the client relationship or they may be monitored and reset on an intraday basis (or over time based on the client's growth and trading activity). Ongoing monitoring protects the prime broker from accepting trades that exceed limits; internal systems may be set up to send warning messages to clients and dealers approaching their trading limits.

With practices and legal documentation in prime brokerage still evolving, a challenge facing market participants is to ensure clarity in their arrangements and interactions with one another. For instance, trading limits, collateral requirements, notification time frames, consequences of rejecting a trade, and other rights and obligations need to be clearly defined in appropriate documentation in order for the arrangement to function properly and to mitigate potential uncertainty in the event that one or more parties fail to perform. Just as the executing dealer and the client need to know their responsibilities vis-à-vis the prime broker, they must also define the scope of their obligations to one another if the prime broker rejects a trade. Many clients and executing dealers negotiate a separate ISDA Master Agreement or a side letter (also referred to as a compensation agreement) to address such situations.

The prime broker relationship places very large demands upon back office systems. A prime broker must manage the capacity of its systems to exchange timely and accurate information with its counterparties, ensure their continued resilience and robustness, and take steps to preserve the integrity of any data employed.[38] Delays in exchanging trade data, including trade notifications, acceptances and rejections, can have adverse consequences for counterparties. Most prime brokers have invested heavily in proprietary systems and require their clients to use them when communicating with the firm; others have built their systems around vendor services such as those offered by SwapsWire or T-Zero. Achieving a high level of automation can ensure that notifications and other communications are sent and received within established time frames. It can also facilitate the timely entry of trade data in risk management systems and better enable the prime broker to handle increasing volumes. The ability of systems to handle increasing volume is an important consideration in a growing business such as OTC derivatives prime brokerage.

Assessment

Much like CCP clearing, prime brokerage tends to concentrate risks and responsibilities for risk management. It is critical that prime brokers manage those risks effectively. As noted, the management of risks from transactions effected though a prime brokerage arrangement is no different than the management of risks on other OTC derivatives transactions. But it is essential that the documentation of the arrangement is clear, and especially important that prime brokers' back office systems are reliable and scaleable. Accordingly, supervisors should continue to monitor potential legal issues and the robustness of the back office systems of firms that offer prime brokerage services. Market participants engaged in prime brokerage transactions should carefully assess the legal documentation so that they have a complete understanding of their rights and responsibilities.

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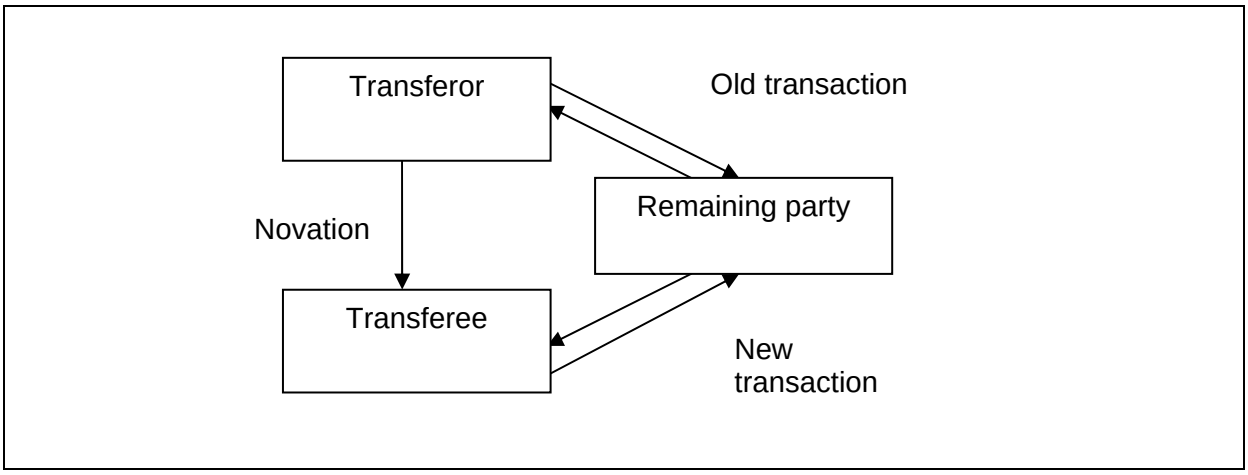
[38] Prime brokers' ability to ensure data confidentiality and data integrity, via the erection of secure Chinese walls, will also be increasingly important in minimising reputation risk from the activity.

4.2 Novation

A novation is the replacement of a contract between two initial counterparties to an OTC derivatives trade (the transferor, who steps out of the deal, and the remaining party) with a new contract between the remaining party and a third party (the transferee). [39] A novation is illustrated in Figure 3.[40] The transferor initiates the novation, transferring his interest to the transferee. The result is a trade between the transferee and the remaining initial counterparty. Portfolios of contracts as well as single transactions may be novated.

Figure 3

Novation



Source: *ISDA user's guide to the 2004 ISDA novation definitions*.

Standard ISDA documentation allows for the novation of trades provided that the remaining counterparty gives its written consent. Indeed, Section 7 of the 1992 Master Agreement stipulates that "neither this Agreement, nor any interest or obligation in or under this Agreement may be transferred (whether by way of security or otherwise) by either party without the prior written consent of the other party". [41] Without written consent, the novation can be deemed invalid. The remaining party has full discretion and may reject the proposed novation. Such rejection can be motivated by credit, collateral, netting, tax, operational, accounting or other considerations.

Use of novations and novation practices

At the time of the 1998 report, dealers reported that novations were rare, and the report did not discuss them at any length. In the last few years, novations have become very common in credit derivatives, and they are reported to be growing in interest rate products. For example, a firm wishing to get out of a position has three alternatives: it may ask the counterparty to terminate, enter into an offsetting transaction, or novate the position.

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[39] The term "assignment" is often used as a synonym for novation.

[40] Four-party novations can occur, but they are rare. In a four-way novation both original counterparties to the trade novate their trades to two other market participants; neither of the initial counterparties keeps an interest in the trade.

[41] There are two exceptions to this requirement, namely when a merger takes place between two different entities, and when one of the counterparties defaults. In the second case, the non-defaulting party is allowed to transfer the trade when it awaits payments from the defaulting party.

Novations allow the party to gather several quotes for the transaction, whereas termination forces it to accept the price offered by the original counterparty. Offsetting transactions create additional counterparty exposures and possibly additional margin requirements that are avoided by novations. For interviewed dealers that provided estimates of the share of novations in their OTC derivatives trades, this share was roughly 25% for credit derivatives and 5% for interest rate derivatives. Novations in equity derivatives were reportedly still negligible. Buy-side clients, mainly hedge funds, are particularly active as transferors. A few of the dealers interviewed also named sovereigns, non-bank financial institutions (eg insurance companies) or other banks as notable initiators of novations.

Although novation requires the consent of the remaining counterparty, by 2005 it had become evident that such consent frequently was not being obtained. Novation without consent created or exacerbated a variety of risks for market participants. Remaining counterparties were often confused about the identity of their counterparty on trades that had been novated, resulting in errors in measurements of counterparty credit risks vis-à-vis the transferor and the transferee. The implications of the practice for operational risk were significant because it contributed to unconfirmed trades, payment breaks, and margin breaks. A few interviewed dealers have reported that some novations only came to light following payment breaks or unexpected requests from transferors to return collateral. Furthermore, master agreements required written consent for novations, creating legal uncertainty as to the status of novations done without consent. At a minimum, counterparties faced uncertainty about their ability to enforce claims, and in the event of a default, this uncertainty would be dramatically magnified. Large-scale inaccuracies in the counterparties' books and records might even impair the orderly resolution of a default, and thereby exacerbate systemic risk.

Not all the dealers were exposed to these risks to a comparable degree. Some of the dealers interviewed - mainly smaller dealers with few hedge fund clients - reported that they never had problems knowing the identity of their counterparties. In some instances, communication problems with regard to novations were mainly internal, as novation requests could enter the firm through various departments, and not all internal systems were immediately updated.

The novation protocol

In autumn 2005, a group of major dealers announced their support of a novation protocol crafted by ISDA for the credit and interest rate derivatives markets. The protocol requires written consent for all novations by close of business on the date the novation is struck. The transferor has the obligation to obtain the consent of the remaining party before 18:00 in the location of the transferee. The protocol notes that providing consent is the prerogative of the remaining party. Standard e-mail or Bloomberg message formats can be used to request and provide consent for the novation. To further ease communication, ISDA has posted contact information on its website.

All the dealers interviewed reported that they had adopted the protocol and do not accept any novations in credit and interest rate derivatives without the remaining party's written consent. Many dealers noted that they also are requiring consent for novations in other derivative products. For these latter types of derivatives, however, the consequences in the protocol of failing to obtain timely consent do not apply. For credit and interest rate derivatives, if consent for the novation is not obtained within the specified time frame, the transferor is deemed to have two contracts - one with its original counterparty and one with the transferee.[42] This incentive for prompt notification has proven effective, and one of the

[42] The implementation guide to the novation protocol, which outlines the process by which consent can be obtained on trade date, states that if such consent is only received on the day following the novation request,

dealers interviewed reported that now only about 3% of novation requests encounter problems with obtaining consent. Adherence to the policy of obtaining consent mitigates the risks from novation activity, and the protocol has been effective in achieving prompt notification and consent.

Buy-side clients were initially reluctant to adopt the protocol, for both fundamental and logistical reasons. Buy-side clients complained that the 18:00 deadline would create uncertainties in cross-border novations, when the transferor would be located in a later time zone than the transferee, and the request for consent would be sent close to the end of the day in the most eastward location. This problem seems to have been alleviated by allowing market participants to designate a transferee location for the purposes of the protocol, and many participants have designated New York (Eastern Standard Time). The stringency of the deadline was also mitigated by a group of 18 dealers committing to respond within two hours following a request for consent for single trades, provided they are delivered in accordance with the protocol. Finally, buy-side clients also wanted the novation notification and consent process to be properly automated, and dealers have committed to improving the automation of these processes.[43]

The novation protocol has been widely taken up by the industry. Widespread inaccuracies in the remaining parties' books seem to have disappeared. Firms are more aware of the rules. Benefits have been observed for instruments not covered by the protocol and for trades with counterparties not having signed up to the protocol. In these instances, dealers simply seem to be applying greater care. In short, the novation protocol has reduced the risks from novations significantly and has contributed to reducing the overall backlog in confirmations.

The industry has also taken steps to automate novation confirmations. DTCC's Deriv/SERV allows for the confirmation of novations involving credit derivatives. SwapsWire offers a novation functionality that is fully compliant with the novation protocol, eliminating the need for the three parties to separately generate and agree to novation documentation. But additional steps are still necessary. Although participation in automated services has increased recently, take-up from buy-side firms has reportedly been uneven. With regard to requests for consent, the process is still largely manual.

Assessment

With encouragement from dealer supervisors, major dealers and their buy-side clients have made significant progress with respect to novation of credit and interest rate derivatives during the last year. If novations of other types of OTC derivatives become common, a similar commitment will be needed to prevent the re-emergence of unacceptable risks from a lack of care in market practices. In addition, market participants should remain committed to automation of all steps in the novation process.

4.3 Closeout

In 1998, dealers identified counterparty risk as the most significant risk they faced in their OTC derivatives business, and they named closeout netting provisions in master agreements as a powerful tool for mitigating this risk. Some dealers were concerned with the

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parties may still decide to correct the booking of these trades, terminating the trade between the transferor and the remaining party.

[43] The major dealers addressed a letter to their clients on 17 November 2005, stating that they are "committed to developing a longer-term novation solution, in collaboration with [their] major client associations [and] envision automated and efficient technology designed to provide streamlined novation processing for all market participants".

enforceability of netting provisions at that time, but the dealers interviewed as part of this study indicated that these concerns have diminished considerably because many jurisdictions have passed legislation supporting closeout netting.

In the interim, however, two different concerns have emerged about reliance on closeout netting provisions as a risk mitigant. First, experiences with defaults and closeouts in the late 1990s demonstrated that certain standard methods for valuing contracts with a defaulting counterparty could be very difficult to implement during periods of market stress. Second, the near failure of the hedge fund LTCM in September 1998 prompted concerns about the potential for the closeout of a major market participant to result in significant market disruptions, especially if it occurs at a time when markets are already under stress.[44]

Valuation methods

With few exceptions, the method for valuation of contracts with a defaulting counterparty is determined by provisions in the master agreement. The three calculation methods included in ISDA Master Agreements are "Loss", "Market Quotation" and "Closeout Amount". The first two methods are standard alternatives in the 1992 ISDA Master Agreement. The third is the standard provision in the 2002 ISDA Master Agreement. Under the European Master Agreement, the valuation of terminated contracts can be determined using a method which produces results equivalent to either Loss or Market Quotation. As in any bilateral contract, the two parties are free to negotiate customised provisions. But if they follow standard market practice, they will choose one of these three methods to value terminated contracts. (The three closeout valuation methods are explained more completely in Annex 4.)

The Loss method calls for the surviving counterparty to calculate the loss it in fact experienced as a result of the default of its counterparty.[45] The Market Quotation method calls for a calculation agent to obtain quotations from four market-makers for each terminated contract. In cases where the calculation agent cannot obtain sufficient quotes to arrive at representative prices, the standard language in the ISDA Master Agreement permits the surviving counterparty to revert to the Loss method. The newer method, Closeout Amount, draws upon aspects of the other two methods, seeking both flexibility and transparency: the surviving party may obtain quotes for some or all of the contracts, either individually or as a portfolio, from dealers and other third parties. In addition to quotes, however, the surviving party can also use external market data and internal firm data (such as yields and volatilities) as model inputs to derive prices.

Generally dealers prefer the simplicity and ease of the Loss method while other market participants, including hedge funds, prefer the transparency of the Market Quotation method. Dealers note that experience in the late 1990s has shown that quotes may not be easy to obtain in times of market stress and for illiquid instruments. Other market participants observe that the Loss method gives dealers wide discretion for determining the final amount owed, and fear that dealers could abuse that discretion and overstate their losses. Adoption by market participants of Closeout Amount has reportedly been very limited because of the divergent preferences of dealers and other market participants.

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[44] Market disruptions might also result from contemporaneous closeouts of multiple smaller participants with similar economic positions in the same or related markets.

[45] The mark to market profit across the portfolio of contracts with the defaulting party plus expenses incurred in closing out is the amount the non-defaulting party would seek to obtain in bankruptcy proceedings. Of course, the survivor could also have a mark to market loss vis-à-vis the defaulter. Depending on the nature of the provisions in the master agreement, this would be the amount the trustee in bankruptcy would seek to obtain from the survivor. The same considerations would apply to Market Quotation and Closeout Amount.

The CRMPG II report acknowledged that each of the three methods has certain strengths and weaknesses that depend in part on the characteristics of the contracts involved and on prevailing market conditions. However, it expressed concern about use of methods other than Closeout Amount in the case of the insolvency of one or more major market participants or in conditions of extreme market stress. If either of the other methods is used in those circumstances, the report argued, uncertainty about contract values could be significant and could result in delays and disputes that "could significantly impede the orderly termination and closeout of affected transactions and could, in the most serious cases, contribute to market disruption and uncertainty in periods of extreme market distress".[46]

Closeout in the case of the insolvency of one or more major market participants or in circumstances of extreme market stress would unquestionably be a complex and difficult exercise. The potential for disputes about valuations and subsequent litigation would be quite high. But it is not clear why use of Market Quotation or Loss would be more likely to impede the orderly termination and closeout of affected transactions than use of Closeout Amount. To be sure, the Market Quotation method is unlikely to be feasible in such circumstances, when dealers' trading desks would be struggling to manage their own positions and unable to value large numbers of trades for others. But, as noted above, if quotations cannot be obtained the standard language in the ISDA Master Agreement permits the surviving counterparty to revert to the Loss method. The Loss method, which puts the calculation in the hands of the surviving party, does not appear to contain any of the considerations that would cause delay or impede closing out positions. Indeed, regardless of the valuation method specified, the surviving party would have a strong incentive to terminate and replace its contracts with an insolvent counterparty as soon as possible; to delay would expose the surviving firm to additional losses.

What is most important is that counterparties reach agreement on the methodology to be used in the event of a closeout. With respect to the choice of methods, CRMPG II's Guiding Principle 16a[47] states that "[m]arket participants should decide bilaterally which of the three ISDA closeout methodologies would be most appropriate in the context of their trading relationship." In addition, counterparties should discuss ex ante, both bilaterally and within their market associations, how they would implement the particular closeout methodology they have agreed to, so that they have a common understanding of the implications of their choice. Market associations are in a good position to develop and publish a common understanding within the industry regarding the use of these methodologies, taking into account existing practices and law.

Limiting the potential for market disruptions

Fear of market disruptions from closing out and replacing their positions with LTCM in OTC derivatives and other instruments was the primary factor that motivated a consortium of LTCM's counterparties to recapitalise the fund and thereby obviate a closeout. Although achieving agreement and clarity about the methods that will be used for determining the value of contracts with a defaulting participant is important, it cannot by itself fully address concerns about potential market disruptions from a closeout.

Market participants should focus on identifying further steps that can help mitigate the potential market impact of a closeout. In discussions with the Working Group, participants have identified two such steps. First, market participants should ensure that they have timely, accurate and comprehensive information on their counterparty credit exposures to major

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[46] *Toward greater financial stability: a private sector perspective*, report of the Counterparty Risk Management Policy Group II, 27 July 2005, p 86.

[47] Ibid, p 87.

participants, so that they can make informed decisions at the time of default. Regular portfolio reconciliation can help here. Second, market participants should routinely identify trades that can be voluntarily terminated, so as to reduce to the extent possible the positions that would need to be replaced following a default. To that end, market participants should expand their use of new services that facilitate multilateral voluntary termination of trades. In addition, market participants should work together to identify further actions that can and should be taken to mitigate the potential market impact of the closeout of one or more major market participants.

Assessment

Closeout in the case of the insolvency of one or more major market participants would unquestionably be a complex and difficult exercise that is likely to place significant stress on financial markets. But it is not clear why use of Market Quotation or Loss would be more likely than use of Closeout Amount to impede the orderly termination and closeout of affected transactions. What is most important is that counterparties reach agreement on the methodology to be used in the event, document that agreement and achieve a common understanding of how the agreed methodology will be implemented. But achieving agreement and clarity about the methods that will be used for determining the value of contracts with a defaulting participant cannot fully address concerns about potential market disruptions from a closeout. In addition, market participants should work together to identify further steps that can and should be taken to mitigate the potential market impact of the closeout of one or more major market participants.

5. Overall evaluation of clearing and settlement arrangements for OTC derivatives

In some respects the clearing and settlement infrastructure of the OTC derivatives markets has been significantly strengthened since 1998. Dealers have greatly reduced backlogs of unsigned master agreements. Since September 2005, remarkable progress has been made in using automation to confirm credit derivatives, and there is some evidence of progress in reducing backlogs of confirmations in some other types of OTC derivatives. The expanded use of collateral now significantly mitigates counterparty credit risks, and the legal and operational risks associated with reliance on collateral have been reduced by changes in national legislation and enhancements to dealers' collateral management systems. A CCP now manages the risks of a significant portion of inter-dealer single currency interest rate swaps; this is perceived by its participants to reduce operational risks as well as counterparty credit risks. There has been increasing use of multilateral termination services, which allow market participants to reduce counterparty credit risks and operational risks.[48] A trade information warehouse has been created, which offers the potential for enhancements to efficiency and reliability in processing post-trade events throughout the life cycle of OTC derivatives contracts.

But additional progress is clearly needed in some areas. The same focus and energy that were brought to bear on credit derivatives confirmation backlogs need to be extended to other OTC derivative products, so that over time all vanilla OTC derivatives trades are confirmed by T+5 and non-vanilla trades are confirmed by T+30, at the latest. Efforts should also be made to use automated systems to confirm trades for all eligible OTC derivative products. Risks of unconfirmed trades should be further reduced by broader use of economic affirmations. Market participants that are frequently involved in novations, terminations or amendments of contracts should take advantage of new automated services that facilitate daily portfolio reconciliations with counterparties. Concerns persist that the closeout of one or more market participants could place significant stress on financial markets. Market participants should work together to identify steps that can and should be taken to mitigate the potential market impact of replacing contracts following the closeout of one or more major market participants.

The market infrastructure for the OTC derivatives markets will undoubtedly continue to evolve. Through a trade information warehouse or otherwise, market participants may seek to achieve the operational benefits of CCP clearing while preserving decentralised counterparty credit risk management. CCP clearing may also expand over time to encompass additional instruments, especially relatively non-complex instruments, or to include tiered clearing arrangements that would allow clearing to extend beyond the inter-dealer market. Whatever path the evolution takes, as the market infrastructure moves further in the direction of centralised processing of trades and post-trade events, several issues will assume greater importance. These issues are (1) open access to the services of trade information warehouses, CCPs and other essential post-trade service providers, and the "interoperability" of different components of the infrastructure for such post-trade services; (2) the operational reliability of any parts of the infrastructure that may become critical to safe and efficient clearing and settlement; and (3) the safety and reliability of centralised money settlement arrangements that may emerge.

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[48] The BIS estimates that use of TriOptima's multilateral termination service during the first half of 2006 resulted in the termination of credit derivatives with a notional value of USD 4 trillion, which shaved nearly 30 percentage points from the growth of that market. See *OTC derivatives market activity in the first half of 2006*, November 2006.

Interoperability is difficult to define precisely in the context of OTC derivatives because of the multiplicity of post-trade processes and events. However, in general terms interoperability means the ability of a system or product to be used in conjunction with other systems or products without imposing unnecessary costs on the users. Interoperability is promoted by common approaches on the part of service providers to the description of data that need to be shared (eg use of Financial products Markup Language (FpML)), common methods and timing conventions for the transmission of data and formal agreements between service providers regarding basic service levels, revenue attribution and similar commercial terms. At the same time, the pursuit of interoperability should not bind service providers so tightly that they are constrained to evolve at the pace of the slowest. The Working Group's discussions with market participants and service providers indicated special concern that any operator of a trade information warehouse should achieve interoperability with other providers of clearing and settlement services, so that competition and innovation in post-trade processing are not impaired by the centralisation of trade information in such a warehouse. But the issue of interoperability clearly has broader relevance: all providers of trade information warehouses, CCP services and other essential post-trade services for OTC derivatives transactions should provide open access to their services and should aim to achieve interoperability.

As the clearing and settlement infrastructure of the OTC derivatives markets evolves from one in which decentralised bilateral clearing and settlement is the norm to one in which post-trade processing is increasingly centralised, the infrastructure is generally becoming safer and certainly more efficient. At the same time, however, the centralisation of some functions and processes may leave the infrastructure more vulnerable to operational disruptions at single points of failure. Central banks and supervisors will need to consider whether the CPSS-IOSCO standards for the ***operational reliability*** of securities settlement systems and CCPs should be applied to other providers of clearing and settlement services for OTC derivatives.[49]

Dealers report that the value of payments associated with OTC derivatives is generally small compared to their overall payment flows. Aside from payments on contracts submitted for CCP clearing, payments are currently often made on a gross basis, even though master agreements permit bilateral payment netting, because of operational constraints at dealers. DTCC announced in December 2006 that it plans to arrange for a provider to settle the periodic payments associated with credit derivatives. These payments tend to be larger than payments associated with other OTC derivative products because cash flow settlements for credit derivatives all typically occur on the same date each quarter. SwapClear bilaterally nets payments with each of its participants and thereby achieves multilateral payment netting of payments on the contracts its participants submit for clearing. SwapClear's cash flow settlements are subject to Recommendation 9 of the CPSS-IOSCO standards.[50] If payments associated with OTC derivatives come to be settled on a multilateral net basis by an entity other than a CCP, central banks and supervisors will need to consider whether the Core Principles for Systemically Important Payment Systems should be applied to the ***money settlement arrangements***.

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[49] See RSSS Recommendation 11 and RCCP Recommendation 8.

[50] Recommendation 9 states that: "A CCP should employ money settlement arrangements that eliminate or strictly limit its settlement bank risks, that is, its credit and liquidity risks from the use of banks to effect money settlements with its participants. Funds transfers to a CCP should be final when effected."

Annexes

Annex 1: Glossary

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Annex 4: Method for valuing terminated transactions

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Annex 6: Vendor services offered to market participants

- Deriv/SERV
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- Trade information warehouse
- TriReduce
- TriResolve
- T-Zero

Annex 7: Members of the working group

Annex 1:
Glossary

Affirmation (of a trade confirmation): a procedure in a confirmation process, whereby a single record of the trade is created by one party evidencing the full terms of the trade and the counterparty verifies and agrees to that record. Affirmation of trade confirmations is different from trade verification (also known as economic affirmation), which is limited to principal economic terms.

Allocation (of trades): the decomposition of a block of trades by an investment manager into component sets of trades for individual clients of the manager.

Amendment: A change or addition to the terms of a trade which may require an amended confirmation. Also, a change or addition to the legal documentation of a trade which, when properly signed and therefore executed, has the same legal power as the original agreement.

Assignment: see novation.

Cash flow/payments generation: the process of determining rate and spot price values on which payments are based and then calculating payment obligations.

Cash flow/payments matching: the process of matching or confirming upcoming payment obligations with counterparties prior to settlement date.

Cash flow/payments reconciliation: the process of reviewing accounts to determine if cash movements have been executed correctly and funds have been paid out or received on correct value date. Also known as nostro reconciliation.

Cash flow/payments settlement: the actual execution of cash movement for payments due.

Central counterparty (CCP): an entity that interposes itself between counterparties to contracts traded in one or more financial markets, becoming the buyer to every seller and seller to every buyer.

Closeout: acceleration and termination of a contract prior to its maturity.

Closeout netting: an arrangement to settle all contracted but not yet due obligations to and claims on a counterparty by one single net payment, immediately upon the occurrence of one of the events of default defined in the relevant documentation.

Collateral: an asset that is delivered by the collateral provider to secure an obligation to the collateral taker. Collateral arrangements may take different legal forms; securities collateral may be obtained using the method of title transfer or pledge.

Collateral management service: a centralised service that may handle any of a variety of collateral-related functions for a client, including valuation of collateral, confirmation of valuations with counterparties, optimisation of collateral usage and transfer of collateral.

Confirmation: a document identifying the details of a trade and any governing legal documentation, as agreed upon by both parties. This document serves as the final record of the transaction.

Confirmation process: the process by which trade details are verified with a counterparty, with a view to obtaining a final record of the trade. This is generally done by exchanging a confirmation proposal via fax, mail or an electronic confirmation service. Either one party provides trade details and the other then verifies the information, or both parties submit records of the trade and verify each other's records.

Counterparty credit risk: the risk that a counterparty will not settle an obligation in full value, either when due or at any time thereafter.

Default: failure to satisfy an obligation when due, or the occurrence of a defined event of default agreed by the parties to a contract.

Economic affirmation: see trade verification.

Executing dealer: see prime brokerage.

Interoperability: interoperability is achieved when the structure of systems or products allows them to be used in conjunction with other systems or products without imposing unnecessary costs on the users.

Legal execution: the agreement by both parties of the written or electronic record of the full terms of a trade.

Marking to market: the revaluation of open positions in financial instruments at current market prices and the calculation of any gains or losses that have occurred since the last valuation.

Master agreement: an agreement that sets forth the standard terms and conditions applicable to all or a defined subset of transactions that the parties may enter into from time to time, including the terms and conditions for closeout netting.

Multilateral netting: netting on a multilateral basis is arithmetically achieved by summing each participant's bilateral net positions with the other participants to arrive at a multilateral net position. Such netting is often conducted through a central counterparty that is legally substituted as the buyer to every seller and the seller to every buyer. The multilateral net position represents the bilateral net position between each participant and the central counterparty.

Netting: an offsetting of positions or obligations by counterparties. See closeout netting, multilateral netting and payments netting.

Nostro break: see payment break.

Nostro reconciliation: see cash flow reconciliation.

Novation: the replacement of a contract between two initial counterparties to a contract (the transferor, who steps out of the deal, and the remaining party) with a new contract between the remaining party and a third party (the transferee). Also referred to as assignment.

One-way collateral agreement: collateral agreement whereby only one of the counterparties is required to post collateral. The other counterparty is usually of much higher credit standing.

Two-way collateral agreement: collateral agreement, whereby both counterparties to the trade are required to post collateral whenever they generate an exposure that exceeds a certain agreed threshold, which can be set at zero.

Over-the-counter (OTC): a method of trading that does not involve an exchange. In over-the-counter markets, participants trade directly with each other, typically by telephone or computer links.

Payment break: the failure to receive an expected payment or the receipt of an unexpected payment.

Payments generation, payments matching, payments reconciliation, and payments settlement: see cash flow generation, cash flow matching, cash flow reconciliation and cash flow settlement.

Payments netting: settling payments due on the same date and in the same currency on a net basis.

Plain vanilla transactions: generally used to refer to a type of derivatives transaction with simple, common terms that can be processed electronically. Transactions that have unusual or less common features are often referred to as exotic, structured or bespoke.

Prime broker: institution offering prime brokerage services.

Prime brokerage: the provision by firms (eg large securities firms) of credit, clearing, securities lending and other services to clients (typically hedge funds). In OTC derivatives transactions, prime brokerage refers to an arrangement that permits a customer (typically a hedge fund) to use multiple dealers to execute OTC derivatives trades while clearing and settling those trades through a single prime broker. For each trade, the prime broker becomes the counterparty to a deal with the customer and the counterparty to a deal with the executing dealer.

Portfolio margining: the practice of determining the initial margin requirement for a group of positions using stress tests or statistical techniques that calculate the largest potential decline in the net value of the entire portfolio.

Portfolio reconciliation: verification of the existence of all outstanding trades and comparison of their principal economic terms.

Remaining party (in a novation): a party to a transaction whose consent is required in connection with, or who has consented to, a transferor's transfer by novation and the acceptance thereof by the transferee of all of the transferor's rights, liabilities, duties and obligations with respect to such remaining party.

Reuse of collateral: the use of collateral deposited by one counterparty to meet collateral demands from other counterparties or to obtain funding, for example in the repo market. When the reused collateral is in the form of securities that have been obtained as collateral by a party to a collateral agreement taking the legal form of a pledge, this practice is generally referred to as rehypothecation.

Setoff: a method of cancelling or offsetting reciprocal obligations and claims (or the discharge of reciprocal obligations up to the amount of the smaller obligations). Set-off can operate by force of law or pursuant to a contract.

Straight through processing (STP): the automated end-to-end processing of trades and/or payment transfers, including the automated completion of confirmation, matching, generation, clearing and settlement orders, without the need for rekeying or reformatting data.

Trade capture: the process of inputting trade information to a firm's internal systems.

Trade matching: the process by which both counterparties to a trade create a written or electronic record evidencing the full terms of the trade. These two records are then compared and considered matched if they are identical.

Trade verification: the process of verifying the principal economic terms of the trade, carried out by trade counterparties, by an operations function separate from front office traders (also referred to as economic affirmation).

Trade information warehouse: a centralised database containing the terms of OTC contracts for multiple counterparties.

Transferee (in a novation): a party to a transaction that proposes to accept, or has accepted, a transferor's transfer by novation all of the rights, liabilities, duties and obligations of a transferor with respect to a remaining party.

Transferor (in a novation): a party to a transaction that proposes to transfer, or has transferred, by novation to a transferee all its rights, liabilities, duties and obligations with respect to a remaining party and discharges such remaining party.

Annex 2:
Questionnaire

Scope: The primary focus of this questionnaire was on interest rate products, but the group was also interested in how practices for credit, equity or other financial derivatives may differ. Foreign exchange contracts were excluded, as they have been studied in other CPSS projects.

A. Documentation

1. As of March 2006 (or another recent date, if it is not available) what was the size of the backlog of unsigned master agreements with active counterparties (a counterparty with which the institution did at least one new trade in the last 12 months)? Approximately what percentage of the gross market value of your outstanding derivatives transactions was with counterparties with whom you had not yet completed a master agreement?

2. In what respects do you perceive risks to be exacerbated by the failure to complete master agreements before transactions are initiated? To what extent are the risks mitigated by including key provisions of the master in confirmations?

3. How are backlogs of incomplete master agreements monitored? Are procedures in place to prioritise efforts to resolve delays in completing documentation?

B. Transactions processing and settlement

Trade execution

1. What electronic trade execution systems do you use for OTC derivative products? Are these dealer-to-dealer or dealer-to-customer systems? What percentage (rough estimate) of the number of your total transactions is executed electronically?

2. How often are brokers utilised in OTC derivatives transactions? What role do brokers play? Do they ever act as principals? For what types of transactions are brokers utilised most frequently? What role do brokers play in post-execution trade processing?

Data capture

3. For what types of contracts is data capture automated? If data capture is not automated, must it be extracted from dealer tickets? How quickly are trade data typically captured if it is not automated?

4. How quickly are trade data reflected in management information systems, including systems for measuring, monitoring and controlling counterparty credit risks and market risks? Is the transfer of trade data from the front office to the middle and back office automated?

5. How do you typically receive information about trade allocations from investment managers? How and how quickly is that information captured in management information and risk systems?

Affirmation and confirmation processing

6. Do you verify the economic terms of a deal (so-called economic affirmation) separately from (and prior to) legal execution (agreement of full terms) of OTC derivatives transactions? If so, on what timetable and how?

7. Do you use any automated services for generation of confirmations, for matching or affirmation of confirmations, and for legal execution (agreement of full terms) of OTC derivatives transactions? If so, which ones and for which products and which types of counterparties? How soon after a transaction is executed are these confirmations communicated? How is your use of technology limited by lack of industry standards or lack of take-up by counterparties?

8. If you are not using an automated service, how do you receive confirmations and how do you provide confirmations to your counterparty? How long after a transaction is executed are these confirmations communicated? How is legal execution typically achieved, that is, by parties signing a single record or by both parties exchanging and matching records of the transaction?

9. How often (rough percentage of total number of trades) are discrepancies detected in economic affirmations? In confirmations? What are the most common sources of discrepancies?

10. How do you prioritise efforts to obtain legal execution? At what point are efforts to obtain legal execution escalated?

11. What risks are exacerbated by transactions that have not been legally executed? Is enforceability of the contract jeopardised? Is it possible that rights to close out and net unconfirmed transactions could be jeopardised? Are credit risks and market risks exacerbated by inaccurate information in management information systems?

Portfolio reconciliation

12. Do you periodically reconcile all of your trades with your counterparties? How frequently? With which counterparties? How do you exchange and compare the information? Do you use any third-party services for reconciliation? What risks arise from not reconciling your portfolio regularly?

Settlement and nostro reconciliation

13. How widely do you bilaterally net payments with your counterparties (for example, within asset class, across asset classes)? What factors facilitate or inhibit the netting of payments?

14. What is the daily average value of payments made and received in settlement of OTC derivatives transactions? How much larger are such payments on peak dates? Do such payments account for a significant share of your institution's overall payments activity?

15. Are standing settlement instructions established with counterparties? Do confirmations include settlement instructions?

16. Are payment amounts matched prior to settlement day? What are the operational practices for determining payment amounts?

17. How quickly are nostro reconciliations performed? How frequent and significant are nostro breaks?

C. Closeout netting

1. How wide is the scope of closeout netting in your agreements (for example, do they provide for closeout netting across products, across branches or across affiliates of your counterparties)?

2. What closeout methodologies are used in your documentation? Do you customise documentation in this area at the request of or based on the creditworthiness of a counterparty?

D. Collateralisation

Usage

1. As of March 2006 (or another recent date, if it is unavailable), how much collateral did you hold to support credit exposures on OTC derivatives transactions? How did this compare to your aggregate OTC credit exposures (current and current plus potential future exposures)? How much collateral had you provided to counterparties to support their OTC derivatives exposures to you?

Structure of collateral agreements

2. Approximately what percentage of your collateral agreements is one-way? What percentage is two-way? With what types of counterparties are one-way agreements used? Two-way agreements?

3. Do collateral agreements typically cover all transactions documented under a single master agreement? Do you offer counterparties portfolio margining for transactions documented under multiple master agreements?

4. What forms of collateral are accepted? What are the predominant forms of collateral posted in practice?

5. Do agreements typically require one or both counterparties to provide upfront collateral (initial margin)? Alternatively, do agreements allow uncollateralised exposures, provided that exposures do not exceed a certain threshold? What determines the size of initial margins or thresholds?

6. How frequently are exposures and collateral values recalculated?

7. If recalculation indicates that additional collateral is required (or that collateral is to be returned to the provider), within how many days is the transfer required to be completed?

8. What procedures are in place to ensure that collateral is called for and received when provided for in the agreements? Do you employ different procedures when the counterparty or custodian is domiciled in a different jurisdiction?

9. How frequently are there disagreements about the amount of collateral required (margin breaks)? What happens when there is a margin break? What are the primary reasons for margin breaks?

10. Do you use any centralised collateral management systems that are external to your organisation? What are the attractions or impediments to the use of such systems?

E. OTC derivatives prime brokerage

1. Do you provide prime brokerage services for OTC derivatives (that is, do you allow certain clients to execute trades with multiple dealers and agree to act as an intermediary between those clients and their executing dealers)? If so, for which types of products and counterparties? [If firm is also being interviewed about its prime brokerage activities, see further questions at the end of the document.]

2. Do you provide executing dealer services for clients as part of a prime brokerage arrangement?

F. Assignments (also known as novations)

1. What types of counterparties seek assignments most frequently? What are the asset classes of contracts assigned most frequently?

2. How do you manage the risks associated with assignments? In particular, how do you ensure that your books accurately record the true counterparties to your transactions?

G. Terminations

1. How frequently do you negotiate terminations to transactions? With what types of counterparties? What types of instruments? For what reasons?

2. Have you used triReduce, e-clerx or a similar service to negotiate early terminations on a multilateral basis? What factors have encouraged or limited your use of such a service?

H. Other bilateral approaches to credit risk mitigation

1. How frequently are periodic cash settlements ("re-couponing") used to mitigate counterparty credit risks? Are such settlements calendar-based or are they triggered by the size of exposures or by changes in counterparty creditworthiness? Are such arrangements used only for individual transactions or for portfolios of transactions?

2. How frequently are early termination options used to mitigate counterparty credit risks?

I. Clearing houses (multilateral trade netting)

1. What are the principal benefits of a central counterparty? What are the impediments? Are there any legal or regulatory issues that have inhibited development of a CCP?

2. Do you participate in LCH's SwapClear (or any other CCP for OTC derivatives)? If so, what percentages of eligible trades (roughly) do you currently clear? To what extent do you perceive the benefits to be limited by the possibility that, in the event of a default, the defaulter's contracts could be assigned to surviving participants? How do you manage the risks associated with such contingent liabilities?

3. To the extent that a CCP would not clear all types of transactions (limited clearing beyond "plain vanilla" transactions), would that cause remaining bilateral net exposures to increase significantly? Have such considerations affected your decision to participate in a CCP? For what types of products would a broadening of multilateral netting facilities be most useful to you?

J. Likely developments in OTC derivatives clearing and settlement

1. More generally, over the next five years, how do you see the infrastructure for clearing and settling of OTC derivatives trades evolving? Do you see opportunities for expanded use of existing or new infrastructure to mitigate risk?

K. OTC derivatives prime brokerage (when applicable)

1. Do you provide prime brokerage services for OTC derivatives (that is, do you allow certain clients to execute trades with multiple dealers and agree to act as an intermediary between those clients and their executing dealers)? If so, for which types of products and counterparties?

2. How do you manage your counterparty risks relative to your prime brokerage clients? What trading limits do you impose? How do you ensure that trades conform to those limits?

3. How do you manage your counterparty credit risk to executing dealers?

4. How do executing dealers and prime brokerage clients notify you of trades executed subject to a prime brokerage agreement?

5. What are your clients' motivations for using your OTC derivatives prime brokerage services?

6. What happens if you reject a transaction submitted by the executing dealer and the client?

Legal questions for OTC derivatives dealers

1. Do you use an ISDA or national master agreement for OTC derivatives contracts? How frequently do you use non-standard, customised agreements, and under what circumstances? How does the location of the counterparty or the type of instrument influence or affect the selection of governing law or the terms of the agreement?

2. Where you do not have a master agreement in place with a counterparty, do you rely upon long-form confirmations to detail the transaction terms as well as the rights and obligations of the parties? Are the terms included in the long-form confirmation legally binding on your counterparties?

3. Are there many jurisdictions where you would have difficulty enforcing oral or electronic contracts? If the authority is not expressly provided, how do you mitigate this legal risk?

4. Do you use standard industry documentation for collateral agreements? Do the opinions you have on the laws of the respective G10 countries provide you with a high level of certainty as to the legal enforceability of your collateral arrangements? What about the legal opinions from other countries? What are the key challenges/barriers that impede broader use of collateral arrangements (eg conflicts of laws considerations, tax laws and issues regarding perfection and priority)?

5. Do you accept assignment of OTC contracts, and do you permit your counterparties to assign your OTC contracts with them? If so, under what circumstances? What are the key legal risks associated with assignment of contracts, and how do you manage such risks?

6. Do you use cross-product and cross-affiliate netting agreements to further reduce your credit exposures? If so, under what circumstances do you use such agreements and in which jurisdictions? Do you use standard industry documentation, or do you use customised agreements? What are the key challenges/barriers that impede broader use of these agreements?

7. To what extent do you rely on industry legal opinions (eg legal opinions obtained by ISDA, TBMA or some other trade organisation) in assessing legal enforceability of the netting provisions (including any cross-product and cross-affiliate provisions) in your master agreements and related collateral arrangements? Do you get supplemental legal opinions? If so, under what circumstances?

Annex 3:
Interviewed dealers

Belgium	Fortis Bank KBC Bank
Canada	Canadian Imperial Bank of Commerce Royal Bank of Canada
France	BNP-Paribas Crédit Agricole Group Société Générale
Germany	Commerzbank Deutsche Bank Dresdner Bank DZ Bank WestLB
Hong Kong	HSBC
Italy	Banca IMI MPS Finance
Japan	Bank of Tokyo-Mitsubishi UFJ Mizuho Corporate Bank Sumitomo Mitsui Banking Corporation
Netherlands	ABN Amro ING Bank Rabobank
Sweden	Nordea SEB Svenska Handelsbanken Swedbank
Switzerland	UBS Credit Suisse
UK	Barclays HSBC JP Morgan (MasterSwap) Morgan Stanley (prime brokerage)
US	Bear Stearns Citicorp Goldman Sachs (prime brokerage) JP Morgan Chase Merrill Lynch Morgan Stanley (prime brokerage)

Annex 4:
Methods for valuing terminated transactions

A. ISDA master agreements

ISDA has developed master agreements for market participants trading in derivative instruments. Upon the occurrence of a triggering event, one or both parties to the transaction may have the right to terminate one, some or all transactions covered by the ISDA Master Agreement. In that instance, payment amounts would need to be calculated for those transactions that have been terminated. The 1992 and 2002 master agreements ("1992 ISDA" and "2002 ISDA") collectively provide for three valuation methodologies. Under the 1992 ISDA parties must choose between two payment measures, Market Quotation or Loss. ISDA revised its master agreement in 2002 and adopted a single calculation and payment methodology, Closeout Amount.

Whichever approach the parties choose, payment amounts will be determined as of an "Early Termination Date" or, if that is not reasonably practicable, as of the earliest date thereafter as is reasonably practicable (1992 ISDA) or, if such determination would not be commercially reasonable, as of the date or dates following the Early Termination Date as would be commercially reasonable (2002 ISDA). This date is determined following an event of default (eg failure to pay or deliver), a termination event (eg illegality, tax event), or, if specified in the schedule to the master agreement, an additional termination event (eg minimum net asset value requirement). The type of event that occurs will determine which party will be responsible for calculating the losses or gains on terminated transactions; this party will then give notice to the other party that one of these events has occurred and advise them of the Early Termination Date.

1. Market Quotation

Market Quotation is the automatic provision employed when parties to a 1992 ISDA fail to designate a payment measure. If Market Quotation cannot be determined or would not produce a commercially reasonable result, Loss is the fallback provision. The payment amount determined under either measure will be subject to any setoff.

Market Quotation requires the party calculating the Early Termination Amount to use several sources and quotes in order to determine the ultimate Market Quotation to be used in valuing the terminated transactions. The Determining Party must select four leading dealers (referred to as Reference Market-makers) in the relevant market to provide quotes (firm or indicative) for the Terminated Transaction(s). The Determining Party, acting in good faith, should consider those dealers whose creditworthiness would meet the party's own lending/credit criteria and, to the extent practicable, have an office in the same city.

Quotes should include the amounts that would be paid to or received from the Reference Market-maker and the Determining Party to enter into a replacement transaction that is the economic equivalent of the Terminated Transaction(s). In addition to these amounts, the Determining Party may also include any payment or delivery that would have been made, but for the Early Termination Date.

The onus is on the Determining Party to request that, to the extent reasonably practicable, the Reference Market-maker provide quotations for the same day and time of, or as soon as practicable after, the Early Termination Date. The Determining Party selects this date and time, acting in good faith, and it may consult with the other party (Defaulting Party) in its selection.

Once the quotations have been received, the 1992 ISDA calls for additional calculations to identify the Market Quotation to be used in calculating the Early Termination Amount:

A. 1. If more than three quotations are provided, the Market Quotation will be the mean of the quotes provided.

B. 2. If exactly three quotations are provided, the Market Quotation will be the remaining quote after the highest and lowest are disregarded.

C. 3. If in either case there is more than one quote at the same highest or lowest value, one will be disregarded.

D. 4. If fewer than three are provided, it will be deemed that the Market Quotation for such Terminated Transactions cannot be determined.

Once the Market Quotation has been determined, the Determining Party must calculate a payment amount. How the final payment amount is ultimately calculated will depend on what type of event triggered the early termination and which payment method is agreed to by the parties.

2. Loss

Parties choosing Loss basically agree that the Defaulting Party will pay the Non-Defaulting Party's losses from the Agreement. Loss refers to the total losses and costs (or gain) in connection with the Agreement or the Terminated Transaction(s) including the loss of bargain, cost of funding or, if elected and without duplication, the hedging losses (that is, the loss or cost incurred in terminating, liquidating, obtaining or re-establishing any hedge or related trading position). Other losses and costs may also be included, such as those associated with payment or delivery made on or before the Early Termination Date, so long as they are not duplicative. Just as with Market Quotation, the triggering event and the payment method will determine the final payment amount.

3. Closeout Amount

The 2002 ISDA adopted a single payment measure, Closeout Amount. The Determining Party calculates the amount of the losses and costs that are, or would be, incurred in replacing or providing the economic equivalent of the payments and deliveries under the Terminated Transactions that would have been required but for the early termination. The calculation also allows the Determining Party to include option rights with respect to the Terminated Transactions that would have existed but for the early termination. The Determining Party must act in good faith and always use commercially reasonable procedures to produce a commercially reasonable result.

Closeout Amount sought to afford parties greater flexibility in determining the payment amount for an individual or group of Terminated Transactions. For example, a quotation may be obtained for an entire portfolio of Terminated Transactions, a group, or just one. The Determining Party may consider quotations, either firm or indicative, from one or more third parties that may take into account the creditworthiness of the Determining Party and terms of relevant documentation. Third parties can include dealers in the relevant market, end users of the relevant product, information vendors, brokers and other sources of information. The Determining Party may also consider external market data, rates, prices, yields, yield curves, volatilities, spreads, correlations and other relevant data; and similar information above from internal sources if such information is used in normal course of business in valuing similar transactions. If the markets are such that relevant market data are not readily available or would produce a commercially unreasonable result (such as in times of market distress), the Determining Party is not required to spend time trying to obtain such information from third parties.

Once the closeout amount has been determined, the payment amount will be calculated. Again depending on the triggering event, this figure would essentially represent the sum of

the closeout amount or closeout amounts, and consideration for any unpaid amounts owed to the parties.

B. European Master Agreement

In addition to the ISDA documentation, in 2004, the European Banking Federation published a European Master Agreement identifying a single valuation method, Final Settlement Amount.

The Non-Defaulting Party, Non-Affected Party or both parties if they are both affected will calculate (the calculating party, "CP") the final settlement amount: as of the Early Termination Date the sum of all transaction values which are positive, the amounts due and the margin claims of the CP less the sum of the absolute amounts of all negative transaction values, amounts due and margin claims of the other party. When doing the calculation the CP has to use good faith and commercial reasonableness.

Final Settlement Amount Σ = [transaction values + amounts owed to CP + margin claims] – [transactions values + amounts owed by CP + margin claims against CP]

There are two methods to determine the transaction value: the CP may chose between the loss incurred or gain realised as a result of the termination of transactions or the arithmetic mean of the quotations for replacement or hedge transactions on the Quotation Date obtained by the CP from at least two leading market participants. This quotation is the amount that the market participant would pay or receive on the Quotation Date if such participant were to assume as from the Quotation Date the rights and obligations of the other party under the transactions.

The Quotation Date is the Early Termination Date except when there is an automatic termination, in which case the Non-Defaulting Party determines the Quotation Date, which is no later than the fifth business day after the day on which the CP becomes aware of the event triggering the automatic termination. The Non-Defaulting Party designates in its notice the Early Termination Date, which is the date on which the termination of all outstanding transactions enters into effect. The amount is positive if payable to the market participant and negative if payable to the CP.

The two methods lead to results comparable with the two methods entitled Loss and Market Quotation in the ISDA 1992. There are, however, the following differences: a) the EMA foresees quotations from a minimum of two leading market participants, while ISDA considers that fewer than three quotations means that the market quotation cannot be determined; b) if the minimum required number of quotations is not possible, then the loss incurred or gain realised will prevail; and c) if quotations are provided, the valuation is always their arithmetic mean.

Annex 5:
Electronic execution platforms for OTC derivatives

1. Developments and trends in electronic trading[51]

Interest rate swaps

Electronic trading of short-dated interest rate swaps has increased in the past few years. The relatively standardised overnight index swaps (OIS), particularly euro overnight index average (EONIA) swaps, are the most liquid segment of the swaps market and are moving towards electronic trading. However, e-trading of longer-maturity swaps is evolving at a much slower pace.

In the inter-dealer market, several platforms are targeting the short-dated segment of the swap market including ICAP's i-Swap and e-MIDER. In the multiple dealer-to-customer market, Bloomberg's SwapTrader and Thomson TradeWeb offer USD and EUR interest rate swaps. Swapstream, launched in 2003, is an electronic platform that currently focuses on EUR and CHF medium-term (one- to 10-year) and long-term (10- to 50-year) interest rate swaps and has plans to launch USD and GBP instruments.

Some of the reasons highlighted as obstacles in e-trading of longer-dated interest rate swaps include lack of standardisation, low trading volumes relative to other instruments and greater counterparty credit risk. Managing counterparty credit risk is a particular issue for anonymous trading platforms since the model does not allow name-based credit checks. Many electronic swap trading platforms are addressing the issue by providing dynamic pre-clearing credit checking systems that monitor and adjust counterparties' credit lines in real time and prevent users from executing a trade if it exceeds credit limits. Other systems limit interactions so that counterparties are only transacting with pre-approved parties.

Despite these challenges, the electronic market for swap trading is expected to continue to grow. The increased automation of post-trade processing and services offered by SwapsWire and SwapClear are expected to encourage electronic execution of swaps.

Credit derivatives

Electronic trading of credit derivatives is on the rise, particularly in the inter-dealer market for CDS indices like iTraxx and CDX. The increased standardisation brought about by ISDA templates, standards in FpML (Financial Products Markup Language) and increased use by dealers of reference entity database (RED) has encouraged the migration to electronic trading.

In the inter-dealer market, there are a number of platforms including Creditex's RealTime[52] (launched in February 2004), GFI's CreditMatch (launched in August 2004), ICAP's BrokerTec (added credit derivatives in November 2004), Prebon Yamane's PrebonEdge and IDX Live by IDX Capital (launched in December 2005).

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[51] This annex focuses on inter-dealer and multiple dealer-to-customer platforms for interest rate swaps and credit derivatives. It should be noted, however, that many dealers are operating proprietary single dealer-to-customer platforms that offer OTC derivatives products. The Working Group has met with Creditex, e-MID, GFI, ICAP, MarketAxess and Thomson TradeWeb.

[52] On 28 November 2006, Creditex announced its merger with CreditTrade (operator of CreditPartner, an electronic trading platform for credit derivatives). The merged entity plans to consolidate both firms' electronic trading services onto Creditex's RealTime platform.

In the multiple dealer-to-customer market, TradeWeb, MarketAxess and Bloomberg added credit derivatives to their existing product offering in 2005. Electronic trading of credit derivatives has been slower in the dealer-to-customer market. One of the reasons cited is the increased difficulty of managing counterparty credit risk. The large number of investors, credit agreements and collateral issues present challenges to developing dealer-to-customer platforms. Respondents to the 2005 Bond Market Association survey on electronic trading systems, however, expect continued incorporation of CDS trading into electronic trading systems.[53] The recent industry initiative to improve operational efficiency in the credit derivatives market is also expected to encourage the adoption of electronic trading.

Table 4

Inter-dealer electronic execution platforms for fixed income OTC derivatives

Platform	Fixed income OTC derivatives traded	Access to electronic matching/affirmation
Blackbird	Credit derivatives Forward rate agreements	No. Trade record can serve as ISDA confirmation
Creditex	Credit derivatives	Direct link to T-Zero, which in turn provides a direct link to Deriv/SERV
e-MID S.p.A.	Overnight index swaps	No
eSpeed	Interest rate swaps	Direct link to Swapswire
GFI Group	Credit derivatives	Direct link to AffirmXpress, which provides a direct link to Deriv/SERV; direct link to SwapsWire
ICAP Electronic Broking	Credit derivatives Interest rate swaps Forward rate agreements	Direct link to Deriv/SERV; direct link to AffirmXpress, which provides a direct link to Deriv/SERV; direct link to SwapsWire
IDX Capital	Credit derivatives	…
Swapstream	Interest rate swaps	Direct link to SwapsWire
Tullett Prebon	Credit derivatives Interest rate swaps	Direct link to AffirmXpress, which provides a direct link to Deriv/SERV; direct link to SwapsWire

Note: … - information not available.

[53] The Bond Market Association, *eCommerce in the fixed-income markets: the 2005 review of electronic transaction systems*, December 2005.

Table 5

Multiple dealer-to-customer electronic execution platforms for fixed income OTC derivatives

Platform	Fixed Income OTC derivatives traded	Access to electronic matching/affirmation
360T	Forward rate agreements	…
	Interest rate swaps	
Bloomberg	Credit derivatives	Pending link to Deriv/SERV; direct link to T-Zero; direct link to SwapsWire
	Interest rate swaps	
MarketAxess	Credit derivatives	Direct link to Deriv/SERV
TradeWeb LLC	Credit derivatives	Direct link to Deriv/SERV; direct link to SwapsWire; TradeWeb ISDA confirm
	Interest rate swaps	

Note: … - information not available.

2. Post-trade consequences of e-trading

Increased efficiency of the trading process is one of the potential benefits of electronic trading. Most platforms provide the ability to capture trade data directly from the e-trading platform to firms' internal data capture systems through upload/download linkages.[54]

Among interest rate platforms, ICAP's i-Swap, TradeWeb, and Bloomberg's SwapTrader offer direct links to SwapsWire. TradeWeb's interest rate swap platform also includes a feature to generate electronic ISDA confirmations.

Among credit derivatives platforms, Creditex provides a link to T-Zero, which then delivers affirmed trades to Deriv/SERV for confirmation (see description of T-Zero in Annex 6). Similarly, trades executed over the trading platforms of GFI, ICAP or Tullett Prebon can be affirmed through AffirmXpress (announced in 2006), which links to DerivSERV for trade confirmation. Bloomberg Professional service also provides a link to T-Zero while TradeWeb and MarketAxess offer direct links to Deriv/SERV.

The adoption of electronic execution of OTC fixed income derivative products appears to be growing at a slower pace than the adoption of electronic confirmation services. Some of the impediments to e-trading of OTC derivatives include lack of standardisation, start-up costs for users (eg documentation and system adaptation requirements), failure to reach economies of scale and greater difficulty in managing counterparty credit risk.

The acceptance of electronic trading also appears to vary by region; inter-dealer traders in the European market have embraced OTC derivatives trading platforms more than their US counterparts. Anecdotally, service providers and dealers attribute the difference in e-trading take-up to a variety of factors including traditional practices, where US traders have long-standing relationships with their voice brokers and are reluctant to alter this personal connection. They also mention the relative geographical dispersion of European dealers.

[54] Electronic platforms generally offer two methods of accessing their systems; the first is through a GUI (graphical user interface) which runs on the traders' desktop and the second is through an API (application program interface) which allows dealers to plug their in-house systems directly into the platform.

Even though electronic trading has the potential to improve post-trade processing, it has not had a significant impact on existing procedures for post-trade processing, which are essentially the same whether the trade is executed electronically or over the phone. Services offered by T-Zero, Deriv/SERV and SwapsWire accommodate electronic trades as well as phone trades. Both dealers and service providers seem to agree that to effectively achieve straight through processing and address many of the problems noted in the post-trade processing of OTC derivatives transactions, the key is to capture the trade details correctly as early in the trade process as possible. Electronic trading accomplishes this as long as there is a way to feed the data from the trading platform to the internal systems of the parties to the trade with no (or limited) manual intervention. Continued industry efforts to expand the use of electronic platforms in the trading of OTC derivatives can serve to improve straight through processing throughout the trade cycle.

Annex 6:
Vendor services offered to market participants

This Annex presents the vendor services most often named by the interviewed dealers.[55]

Deriv/SERV (DTCC)

In late 2003, DTCC Deriv/SERV launched an automated trade matching and confirmation service for credit default swaps. There are over 700 dealers and investment managers that use this service worldwide and, as of August 2006, the share of credit default swap trades confirmed on an electronic platform was in excess of 80% of total global trade volume. Deriv/SERV has also started offering a trade matching and confirmation service for equity derivatives (equity index and share options, as well as equity and variance swaps) and interest rate derivatives (interest rate swaps and swaptions).

Both sides to a trade submit trade information to Deriv/SERV either through a direct computer-to-computer link or through a secure web-based application. Once information is received from both parties, Deriv/SERV automatically compares the trade information and matches (or mismatches) are reported in real time to the counterparties. If the trade details fully match, the trade is considered "confirmed" and no further action is necessary. If there are fields that do not match, the system reports the fields that do not match and counterparties are required to submit revised data to resolve the differences. This process continues until all the trade details fully match and the status of the trade becomes confirmed.

For the benefit of lower-volume buy-side firms, there is the option of using Deriv/SERV differently. Rather than submitting their version of the trade, buy-side firms may view trades alleged against them in Deriv/SERV and either accept the trade or suggest modifications. When the buy-side firm accepts the trade, it is considered fully confirmed. When modifications are suggested by the buy-side firm, a new trade record that reflects these changes is created in Deriv/SERV for the buy-side firm. At this point, with two records of the trade in Deriv/SERV, the trade matching process described above commences and the two parties to the trade will work to resolve the differences to reach a confirmed trade status.

In June 2006, Deriv/SERV announced the launch of AffirmExpress for brokered trades. AffirmExpress is a single-screen affirmation platform that allows traders and front office staff to affirm credit derivative trades from brokers at the point of the trade. Counterparties then have the option to submit their affirmed trades directly to Deriv/SERV's automated matching and confirmation service, which theoretically should match and result in a final confirmation quickly as the records submitted by the two parties of the trade would already be the same.

eConfirm (ICE)

IntercontinentalExchange (ICE) launched ICE eConfirm, an electronic trade confirmation system for products traded in the energy and metals markets, in April 2002. As of December 2006, this electronic trade confirmation platform for the OTC energy markets had 129 participant firms enrolled. ICE indicates that users of the system include investment banks, oil and gas producers, electric utilities and merchant energy trading firms. ICE eConfirm affords counterparties in the OTC markets the ability to complete accurate and legally

[55] The Working Group has met with all vendors named in this Annex, with the exception of eConfirm.

binding trade confirmations regardless of whether the trade was executed bilaterally on the ICE platform or away from the ICE platform.

eConfirm reviews received electronic trade data, screens and matches these data electronically, then highlights any discrepancies in a report to the traders' respective back offices. Discrepancies are resolved between the counterparties and changes are made in eConfirm by the involved parties. As soon as the trade is fully matched in the system, an electronic confirmation of the trade is issued. This electronic confirmation may be used as the official record of the transaction. The platform is internet-based and available via the eConfirm website.

SwapClear (LCH.Clearnet)

SwapClear is a central counterparty service for interest rate derivatives, launched by LCH.Clearnet in September 1999. It clears single currency vanilla interest rate, basis or compounding swaps, with varying maturities, in 12 currencies. At end-2006, SwapClear estimated clearing a notional value of USD 35.5 trillion.[56] This represents approximately 40% of outstanding notional values in the inter-dealer interest rate swaps market. Both membership criteria and product restrictions limit the size of the market eligible for clearing. LCH.Clearnet is a recognised clearing house under the UK's Financial Services Act 1986 and is supervised by the Financial Services Authority. SwapClear is a clearing service of LCH.Clearnet Ltd and can draw on the full resources of the clearing house in case of a major default. The service was developed for the purpose of reducing counterparty risk, operational risk and collateral requirements for the major inter-dealer swap trading institutions.

Participation

SwapClear Clearing Members (SCMs) must have a swap portfolio of USD 1 trillion outstanding, a minimum of USD 5 billion of Tier 1 capital (or a parental guarantee), and a credit rating of A or higher. There are currently 20 SCMs. SwapClear charges a one-off initial fee and an annual fixed clearing fee.

Clearing process

Trading continues to take place on a bilateral basis and is not affected by the clearing process. SwapClear only accepts trades which have been affirmed or confirmed through one of the Approved Trade Source Systems (ATSSs), SWIFT or SwapsWire. Once the trades are matched, a copy is sent to SwapClear for registration. The counterparties (and, if relevant, their SCMs) then receive a registration notification or a rejection message via the originating ATSS. Following registration, trades are novated to SwapClear, which becomes buyer to every seller and seller to every buyer. The original contract between the counterparties is replaced by two back-to-back trades, between SwapClear and each counterparty, on the same economic terms as the original trade, and incorporating standard SwapClear terms. This eliminates the original counterparty exposures created by the trade. It is possible to back-load trades.

Risk management

SwapClear collects initial margin, calibrated to cover potential future exposure in the event of a SCM default. Initial margin can be delivered in cash or in acceptable securities. SwapClear rejects new trades when initial margin is insufficient (margin credit limit). Positions are marked to market at least daily. Variation margin is paid and received each day, in the

[56] Adjusted for double-counting.

currency of the liability. SwapClear only acts as intermediary, receiving variation margin from the loss-making side of the contract, and paying it to the profit-making side. All payments to and from SwapClear are settled on a net basis.

Default procedures

In OTC products, liquidation of a defaulting member's positions is more challenging than would be the case in an exchange-traded market and implies a more significant contingent liability for survivors. SwapClear introduced new default management procedures in September 2006. In the event of a default, SwapClear would, in the first instance, seek to hedge the defaulting member's positions. The defaulter's portfolio would then be split by currency and auctioned off to surviving members in close to market neutral blocks. If no bids were forthcoming, the defaulter's portfolio would simply be allocated at market value to survivors. Any costs/losses associated with the default process would be borne initially by the defaulter's initial margin contributions and then its contribution to LCH.Clearnet's general default fund. Only in the event that these funds were insufficient would SwapClear seek recourse to LCH.Clearnet's profits or other members' default fund contributions.

SwapsWire

The product

SwapsWire was launched in late October 2002, providing an automated and efficient trade input facility linking dealers, buy-side users, electronic execution platforms and inter-dealer brokers for: (i) trade verification; (ii) trade capture; (iii) broker and legal confirmation; and (iv) STP of the trades to internal systems (both front office and/or back office). The system is modular and allows the users to take advantage of all of or selected elements of the functionality. Since launch with interest rate swaps, SwapsWire has expanded coverage to 25 currencies and a range of additional product types, including interest rate options, inflation swaps, CDSs and equity products.

SwapsWire is involved with the trade immediately after execution and with certain post-trade events over the trade life cycle. It also acts as a hub by linking in to other specialist automated services (TriOptima, LCH.Clearnet, Markit RED, prime brokers, switch engines[57], custodians and administrators). For example, once legally confirmed in SwapsWire, there is a straight through link directly to LCH's SwapClear CCP service, where contracts are novated and cash flows are generated. Similarly, SwapsWire's PBWire service automates OTC derivatives prime brokerage via the electronic linking of all the relevant participants.

Confirmation

Trades are recorded in SwapsWire right after the trade has been executed. There is a unique version of the trade available to participants in the trade, which is then confirmed by affirmation or matching by each participant via SwapsWire. This is generally done via the touch of a button in the front office. As a consequence, close to 100% of inter-dealer trades are confirmed on trade date T+0. The buy side tends to be a little slower, with more than 70% of trades confirmed on T+0 and over 90% on T+1.

[57] A switch engine is a service that enables dealers to mitigate reset risk across their trading portfolios. Such reset risk occurs when the actual interest rate on a valuation date is different to the expected forward rate calculated at the last reset date. An example of a switch engine is ICAP's RESET (formerly FRA-Cross), a specialised broking service matching forward rate agreements and interest rate swaps.

Life cycle management

SwapsWire maintains a database of all trades confirmed in the SwapsWire system. In addition, historical trades can be back-loaded into SwapsWire. As a result participants can reconcile their database of trades to the SwapsWire records on a periodic basis, knowing their counterparty is reconciling to the same database of trades. This also facilitates confirmation and STP of lifecycle events, such as trade amendments, terminations, allocations, exercises, corporate actions and novations.

In the case of novations, SwapsWire automates and merges the ISDA novation protocol and the agreement of the legal confirmation. The process is initiated by the transferor (typically the buy side), who works from the original trade details. These are then sent to both the transferee and remaining parties for affirmation. Once all parties have expressed their consent, novation is legally binding. This is a same-day process.

SWIFTNet Accord and SWIFTNet Affirmations (SWIFT)

SWIFT (Society for Worldwide Interbank Financial Telecommunication) is a major provider of secure messaging services for use in interbank communications. Its services are extensively used in the foreign exchange, money and securities markets, for confirmation, matching, settlement and some collateralisation messages. It develops standards for messages that can be used to confirm transactions via the SWIFT network. Confirmations can be matched on the SWIFTNet Accord matching service or, more recently, by affirming a counterparty's confirmation on SWIFTNet Affirmations. Messages used for OTC derivatives transactions are ISDA-compliant for transactions governed by its agreements.

SWIFTNet Accord is a central matching system for confirmations. It can match confirmations for forex, money market and derivatives transactions (MT3xx message types). Once the trade is agreed, counterparties send SWIFT confirmation messages; SWIFT copies these messages into the Accord matching service. Accord informs the counterparties in real time of matching; it also informs them about "mismatched" (most but not all terms match) or "unmatched" confirmations. Non-SWIFT messages can also be matched (using a fax/mail/telex function) either manually or following conversion into electronic format. Transactions confirmed with non-SWIFT messages can still be settled automatically. Accord safeguards all confirmations for a week. Using its Long Term Archival facility, participants can choose to store confirmation information for up to 10 years. In OTC derivatives, Accord is mainly used in currency derivatives, and also in interest rates, but not (yet) in credit, commodities or equities. Matched trades can be fed into SwapClear.

In 2007 SWIFT will introduce support for trade notifications for interest rate and credit derivatives in FpML format. SWIFTNet Accord services will be extended to match exotic FX options (MT306) as well as CDS and IRS confirmations in FpML format. Cross-syntax matching between traditional MT3xx and FpML formats will be supported for interest rate swaps.

SWIFTNet Affirmations, introduced in November 2006, has been developed for SWIFTNet users who cannot send MT3xx messages, mainly (regulated) buy-side clients and corporates. It allows dealers to send confirmations to their buy-side counterparties, who then only need to accept (or not) the dealers' confirmation. Among other products, it is possible to confirm FRAs (MT340 and MT341 for settlement), single (MT 360) and cross-currency interest rate swaps (MT361) and IRS rate resets (MT362) with SWIFTNet Affirmations.

Trade information warehouse (DTCC)

On 26 November 2006 DTCC went live with a trade information warehouse (trade warehouse) which takes in credit derivatives transactions that have been confirmed by an automated system. All trades confirmed in Deriv/SERV automatically populate the

warehouse. In addition, dealer participants have started back-loading previously confirmed credit default swap trades into the trade warehouse and it is expected that buy-side participants will begin to do the same in 2007. The trade warehouse will later expand to include bronze records (information on trades not standard enough to be electronically confirmed) of credit derivatives transactions. Eventually, DTCC plans to expand the trade warehouse to include interest rate, equity and other OTC derivative products. [58]

At the core of the trade warehouse is a central trade database, which maintains the official legal records of all contracts that have been confirmed by an automated system (gold records) and the basic economic information for other contracts (bronze records). In addition, the trade warehouse would provide a central support infrastructure to facilitate payment matching and other post-trade events associated with the contracts. Confirmed trade details would be used as input for the warehouse, so that downstream processing flows automatically from agreed-upon trade terms. With each bilateral pair of market participants using the same trade record for post-trade operations, the existing need for multiple bilateral reconciliation processes between thousands of pairs of counterparties would be obviated. The use of the agreed-upon trade record by counterparties has the potential to reduce payment and margin breaks and other processing problems. Additionally, other service providers that provide services that facilitate automated processing of post-trade events would be able to connect to the trade warehouse and base their services on the golden copy of the trade records.

triReduce (TriOptima)

triReduce is a multilateral early termination service for swap dealers in interest rates, credit derivatives and energy. Termination cycles are run on a fixed schedule for each product, with 10 to 30 dealers typically participating each time. To date, only vanilla products have been included in triReduce cycles.

Each participant submits a file of trades that it is willing to put forward for termination. Subject to a set of constraints (tolerances) established by the dealer - with respect to changes in counterparty credit exposure; changes in portfolio delta; and residual cash settlement reflecting the net mark to market value of the terminated trades - triReduce searches for offsetting positions among all the trades submitted by participating dealers. TriOptima estimates that up to 80% of a typical dealer's positions could be unwound with minimal impact on its net exposure to the market at large.

There are conditions to the triReduce process. Firstly, termination takes place only in discrete cycles, rather than continuously. Secondly, the success of a cycle is dependent on the volume of trades submitted by participating dealers and the degree to which the tolerances described above are too narrowly applied.

All major dealers use the triReduce service and, as of December 2006, a total notional of USD 5 trillion had been terminated in the credit derivatives market. When compared to the June 2006 BIS data, this represents around 25% of the total notional outstanding in the market. This has been achieved without buy-side participation. While the total notional value of interest rate contracts terminated is somewhat larger, at USD 13.3 trillion, this constitutes only 6.4% of outstanding value in that segment of the market. A significant portion of the inter-dealer market in interest rate swaps has been cleared and, to date, these contracts have not been available for termination.

[58] The trade warehouse does not provide book-entry delivery versus payment services, central counterparty credit intermediation or cash flow settlement services.

triResolve (TriOptima)

triResolve is a portfolio reconciliation service, which at the time of writing had been piloted by a group of the 14 major derivatives dealers and was to be launched imminently. Applying web-based matching technology to reconcile portfolios of OTC products on a regular basis, triResolve is designed to be used proactively to identify and resolve discrepancies in trade populations between counterparties before they result in collateral disputes. The system can support portfolios containing all product types covered by the ISDA Credit Support Annex (rates, credit, equity, long-term foreign exchange and commodities). triResolve maintains all matching information from one reconciliation to the next, so the discrepancies which do arise are incremental.

T-Zero (Creditex)

T-Zero was established in July 2005 and is a wholly owned subsidiary of Creditex Group and sister company of inter-dealer broker Creditex Brokerage Services. T-Zero is an affirmation service enabling counterparties to agree on the economic terms of a credit derivatives trade prior to execution of the legal documentation. When appropriate, the affirmed trade is then automatically sent to DTCC's Deriv/SERV platform, where the document can be legally executed electronically. The company operates under an authorisation from the UK Financial Services Authority.

T-Zero assigns a unique identifier code to trades booked on dealer systems and passes the transaction information on to the counterparty for affirmation. Trades can be affirmed and allocated by the client via a Bloomberg terminal, T-Zero's own interface or other proprietary interfaces on trade date. Prime brokers can also offer T-Zero's affirmation services alongside their own. An integral messaging system used by all participants enables rapid resolution of outstanding issues. To ensure such rapidity, participants commit themselves, through the signing of service level agreements, to respond to any action from a counterpart within one hour.

Trade affirmation on T+0 reduces the risk of misbookings and of subsequent downstream operational risks, while allowing for an increased automation of post-trade processing. The use of a unique trade identifier eases storage of and access to trade information, and makes it possible to keep track of all the changes to the terms of that trade.

T-Zero also offers inter-dealer broker services and supports novation, in conformity with the requirements of ISDA's Novation Protocol.

T-Zero has adopted a philosophy of "agnostic connectivity", aiming to fill gaps in the operational processing of derivatives trades, by offering a system complementary to and compatible with other vendor services and internal business processes.

Annex 7:
Members of the Working Group

In producing this report, the Committee on Payment and Settlement Systems was greatly assisted by the working group it set up, whose members are listed below.

Chairman (Board of Governors of the Federal Reserve System)	Patrick Parkinson
National Bank of Belgium	Steven Van Cauwenberge
Bank of Canada	Natasha Khan
European Central Bank	Chryssa Papathanassiou
Bank of France	Patrick Guerchonovitch
Deutsche Bundesbank	Andy Pralat
Hong Kong Monetary Authority	Peng-Khoon Lim
Bank of Italy	Gaetano Marseglia
Bank of Japan	Takeshi Shirakami
Netherlands Bank	Rien Jeuken
Sveriges Riksbank	Johan Molin
Swiss National Bank	Philipp Haene
Bank of England	Mark Manning
Financial Services Authority	Nicholas Newland (until April 2006) Martine Doyon (until April 2006) Jennifer Boneham (as from April 2006)
Federal Reserve Bank of New York	Christopher McCurdy Marsha Takagi Jeanmarie Davis
Board of Governors of the Federal Reserve System	Pat White Jennifer Lucier
Bundesanstalt für Finanzdienstleistungsaufsicht (BaFin)	Claudia Knoche
US Securities and Exchange Commission	Jeffrey Mooney
Participating observer (Basel Committee on Banking Supervision)	Steven Friedman
Secretariat (Bank for International Settlements)	Elisabeth Ledrut