

THE JOINT FORUM

BASEL COMMITTEE ON BANKING SUPERVISION
INTERNATIONAL ORGANIZATION OF SECURITIES COMMISSIONS
INTERNATIONAL ASSOCIATION OF INSURANCE SUPERVISORS
C/O BANK FOR INTERNATIONAL SETTLEMENTS
CH-4002 BASEL, SWITZERLAND

Credit Risk Transfer

October 2004

Table of contents

Report on Credit Risk Transfer: Summary.....	1
Do the transactions accomplish a clean transfer of risk?.....	2
Do participants understand the risks involved?.....	3
Are undue concentrations of risk developing?	4
Financial Stability Implications	4
Recommendations	5
Report on Credit Risk Transfer	11
1. Background.....	11
2. Trends and Market Developments.....	12
3. Extent and Sources of Risk Transfer	15
4. Risk Management Issues Associated with CRT Activity	22
5. Outstanding issues	34
Annex 1 The Risks of Credit Portfolio Products.....	42
1. The mechanics, economics, and risks of CDOs	42
2. The recent evolution of credit portfolio products	49
Annex 2 Disclosures on Credit Risk Transfer	60
1. Disclosure made by banks.....	60
2. Disclosure made by securities firms	61
3. Disclosure made by insurance companies	62
Annex 3 The Supervisory Approaches for Credit Risk Transfer	64
1. Minimum capital requirements	64
2. Regulatory restrictions and limits	70
3. Reporting requirements, guidelines and supervisory oversight	73
Annex 4 Members of the Working Group on Risk Assessment and Capital.....	77

Report on Credit Risk Transfer: Summary

The attached report responds to a request by the Financial Stability Forum (FSF) for the Joint Forum to undertake a review of credit risk transfer (CRT) activity. The report was prepared by the Joint Forum's Working Group on Risk Assessment and Capital on the basis of a number of interviews and discussions with market participants.

The September 2003 FSF discussions noted the importance of considering the financial stability issues that could be associated with CRT activity and highlighted three issues in particular: (1) whether the instruments/transactions accomplish a clean risk transfer, (2) the degree to which CRT market participants understand the risks involved, and (3) whether CRT activities are leading to undue concentrations of credit risk inside or outside the regulated financial sector. Additionally, the FSF asked whether there is a need for enhanced reporting to supervisors and improved public disclosures by regulated institutions, as well as whether there is a need for further information on credit risks that are transferred to non-regulated institutions. These questions are addressed below.

The Working Group has undertaken efforts to coordinate with similar projects that have been initiated within the European Union. In particular, the Working Group has benefited from direct participation by individuals closely involved in the efforts of the European Central Bank's Bank Supervision Committee (BSC) and the Committee of European Insurance and Occupational Pension Supervisors (CEIOPS). The Working Group also has been in contact with a representative of the Committee of European Securities Regulators (CESR) to ensure mutual knowledge of the respective projects. On the basis of these liaison activities, the Working Group believes that the products of these various efforts will be complementary.

By way of background, it is clear that credit risk transfer, including such transactions as loan guarantees, has a long history. In recent decades, loan syndication and securitisation activities experienced significant growth. The present report, however, focuses more narrowly on the newest forms of CRT, in particular on those activities associated with credit derivatives. The first credit derivatives transactions took place among a handful of pioneering banks in the early 1990's, with significant growth occurring since the latter part of that decade.

The report concludes that CRT activity (defined as indicated in the context of credit derivative-related transactions) has been developing at a rapid rate characterised by significant product innovation, an increasing number of market participants, growth in overall transaction volumes, and perceived continued profit opportunities for financial intermediaries. The report further concludes that continued development of the CRT market offers potential benefits in the form of more liquid and efficient markets for the transfer of credit risk. In this context, the Working Group believes that the most important high-level issues associated with these developments relate to the need for market participants to continue improving risk management capabilities and for supervisors and regulators to continue improving their understanding of the associated issues. Accordingly, the report contains a series of recommendations for market participants and supervisors in the areas of risk management, disclosure, and supervisory approaches. The recommendations specifically address the additional questions raised by the FSF in relation to reporting and disclosure.

The remainder of this summary focuses first on the three specific issues highlighted above. It then briefly discusses some of the financial stability aspects considered in the report and concludes with a summary of the recommendations included in the report.

Do the transactions accomplish a clean transfer of risk?

In regard to the question of whether credit derivatives transactions achieve a clean transfer of risk, the Working Group believes that credit derivatives have achieved a relatively good record to date. There are several issues to consider. First, there is the question of counterparty risk – will the counterparty to a credit derivative transaction be able to perform on its obligations? Market participants address this risk in several ways. A number of transactions are effectively funded up-front, via issuance of securities, so that the counterparty risk is eliminated. Even in the case of unfunded transactions, frequent marking-to-market with transfer of collateral is common, particularly in relation to inter-dealer transactions and those involving lower quality counterparties. Market participants also stress the importance of proper credit due diligence with respect to credit derivatives counterparties.

A second issue in regard to achieving a clean transfer of risk is whether there are legal uncertainties associated with the transaction. Market participants express increasing confidence in the legal status of credit default swaps using industry-standard documentation developed by the International Swaps and Derivatives Association (ISDA). In part, this is based on the performance of such contracts in the context of several high-profile corporate defaults. One of the most challenging issues associated with the development of the ISDA documentation has been the question of whether the contracts should cover restructuring events as well as bankruptcy or other more clear-cut default events. While this issue has generated some controversy among market participants, it has not been perceived to affect the legal standing of the ISDA documentation in a fundamental sense.

Another issue in relation to the documentation of transactions is whether the trade documents are matched and confirmed in a timely fashion. While many participants still report higher than desired levels of unmatched confirmations, they are hopeful that recent initiatives for automating credit default swap matching and confirmation processes will help alleviate this concern.

In regard to legal risk more generally, market participants are cognizant that legal issues have previously arisen in the broader financial derivatives market in several areas. These include the risk that counterparties did not have the appropriate legal authority to enter into the transactions and the risk that a counterparty or customer may seek to avoid payment based, for instance, on the market participant's failure to make adequate disclosures, or to assess the appropriateness of the transaction and its risks for the counterparty or customer. Market participants understand the need to reduce such risks as much as possible, and thus far the credit derivatives market seems to have been largely successful at absorbing the lessons of past experience in this regard. Nevertheless, the very nature of these risks will require continued vigilance by participants and regulators.

A final issue in relation to the clean transfer of risk is that some transactions are not really intended to transfer a large portion of credit risk in the first place. For example, some structured transactions may only transfer the “catastrophic” risks associated with the most extreme set of portfolio outcomes; these risks may be more macroeconomic than credit events.¹ It is therefore important that all participants have a good understanding of the relevant transactions and the circumstances in which they do and do not transfer credit risk.

¹ See comment in section 5.1, and discussion in Annex 1.

Do participants understand the risks involved?

Market participants seem to be largely aware of the risks associated with credit derivatives activity, although the extent to which all participants fully understand even the most complex new products could obviously not be determined with accuracy on the basis of a limited set of interviews. Almost certainly the most important risk associated with credit derivatives is the credit risk that is inherent in – and the motivation for – the transactions themselves. In addition, there are the legal and counterparty credit risks just outlined, as well as operational and liquidity risks, each of which has the potential to create problems if not managed appropriately. It is important to make a distinction between the two major product categories of the credit derivatives market: (1) credit default swaps, which bear credit risk that is similar though not necessarily identical to that associated with a bond, and (2) collateralised debt obligations (CDOs), where the credit risk of a portfolio of underlying exposures is “tranching” into different segments, each with unique risk and return characteristics. For example, the so-called “equity” tranches are the first to absorb losses and thus entail the greatest credit risk. On the other hand, senior and super-senior tranches entail less credit risk because they absorb losses only if all tranches subordinate to them have already been exhausted. In contrast to credit default swaps, which are increasingly viewed as plain-vanilla financial instruments, understanding the credit risk profile of CDO tranches and other structured credit products is viewed as more of a challenge.

Probably the most important credit risk management issue associated with CRT activity is the assessment of default correlation across different reference entities. Correlation is critical to evaluating the risk of a portfolio of credit default swaps or the risk associated with CDO tranches. Increasingly, CRT transactions are motivated by the desire to take a specific view on the correlation between different entities. This is reflected in the growth over the past year in “correlation trading desks” at the major intermediaries.

For dealer firms that are engaged in more complex and model-driven transactions and trading strategies, the challenge is to ensure that they are truly as well-hedged as they intend themselves to be. This requires careful attention to the underlying models and assumptions they are using, especially in relation to correlation. The issue of model risk was raised by a number of market participants, indicating a high degree of awareness of this issue by the dealer community.

With regard to investments in CDO tranches, which are a common means of participating in CRT markets, there are several important risk management issues. First, even if the underlying portfolio is well-diversified and the investment itself is not leveraged, the risk characteristics of CDO tranches can in some cases resemble those of more leveraged investments. Second, identical credit ratings do not imply identical risk characteristics (ie severity). In particular, because external ratings tend to focus on expected outcomes such as probability of default or expected loss, they may not provide a comprehensive measure of the risk associated with a CDO tranche. This is one reason why the market pricing of investments with similar external ratings can involve substantial differences in the associated yield. More broadly, the Working Group believes that it is important for investors in CDOs to seek to develop a sound understanding of the credit risks involved and not to rely solely on rating agency assessments. In many respects, the losses and downgrades experienced on some of the early generation of CDOs have probably been salutary in highlighting the potential risks involved.

Are undue concentrations of risk developing?

The Working Group spent considerable time trying to assess the extent of risk transfer that has occurred. This is extremely difficult to assess with any precision because notional amounts do not provide a measure of the extent of risk transferred. Nevertheless, based on the Working Group's interviews and analysis, including assessments of two recent surveys on this issue by rating agencies, a reasonably broad picture can be developed. This picture suggests that while individual firms may be involved to a greater or lesser extent, the aggregate amount of credit risk that has been transferred via credit derivatives and related transactions, particularly outside the banking system, is still quite modest as a proportion of the total credit risk that exists in the financial system.

The Working Group has not found evidence of "hidden concentrations" of credit risk. There are some non-bank firms whose primary business model focuses on taking on credit risk. Most important among these firms are the monoline financial guarantors. Other market participants seem to be fully aware of the nature of these firms. In the case of the monolines, credit risk has always been a primary business activity and they have invested heavily in obtaining the relevant expertise. While obviously this does not rule out the potential for one of these firms to experience unanticipated problems or to misjudge the risks, their risks are primarily at the catastrophic or macroeconomic level. It is also clear that such firms are subjected to regulatory, rating agency, and market scrutiny.

Other insurers are also active in the CRT markets to a varying extent, although the evidence suggests that such activity tends to be quite modest in relation to their overall scale of activities and risk profiles. Some banks are increasingly active in taking on credit risk via CRT transactions, particularly where it may provide geographic diversification benefits, but again this activity would appear to be modest in comparison to the overall credit risk in the banking sector.

There is clearly some degree of concentration in the market-making activities associated with credit derivatives transactions. Many market participants expressed the view that the default or exit of one of the large dealers would be disruptive to the liquidity of the CRT markets, while noting that the same is also true of other OTC derivatives markets. Importantly, dealer firms clearly seek to operate their market-making activities in a manner that leaves them hedged to the greatest extent possible.

In regard to unregulated market participants, hedge funds have a growing role in the market. Initially, their activity focused heavily on two-way trading in CDS, for example to exploit opportunities relative to bonds and other fixed-income instruments. While this activity remains prominent, hedge funds have also been cited as playing a greater role in holding equity tranches of CDOs and participating in correlation-related trading more generally.

Private asset managers were cited as significant participants in the CDO market, where they are reportedly willing to hold some of the riskier tranches. This provides the asset manager with a high-risk high-return investment even if they have not themselves leveraged their investment capital.

Financial Stability Implications

Market participants generally hold highly favourable views regarding the overall benefits of a robust CRT market. They note the benefits of being able to transfer risks and particularly of being able to reduce risk concentrations. They also cite the benefits of CRT activity in fostering more liquid and transparent markets for credit risk generally.

It appears that CRT activity is helping foster some significant long-term changes in the approach that market participants take to credit markets. For example, several market participants noted that pricing credit for large investment-grade borrowers is increasingly based on an assessment of the marginal risk contribution to a portfolio of credit exposures, as opposed to a pure stand-alone assessment. While similar approaches have been common in equity markets for many years, the move of credit markets in this direction will undoubtedly have a variety of impacts. This implies, for example, that corporate treasurers need to understand how CRT activity may be affecting their firm's financing costs.

In addition to the issues highlighted already in this summary, another aspect of CRT activity that bears on financial stability concerns the linkages between credit derivatives markets and other markets. The growth of CRT activity ensures that such linkages, including linkages with both bond and equity markets, are likewise expanding. This implies, for example, that an event in one market will have a spillover effect into the CRT market.

With regard to the role of unregulated market participants, the Working Group believes that market discipline as evidenced through effective counterparty risk management is an essential element of a well-functioning marketplace. Market participants should seek to ensure that sufficient measures are taken to address these risks with respect to all counterparties, whether regulated or not. In addition, supervisory authorities have a legitimate basis for seeking to understand the aggregate amount of credit risk that is being transferred outside of the regulated sector. While greater information sharing among supervisors, including developing a common understanding of key concepts and terms, as well as improved analysis of existing and planned reports provided by regulated firms should provide an increased ability to assess such developments, it will be important to monitor progress in this area closely.

Recommendations

The Working Group has developed recommendations in relation to risk management practices, disclosure, and supervisory approaches. The individual recommendations are included in the main text of the report at the end of the relevant sub-section and thus their ordering largely reflects the order in which the relevant topics are discussed in the main text of the report. Some of the recommendations have several parts, consistent with the nature of the issue being discussed. There are a few issues that cut across several of the recommendations. In particular, the role of external ratings as applied to CDO transactions is relevant to recommendations concerning risk management practices as well as disclosure practices.

Recommendation 1: Role of Senior Management

Market participants should use CRT instruments in a manner consistent with the overall risk management framework approved by their board of directors or equivalent senior management body, and implemented by their senior management. Before entering the CRT market, policies and responsibilities governing CRT instruments use should be clearly defined, including the purposes for which these transactions are to be undertaken. These policies should be reviewed as business and market circumstances change, for example as the firm enters into increasingly complex transactions. Senior management should approve procedures and controls to implement these policies and management at all levels should enforce them. Senior management should have access to appropriate management information systems covering the extent of CRT transactions undertaken by the firm.

Recommendation 2: Credit Risk

Market participants transacting in CRT instruments should have the capacity to understand and assess the credit-related risks inherent in these instruments. This should include the capacity to understand the major variables on which the valuation of the instrument depends and how the valuation of the instrument will be affected by changes in these variables. Firms that undertake CRT transactions on both the asset and the liability side of the balance sheet should have the ability to assess on a comparable basis the relevant credit risk regardless of how the transaction appears on the balance sheet.

Aggregation of credit risk: Market participants should seek to ensure that their measures of credit exposures to individual obligors are as comprehensive as possible, for example by including both direct exposures (eg, loans and OTC derivatives exposures) as well as indirect exposures from CRT transactions.

Recommendation 3: Credit Model Risk

Firms that rely on models to assess the valuation and risks of CRT instruments should have sufficient staff and expertise to properly understand the assumptions and the limitations of those models, and to manage their usage appropriately. It is essential that the usage of such models be subject to periodic validation independent of the trading or business area, including independent audits conducted by capable internal or external auditors. Firms should undertake efforts to regularly compare model-based valuations with available market proxies and/or valuations of similar instruments produced by other firms. Management and risk monitoring staff should take into account the assumptions and the limitations of those models in making decisions in relation to CRT instruments.

Correlations: Firms should thoroughly understand the sources for and roles of correlation assumptions in models used for valuation and risk management of CRT instruments. Firms should regularly assess the impact of changes in correlation assumptions on model outputs, for example via stress testing.

Extent of risk capture: Firms should assess the extent to which trading/hedging approaches in CRT instruments may leave the firm exposed to risks that are not routinely captured in the firm's risk management calculations (eg, "jump to default" or other issuer-specific risks and basis risks). In particular, firms should have the capacity to monitor the extent of potential build-up in such risks and be able to incorporate the results of such monitoring into their risk management approach. Firms should regularly evaluate the need to incorporate such risks into their routine risk measurement calculations.

Recommendation 4: External Ratings

Market participants should understand the nature and scope of external ratings assigned to CRT instruments, particularly CDOs, how these differ from external ratings assigned to other types of instruments, as well as how ratings methodologies differ across the rating agencies. In particular, market participants should seek to understand the extent to which the external ratings are conveying information on probability of default or expected loss as opposed to information on the potential for loss in unexpected circumstances.

Supplementary measures: Market participants should encourage the rating agencies to continue their efforts to provide information that supplements the ratings themselves. Efforts to provide information on the events and scenarios that would lead to CDO ratings downgrades or information on ratings volatility are examples of additional

information that could help market participants better understand the risks of CDO instruments.

Recommendation 5: Dynamic Management of Structured Transactions

Market participants investing in dynamic structures should evaluate carefully the record of the manager, the nature of the manager's discretion, and the potential for conflicts of interest. Key issues in this regard include triggers that call for or prevent certain actions, provisions governing the diversion of cash flows to various tranches, and the ability/right to substitute reference credits.

Recommendation 6: Counterparty Credit Risk

Counterparty credit risk arising from unfunded CRT transactions should be managed actively, at least to the same standards applied to other OTC derivatives. In particular, for risk management purposes, counterparty credit exposures on derivatives, and all other credit exposures to the same counterparty, should be aggregated taking into consideration legally enforceable netting arrangements. Counterparty credit exposures should be calculated frequently (in most cases, daily) and compared to credit limits. All counterparties, regardless of collateral status, should be subjected to a sound due diligence process. Buyers of credit protection should evaluate the potential correlation of reference entities and protection sellers and take account of such assessments within their risk management processes.

Recommendation 7: Legal Documentation Risk

All market participants need to pay careful attention to the legal documentation relating to CRT instruments, such as the range of credit events covered by the instruments and to the clear and unambiguous identification of underlying reference entities. In particular, credit hedging firms should specifically assess whether the reference entity in the underlying contract is the one to which they have credit exposure. A clear understanding of documentation is of particular importance for complex, structured CRT products.

Standardisation: To reduce legal risk arising from CRT transactions, market participants should aggressively continue their efforts towards standardisation of documentation, including for CDOs and other more complex products.

Recommendation 8: Legal Risk and Appropriateness of Transactions

Before entering into a CRT transaction, market participants should undertake the due diligence necessary to clearly identify their legal responsibilities to the counterparty or customer, based on their role in the particular transaction, and to determine that their counterparty or customer has the legal authority to enter into the transaction. Furthermore, originators, dealers and end-users should have in place processes to assess and control potential reputational risks involved in the transaction.

Marketing: When marketing structured CRT products, originators and dealers should seek to foster a complete understanding of the nature and material terms, conditions, and risks involved and should not encourage exclusive reliance on external ratings as a measure of risk associated with the transaction. Originators and dealers should have in place processes for reviewing marketing materials to ensure that such materials present all relevant information fairly and accurately.

Investor Information: *Before entering into a CRT transaction, investors should ensure their ability to obtain, both at the outset and on an ongoing basis, the necessary information to properly evaluate and manage the risks associated with their investment. In particular, they should take into account their ability to access information on the valuation and risk profile of the investment.*

Recommendation 9: Use of Material Non-Public Information

Market participants, especially banks that lend to firms referenced by CRT instruments, should take care to ensure compliance with all relevant laws and regulations as well as industry recommendations concerning the use of material non-public information (MNPI) as it relates to their participation in CRT transactions. *Efforts by banks to ensure a comprehensive approach to compliance with such restrictions can take a number of forms. In each case, however, banks and other market participants with access to MNPI should adopt, and be able to clearly demonstrate that they have adopted, policies and procedures sufficient to address the concern. Supervisors, especially bank supervisors, should review the adequacy of and compliance with such policies and procedures, taking corrective action where necessary.*

Recommendation 10: Documentation and Settlement Risk

Market participants should execute confirmations and any other documentation associated with a CRT transaction promptly after the transaction has been agreed. *Market participants should establish clear standards or guidelines for the time periods that should be permitted for the exchange of documents and confirmations. Supervisors should reinforce that significant backlogs of unsigned documentation are unsound by requiring market participants that are unable or unwilling to effectively manage their volume of transactions to adopt corrective measures.*

Assignments: While the assignment of CDS transactions has the potential to reduce the ongoing operational risks associated with maintaining large two-way books, market participants should ensure that such assignment occurs in a manner consistent with the underlying documentation and with sound risk management practices.

Recommendation 11: Operational Risk

Market participants should ensure that their CRT activities are undertaken by professionals in sufficient number and with the appropriate experience, skill levels, and degrees of specialisation. *Reports to senior management on the performance of areas conducting such activities should seek to encompass these issues as well as measures of financial performance. In addition, before committing to this market, market participants should make sure that their information and technology systems are commensurate with the nature and level of their market activity.*

Recommendation 12: Market Liquidity Risk

Market participants should understand the liquidity characteristics associated with the CRT positions they have taken on, including those positions used for hedging purposes. *In particular, investors in CDOs and other structured products should be aware of the limitations on secondary market activity associated with such instruments. Firms should periodically consider how their positions in CRT instruments would behave under stressed liquidity conditions and incorporate the results of such assessments into their risk management approach.*

Recommendation 13: Disclosure

Market participants should continue to work to improve the quality of material public disclosures concerning CRT transactions and the resulting distribution of credit risks.

While disclosures of CRT-related risks need to respect the frameworks within which individual firms present their risk profiles, there is room for improvement in a number of areas. Clearly, the need for improvements varies across firms and the relevance of these recommendations will also vary with the level of CRT activity undertaken by firms. In certain cases (eg, asset managers), the recommendations may be appropriately targeted at internal reports to boards of directors or trustees.

- *Market participants should provide clear qualitative descriptions of the nature of their activities, including a discussion of the purpose and nature of CRT transactions employed.*
- *Market participants, such as banks, that typically provide summary information and breakdowns (eg, by credit quality, industry or geography) of credit exposures for lending portfolios, should consider presenting information that describes how CRT transactions affect these summary measures and breakdowns of credit exposure.*
- *Market participants that engage in CRT transactions as part of their trading activities should consider providing breakdowns of trading risk exposure and revenue that detail credit-related risks separately from other risk categories such as interest-rate risks (eg, disclose credit-related VaR separately).*
- *Market participants that report asset holdings by ratings categories should not simply aggregate holdings of CDOs with holdings of other types of instruments that are similarly-rated. Because of the differences in risk characteristics, it would be more appropriate to consider distinguishing material holdings by type of instrument (eg, bond vs. CDO) and/or to consider structuring reporting categories by spread amounts.*
- *Market participants, such as insurers, that take on credit exposures as an underwriter, should consider providing information on the amount of such exposures and associated provisions.*

Recommendation 14: Aggregate information

The efforts of the Committee on the Global Financial System to develop mechanisms that better identify aggregate information on credit risk should be strongly supported by supervisory authorities and market participants.

Recommendation 15: Supervisory Efforts

Supervisory authorities should undertake the steps necessary to enhance their understanding of evolving market developments in relation to CRT transactions. This includes the need to attract and retain qualified staff and to implement procedures, such as training programs, to improve staff knowledge and understanding on an ongoing basis. Supervisors would benefit from periodic discussions with market participants regarding developments in this area.

Recommendation 16: Supervisory and Regulatory Review

Supervisory authorities should periodically review regulations, supervisory guidance and reporting mechanisms that are pertinent to CRT transactions. In many cases, supervisory guidance and regulations applicable to OTC derivatives are not tailored

specifically to credit derivatives transactions. While in many cases this is appropriate, there may be circumstances where the regulations, supervisory guidance or reporting mechanisms need to be adapted to some extent to better fulfil their specific objectives. Supervisors should undertake efforts to understand thoroughly the accounting treatment of CRT transactions and their implications, while also seeking to provide knowledgeable input into the development of appropriate accounting standards for CRT transactions.

Recommendation 17: Supervisory Information Sharing

Supervisory authorities should continue efforts to share information on CRT activities with the objectives of strengthening their mutual understanding of developments, promoting further improvements in risk management practices by market participants, and enhancing supervisory and regulatory approaches. In particular, supervisory authorities should share information on the regulatory approaches adopted in such areas as minimum capital and securitisation to better understand the potential interactions between the different approaches and the incentives that these interactions could create for market participants.

Report on Credit Risk Transfer

1. Background

In June 2003, the Financial Stability Forum (FSF) requested that the Joint Forum undertake a review of credit risk transfer (CRT) activity, with the objective of contributing to an increased understanding of CRT activities and the issues that these activities raise for regulated institutions and their supervisors. Following its September 2003 discussions, the FSF urged the Joint Forum to give emphasis to the issues that are important from a financial stability perspective and highlighted three issues in particular: (1) whether the instruments/transactions accomplish a clean risk transfer, (2) the degree to which CRT market participants understand the risks involved, and (3) whether CRT activities are leading to undue concentrations of credit risk inside or outside the regulated financial sector. The FSF additionally asked whether, from a regulatory point of view, there is a need for enhanced reporting to supervisors and improved public disclosures by regulated institutions, and whether there is a need for information where credit risks are transferred to non-regulated institutions.

The Joint Forum commissioned its Working Group on Risk Assessment and Capital to undertake this work. This report by the Working Group provides an assessment of the relevant issues and is based on six meetings of the Working Group, presentations to the Working Group from eleven market participants, and about 60 interviews of market participants by individual members of the Working Group. In some jurisdictions, supervisory reports were used to assess regulated firms' involvement in CRT products. The Working Group has also benefited from efforts to coordinate with similar projects that have been initiated within the European Union. On the basis of these liaison activities, the Working Group believes that the products of these various efforts will be complementary.

Based on the Working Group's assessments, and consistent with the priorities identified by the FSF, the report includes a series of recommendations in relation to risk management, supervisory practices, and disclosure.

Given that the impetus for this work has been the continued growth and development of CRT activities related to credit derivatives, the Working Group has focused its attention primarily on these transactions. In particular, the Working Group has concentrated on the developing markets for credit default swaps and related products, as well as the markets for synthetic collateralised debt obligations (CDOs) and related products.² It is important to recognise that CRT broadly defined encompasses a wide range of transactions including loan sales and syndications, as well as the many varieties of traditional securitisations. While this context is clearly relevant to an overall understanding of how the newer forms of CRT fit into the marketplace, the Working Group believed that it would be most productive to focus primarily on these newer transactions.

² The difference between cash and synthetic CDOs is that a cash CDO is a cash market security collateralised by loans and/or bond exposures and tranches to create customised risk/reward profiles, whereas a synthetic CDO is a credit instrument that is collateralised by default swaps. It can be either a cash market security (ie "funded") or a swap contract ("unfunded"). The originator sources risk in the market by selling protection via CDS. Because the risk is sourced via default swaps, the credit exposures are synthetic. The originator hedges that risk by purchasing protection via the synthetic CDO. The terms "funded" and "unfunded" are used throughout the document.

2. Trends and Market Developments

Defined to include such transactions as guarantees, CRT activity clearly has a long history.³ Moreover, as already mentioned, loan syndications and various types of securitisations have been common for many years. The first credit derivative transactions are reported to have occurred among a handful of banks in 1993, with a few more following suit the next year.⁴ The International Swaps and Derivatives Association (ISDA) published their first documentation related to credit derivatives in 1998 and followed up with a set of Credit Derivative Definitions in 1999. This move toward a standardised contract, together with increasing emphasis on quantitative approaches to credit risk management by many market participants, helped spur continued growth in the market, which has more than doubled in size since 2001.

Probably the most important credit derivative instrument is the credit default swap (CDS), in which one counterparty (the “protection seller”) acquires the credit risk associated with a specific reference entity over a fixed term in exchange for a fee from the other counterparty (the “protection buyer”). CDS are used for hedging credit risk and as building blocks in creating more complex structured products. A second important credit derivative instrument is the synthetic CDO, in which the credit risk of a portfolio of exposures is transferred with credit default swaps and “tranching”. This means that the credit losses associated with the portfolio of exposures are allocated separately to individual tranches depending on priority rules established at the inception of the CDO. The riskiest tranche, which is the first to absorb any losses, is the “equity” or “first-loss” tranche. At the other extreme are the “senior” and “super-senior”⁵ tranches, which will only absorb losses after all of the tranches that are subordinate to them have absorbed their maximum loss. In between are the “mezzanine” tranches. The ability to construct a CDO synthetically enables this technology to be applied to any set of exposures whose credit risk can be transferred via the CDS market.

Using a stylised example, a Technical Annex to this Report further deals with the mechanics, economics, risks and recent evolution of synthetic CDO transactions. From an economic perspective, the tranching of risk associated with synthetic CDOs is appealing because it allows the credit risk associated with a pool of exposures to be divided up and allocated to parties based on their underlying risk preferences. From a disclosure perspective, synthetic CDOs and other tranching credit risk products are challenging, because notional amounts are not a sufficient measure of risk.

By nearly any measure, there continues to be significant growth in the credit derivatives market, even if outstanding notional amounts are still limited compared with outstanding amounts of other OTC derivatives (2.3 and 169.7 trillion USD, respectively⁶). The major dealer firms report increasing the scale of their credit derivatives trading operations, adding staff and other resources. This reflects what is reported to be a high level of profitability associated with such trading operations. Given this situation, it is not surprising that additional dealing firms beyond those in the top tier are also seeking to add to their capabilities. Taking a long-term perspective, growth in CRT seems likely to continue as the

³ The following verse from the Bible takes a rather conservative view on the issue. “He who gives surety for a stranger will smart for it, but he who hates suretyship is secure.” (Proverbs 6:15)

⁴ See Robert Reoch, *Credit Derivatives: the past, the present, and the future in Credit Derivatives: The Definitive Guide* (RISK publications 2003).

⁵ So-called as they are senior to a tranche rated Aaa/AAA.

⁶ Sources: *Risk Magazine Credit Derivative Survey* (February 2003) and *OTC Derivatives Market Activity in the First Half of 2003*, Bank for International Settlements (November 2003).

active credit portfolio management techniques that are made possible by credit derivatives spread to a wider range of market participants. In the short-term, growth in CRT transaction volume is harder to predict and could even slow depending on market conditions.

Despite this growth, the CDS market remains predominantly focused on investment-grade corporate reference entities, including both financial and non-financial corporates. Globally, trading occurs with some regularity in approximately 1,200 reference entities (“names”), although there are several tiers of liquidity within this set of names. The most active fifty names are much more liquid than the next hundred or so, while these in turn trade with more liquidity than the next several hundred, and so on. The CDS market is most liquid for CDS contracts with five-year maturities, although there is an increasing effort by dealers to build liquidity, and therefore a more continuous “credit curve”, in maturities out to ten years. There are also efforts to expand the CDS market beyond investment-grade corporate names, for example to the high yield and middle market sectors, with modest activity in the former and relatively little in the latter, at least to date. On the other hand, there is a growing market in CDS with sovereigns as the reference entity.

From a product perspective, the Working Group found that there has been significant innovation in the last year or so. Two innovations were widely emphasised: (1) the growth of CDS indices and index-related products and (2) the growth of “single-tranche” synthetic CDOs. With regard to the development of CDS indices, two groupings of market participants introduced competing families of CDS indices – the TRAC-X and the iBoxx. The indices are calculated by averaging the CDS spreads associated with a pool of reference entities, and thus they provide a measure of the average price of purchasing credit protection on that set of reference entities. For example, the TRAC-X NA IG index is based on the average CDS spread for a pool of 100 North American investment grade corporate reference entities. There are now quoted CDS indices for Europe, Japan, Asia ex-Japan, emerging markets, and North American high yield. Efforts are underway to list one or more of these indices on futures exchanges. Most recently, the two families of CDS indices have merged, implying that going forward there will be a single set of widely quoted dominant CDS indices.

Market participants indicated that the development of broad-based indices is extremely helpful to the growth and liquidity of the credit derivatives markets. The indices provide a standard benchmark against which other more customised pools of exposures can be assessed. They also provide a mechanism by which broad-based credit risk can be traded and hedged. In addition, the indices can be used as the building blocks for constructing other products. In particular, there is now a growing market in standardised tranches of the North American investment grade indices.

Such a development is also related to the second main product innovation of the last year or so – the growth of single-tranche CDO structures. The first generation of synthetic CDOs involved the issuance of tranches representing the full capital structure of the securitisation. That is, there would be an equity tranche (eg, absorbing the first 3% of losses), a mezzanine tranche (eg, absorbing losses between 3% and 7% of the portfolio notional amount), and senior and super-senior tranches (eg, absorbing losses between 7% and 100% of the portfolio notional amount). However, synthetic CDO issuers often had difficulty placing certain parts of the capital structure, for example the high-risk equity tranche or a large super-senior tranche (especially in funded form). In many cases, issuers simply retained those portions of the CDO capital structure that were difficult to place.

Over the course of 2003, however, it became increasingly common to structure the CDO such that only a single tranche is issued. These “single-tranche CDOs” allow a deal to be customised for the CDO investor. The investor can select all aspects of the reference portfolio as well as the specific portion of the loss distribution to which they wish to be exposed. To the extent that the CDO issuer itself has acquired the credit risk associated with

the entire pool of exposures, this implies that the issuer retains those portions of the capital structure that are not issued. An alternative approach is for a dealer to manage the “short” position in the issued CDO tranche without actually acquiring the credit risk associated with the entire pool. This approach is known as “delta-hedging” because of its similarity to hedging an options position.

Such activity reflects a clear trend in the credit derivatives market over the last year, namely the growth of more complex and model-driven trading strategies and transaction structures. This trend encompasses the growth of single-tranche CDOs as well as other less common (but growing) products such as first-to-default and *n*th-to-default basket CDS, options on CDO tranches, and CDOs using CDO tranches as collateral (also known as CDO-squareds). The pricing and risk management of these more complex products and strategies require reliance on credit risk models and in particular on assumptions about the extent of default correlation between different reference entities. This is reflected in the emergence of what are referred to as “correlation trading desks” at perhaps a dozen or so of the most active players. The correlation desks make markets in these complex products and strategies, while managing the overall risk exposure associated with the dealer’s position.

Both the rapid growth rates of transaction volumes and the increase in product complexity are reminiscent of the development of the broader OTC derivatives market a decade ago, a point that was made by numerous market participants. Many of these participants also noted that the earlier experiences have helped the credit derivatives market to address potential challenges faster and more effectively. In particular, over the last year several initiatives have been taken collectively by market participants to address perceived vulnerabilities in various areas. These include (1) a project to ensure a consistent database of reference entity names to limit the risk of confusion and legal disputes related to the specific legal entity on which a CDS is written, (2) the development of services to support the matching, affirmation, and/or confirmation of CDS transactions, (3) the development of standardised CDO documentation and CDO trustee report templates, and (4) the development of proposed voluntary standards to ensure that material non-public information is not used inappropriately by firms trading in the credit derivatives market. In several cases, these efforts may be more properly characterised as reactive rather than pro-active. Nevertheless, they signal the willingness of market participants to address such issues prior to specific regulatory pressures to do so, as well as the existence of effective mechanisms to undertake such collective efforts.

Another development that was cited repeatedly in discussions with market participants is the significant movement in credit spreads that has occurred over the two years. Several market participants indicated that the demand for credit protection grew substantially in the wake of the increase in investment grade default rates witnessed in the years 2000, 2001, and 2002. As one presentation to the Working Group noted, this “created an environment where default risk was a tangible event and the cost of hedging was a rational expense in relation to the potential losses.” At year-end 2002, the TRAC-X NA IG index traded at approximately 160 basis points, meaning that the average cost of credit protection on the names in that index was 160 basis points per annum. Over the course of 2003, however, perceptions of credit conditions improved considerably, at least as measured by market data. By the end of 2003, the same index had fallen to approximately 55 basis points, implying that the fee for providing credit protection had fallen by nearly two-thirds. Market participants noted that both supply and demand factors were relevant; banks became more reluctant to hedge as credit conditions were perceived to improve, while at the same time the larger spreads in prior years had induced additional sellers of credit protection to enter the market. Narrow spreads made it harder to structure traditional CDOs with investment grade credits as collateral. In response, underwriters shifted to new collateral types (ABS, CDO-squared) and to single-tranche deals.

3. Extent and Sources of Risk Transfer

3.1 Fitch Ratings and Standard and Poor's surveys

In late 2003, Fitch Ratings and Standard and Poor's (S&P) released two interesting surveys on CRT activities.⁷ The Fitch survey concluded that "credit derivatives have been a positive development for the global financial system" and emphasised the following points:

- The financial guarantors (the US monolines are most active in this segment) have the largest notional exposure taken on in CRT markets. However, much of their activity in CRT markets involves taking on the least risky exposures (for example, "wrapping" senior tranches of cash and synthetic CDOs). Fitch found that over 95% of their exposures were rated single-A or better.
- Insurance companies, primarily North American insurers, are large sellers of protection. European banks have also taken on a fair amount of credit risk exposure via CRT.
- European insurers and North American banks have a smaller share of the market for selling credit protection.
- Among protection buyers, European banks reported larger amounts of credit protection bought than North American banks.⁸

Fitch also provided some data on the number of firms of each type active in CRT markets and gave a sense of the relative size of their participation in CRT markets. From these data, it is clear that a few firms account for the bulk of the exposure, and most of the firms have small exposures. Fitch reported that banks that sold protection tended to be smaller, regionally oriented banks with small exposures; banks that bought large amounts of protection were the largest global banks. At banks that sold credit protection, exposures taken on via CRT were small relative to traditional lending (2 to 6% of total loans).

Shortly before the present report was finalised, Fitch released an update on their survey results.⁹ This update reaches broadly similar conclusions, while emphasising several points. First is the continuing growth of CRT activity, led by their finding of a doubling in the amount of CDS transactions among survey participants. The update noted some changes in the positions of global bank intermediaries, where correlation trading activity has become more prominent, although as a group global banks remain net buyers of protection. The update also concluded that the global insurance sector - with some exceptions - is continuing to pull back somewhat from CRT activity, while hedge fund involvement is growing.

The S&P report takes a more sceptical view of the benefits of CRT than Fitch. However, a close reading shows that despite the different "spin" of the two reports, they agree on the basic data and character of the market. S&P concludes that the net protection bought by all banks (protection bought minus protection sold) is about \$150 billion. Three features of the CRT market, all of which are also acknowledged by Fitch and confirmed by the Working Group's interviews with market participants, lead S&P to be sceptical about the amount of

⁷ Fitch Ratings, "Global Credit Derivatives: A Qualified Success", September 24, 2003 (a follow-up report to their march 10, 2003 paper, "Global Credit Derivatives: Risk Management or Risk?") and Standard & Poor's, "Demystifying Banks' Use of Credit Derivatives", December 8, 2003.

⁸ As discussed elsewhere in the report, measures of exposure transfer would overestimate the amount of risk transfer out of the bank if the bank retains a first-loss piece of the risk, as was known to occur in many transactions.

⁹ Fitch Ratings, "Global Credit Derivatives Survey: Single-Name CDS Fuel Growth", September 7, 2004.

risk that banks have actually shed. All three are variants of the point that notional amounts are not a sufficient measure of risk.

- Risk transfer is limited when a first-loss piece is retained by the bank. S&P notes that in many cases, banks bought protection via CDOs where the bank retained a first-loss position. S&P estimates that banks did \$50 billion notional of such transactions, thus S&P subtracts this amount from the \$150 billion of net protection bought by banks to arrive at its estimate of \$100 billion of actual credit risk transferred.
- S&P notes that the most actively traded names in the credit derivatives market are investment grade. Banks using credit derivatives to hedge will, of necessity, largely be hedging exposures to investment grade credits. Investment grade credits have less risk per unit of notional exposure than speculative grade credits.
- The banks holding the largest notional amounts of credit derivatives are also the largest dealers in the CRT market. These banks report their dealer books make up 90 to 95% of their credit derivatives, while credit derivatives used for hedging banking book exposures make up only 5 to 10%. (Interviewed firms reported similar numbers to Working Group members.) Banks typically run matched books in their dealer business. Much of the notional amount of credit derivatives outstanding (\$3 trillion according to S&P) reflects inter-dealer trading, not actual risk transfer.

Despite the different “spin” they put on the data, Fitch and S&P agree on two fundamental facts about the CRT market. First, the aggregate amount of risk transfer that has occurred is small relative to banks and insurers’ overall exposures and relative to the notional size of the market. Second, CRT is a key part of the ongoing transformation of credit markets. Credit markets are becoming more liquid. The markets for loans, bonds and CDS are becoming integrated. Large banks now rely on these markets to actively manage their credit risk profiles and an increasing number of banks and other investors are using CDS markets for both pricing and price discovery. It is likely that this transformation will continue and even accelerate, and in the future the effect of CRT will probably be larger than it has been to date.

3.2 Working Group interviews

The Working Group spent considerable time discussing with market participants the related questions of how much risk is actually being transferred via credit derivatives transactions as well as the ultimate sources of the risk protection. These questions have also been the subject of much discussion by market participants themselves, in particular the rating agencies as discussed above. In general, the Working Group believes that it would be impractical to develop a precise answer to these questions, because it would require a comprehensive survey of a very large number of market participants, including many private fund managers, and a detailed analysis of many different structured products. Nevertheless, the Working Group believes that its discussions with market participants have shed considerable light on these issues.

It seems important to stress at the outset that, as discussed above in the context of the S&P survey, the notional amount of credit derivative transactions significantly overstates the total amount of credit risk transfer that is occurring via such transactions. For tranching transactions, in particular, a precise quantitative assessment of actual risk transfer accomplished would require the use of a model-based metric, such as economic capital, that would estimate the amount of credit risk effectively embedded in each and every tranche of outstanding transactions.

3.2.1 Banks and securities firms

Despite the likely overstatement of risk transfer that is suggested by gross notional amounts, market participants tend to agree that a material amount of credit risk transfer has been facilitated by the development of the credit derivatives markets. Importantly, not all of this risk transfer involves the risk leaving the banking sector. In several cases, market participants reported that banks in Europe and Asia have been net sellers of credit protection, particularly in relation to highly rated products involving North American reference entities. This type of activity is viewed as enhancing the geographic diversification of the credit risk profile of such banks; some have also suggested that it may be perceived to offer a superior risk-return profile relative to domestic market opportunities.

The largest banks indicated that they believe credit derivatives offer a highly attractive mechanism for managing exposure concentrations. These hedging activities are increasingly managed by specialised credit portfolio management units within banks that are distinct from the broader credit derivatives dealing desks these banks often maintain as part of their market-making function. As the global banking sector has grown more consolidated – and in the wake of high-profile investment-grade defaults – the largest banks have become increasingly concerned with exposure concentrations to individual names. Their credit portfolio management units have therefore used credit derivatives as a way of bridging the gap between the credit extensions needed by their corporate customers and the bank's own desires with respect to exposure concentrations.

Banks generally report that efforts to lay off significant portions of portfolio risk have abated significantly. Banks cited a reduction in bank regulatory capital requirements and in portfolio risk as motivations for some of the initial synthetic CDOs. However, because not all of the capital structure could be placed, the extent of risk reduction was frequently not complete or required pricing of tranches that is no longer attractive. Banks also cite the impact of accounting requirements (discussed further below), which have tended to force banks to recognise losses on credit hedges over the past year, while the increase in the underlying economic value of the loans being hedged is not recognised. This has caused a number of banks to reassess, and in several cases scale back, their credit hedging strategy.

As noted, the synthetic CDO market is evolving away from transactions that were principally motivated by banks' desires to reduce regulatory capital requirements toward single-tranche structures principally motivated by investors' desire for a highly tailored product. Importantly, however, this does not mean that synthetic CDOs are becoming a less important conduit for credit risk transfer. Instead, it implies a larger intermediation role for those dealer firms that are constructing synthetic CDOs according to investor taste (rather than bank taste) while at the same time making a market in the CDS that banks are purchasing in order to hedge exposure concentrations. The skills required to manage the risks associated with this intermediation activity are presumably the source of the economic returns currently being generated by these dealer activities.

To summarise the situation regarding the banking sector, the dominant trend seems to be to use credit derivatives primarily to manage exposure concentrations to investment-grade corporate customers. Further, as noted, there is also a growing amount of geographically motivated risk transfer within the banking sector itself. In terms of the total amount of credit risk transferred, one of the largest banks reported that it had hedged in the vicinity of 15% of its investment-grade corporate credit exposures, which would imply net CDS positions in the tens of billions of US dollars. Other banks report smaller percentages of exposures hedged with CRT (in the single-digits).

As to the major US securities firms, they are in the top echelon of counterparties in the global credit derivatives market (according to Fitch's, four major US broker-dealers are in the top ten list of such counterparties). These firms engage in CRT activities primarily as

intermediaries and underwriters, although they also use these products to hedge their own proprietary credit risks. The firms are involved with most types of CRT instruments, with the heaviest emphasis in single name or structured CDS, and the next greater emphasis in the synthetic CDO. They expect their participation in the CRT market to remain high or even increase in the coming years.

As to hedging their own credits, one firm stated that it uses tranching structures to reduce the credit risk associated with balance sheet assets. Others stated that CRT instruments were used to hedge credit risk on a “jump-to-default” basis, and to construct synthetic exposures to particular credits through the use of “best-priced” instruments.

3.2.2 Insurance firms

Most market participants, as well as the Fitch survey, said that the insurance sector (including reinsurance firms) was a significant source of credit protection. Even given the relative coarseness of the S&P estimates, they nevertheless imply that perhaps \$150 billion notional in credit derivative instruments have been purchased on a net basis by non-bank entities (of which presumably a significant share involves the insurance sector). Many market participants noted that much of the activity of traditional life and P&C insurers took the form of purchasing highly rated CDO tranches or otherwise providing super-senior level protection. Market participants noted that some CDOs (including cash as well as synthetic CDOs) had not performed as well as hoped over the last several years, leading insurers to reassess the extent of their involvement, or at least to be more selective in their investment strategy.

Some insurance supervisors participating in the Working Group reviewed supervisory reports to measure the extent of insurers’ investments in CRT. In general, CRT investments made up only around 1% of total investments, leading to a conclusion that, at present levels, insurers’ aggregate financial strength is not threatened by their involvement in CRT. This figure excludes activities of non-insurance affiliates whom market participants may perceive as insurance companies but which are not subject to solvency regulation. Several of these are among the largest CRT participants.

From the point of view of insurance/reinsurance coverage, a number of market participants indicated that they believed many insurers, and certain reinsurers, have been scaling back their credit derivative activity, with several putting it into “run-off” mode. This was perceived to be due to a combination of the aforementioned downgrades to some CDO tranches, the reduction in credit spreads, and an upturn in the regular P&C pricing cycle (leading P&C insurers to redeploy capital back to core business lines). Over the long run, however, some market participants felt that the trend would be for an increasing degree of credit risk transfer from the banking into the insurance sector, especially via the more tailored single tranche CDOs.

One specific sector of the insurance industry that has received significant attention in the context of credit derivatives is the “monoline”¹⁰ financial guaranty insurance (FGI) sector. These firms are mainly based in the United States and have a traditional business in insuring or “wrapping” various forms of debt obligations by providing a guarantee of the issuer’s obligation to make timely principal and interest payments. This additional layer of protection is often helpful in ensuring both a high rating from the public rating agencies and facilitating a more liquid market for the securities, especially if the issuer’s own track record is not

¹⁰ So-called as they write only one line of business, financial guaranty.

substantial or its name recognition is low. The monolines have extended their expertise in ABS and MBS securitisations to providing senior and super-senior protection on CDO transactions. In some cases, these firms have also been active participants in the CDS market, although their level of interest in this activity appears to have waned due to overall tighter credit spreads, earnings volatility due to mark-to-market accounting, and sector risk limits.

In regard to their role in CDO transactions, as noted above, the monolines generally only provide credit protection against positions that they consider extremely safe investment-grade quality positions, predominantly super-senior or triple-A rated. To a great extent, their role appears to be to provide an additional layer of bonded due diligence (beyond that provided by the rating agencies) that enables CDO tranche buyers to become more comfortable with purchasing instruments that they themselves are uncertain how to evaluate fully. Along these lines, the monoline insurer interviewed by the Working Group indicated that it has little interest in participating in truly efficient markets.

The Fitch survey cited North America insurance companies, including the monolines, as the largest sellers of credit protection. Based on public financial statements, the monoline insurers have over \$200 billion in credit derivative exposure,¹¹ although most of it is likely in the form of super-senior protection. Importantly, it is difficult to relate this figure to the S&P figures cited earlier because the monolines may well be insuring CDO tranches subsequently purchased by other entities. Nevertheless, it seems clear that the monolines are among the most heavily involved of all non-bank entities in the credit derivatives marketplace. From a risk perspective, because they are providing protection on high-quality exposures, the monolines are essentially writing deep out-of-the-money options on catastrophic credit events (ie, unprecedented large numbers of investment grade credits defaulting simultaneously). The monoline firm interviewed by the Working Group did not disagree with such a characterisation, but emphasised strongly the sophistication and depth of its underlying credit analysis as well as its excellent track record. Although some market participants questioned whether the monolines are being adequately compensated for the guarantees they are providing, the rating agencies stood firmly behind their triple-A ratings of these firms and noted that the monolines have in the last year begun to raise their fees and require additional subordination for their positions.

Working with the Securities Valuation Office of the National Association of Insurance Commissioners, the New York State Insurance Department, one of the members of the Working Group, has aggregated and summarised statutory financial data on the CDO and credit derivatives investment activities of US life and property/casualty (P/C) insurers, along with data from the Fitch survey on the CRT activities of the financial guaranty companies.

US insurers must disclose every investment and derivative transaction – but not individual financial guaranty or surety policies – in quarterly and annual statutory financial statements filed with state insurance regulators. These statements are publicly available. In addition to the market discipline provided by full disclosure, US insurance laws place several restrictions on credit risk exposures. For example, New York places a limit of 20% on life insurers' below-investment-grade fixed-income investments and property/casualty companies must meet a series of capital thresholds before increasing investment risk.

These data are displayed in Table 1 below. It appears that CRT activity among US insurers is primarily from the FGI sector, followed by life and then P/C companies. While perhaps

¹¹ As-of September 2002.

significant for individual companies or groups, below investment grade CDOs and credit derivatives are not significant compared to the industry's fixed income holdings or invested assets. The FGI sector has the highest overall credit quality, especially considering that exposures rated "A or higher" include a significant amount of "super senior" tranches.

Table 1: Credit quality of US insurers' CRT activities (in percentages)

Credit rating	CRT activity				Memo: cash market investments	
	Financial guaranty	Life (CDO)	P/C (CDO)	Credit derivatives	Life (bonds)	P/C (bonds)
AAA - A	95*	55	48	65	63	88
Baa3/BBB-	3	26	24	30	29	9
Below investment grade	2	19	28	5	8**	3
MEMO						
Amount (\$billions)	222	26.4	1.8	2.5	1,765	632
Amount below investment grade (\$billions)***	4	5	0.5	0.2	141	19

Notes: On regulatory reports, credit derivatives are referred to as "RSAT" (replication or synthetic asset transactions). All data as-of 12/31/02 except RSAT/replications, as-of 9/30/03.

* Under New York Insurance Law (NYIL), monolines' insured portfolios must be 95% investment grade – ie, 95% Baa3/BBB- or higher.

** Under NYIL, a life company's below investment grade bonds may not exceed 20%.

*** Estimated

The Table reflects December 2002 data, except for the memo (dollar) amount for financial guaranty which is September 2002, as compiled by Fitch Ratings. From 2002 to 2003 U.S. insurers' holdings of CRT investments were little changed, increasing from \$30.1 billion to \$31.1 billion. The composition changed however with a \$3.8 billion decline in CDO and a \$4.3 billion increase in credit derivatives (replications). Distributions across credit rating categories are also largely unchanged in 2003. While Fitch has not released December 2003 data regarding financial guarantors' activities, comparative data from several of the largest firms suggests only modest growth (+7%) in 2003 -- very modest when compared to the rapid growth in 2002 and prior years.

3.2.3 Other participants

Apart from the previously mentioned non-insurance affiliates of certain major insurance groups, the other significant participants in the credit derivatives market are hedge funds and private asset managers. By all accounts, the level of involvement of hedge funds in the CRT markets has been growing substantially in the last year. Initially, hedge funds participated as protection buyers in the CDS market, taking advantage of a lower-cost alternative to shorting corporate bonds. More recently, however, the nature of their participation has broadened to encompass a wider variety of trading strategies and approaches that involve selling as well as buying protection. However, few if any hedge funds were reported to be operating as a pure net protection seller. Rather, the selling of protection would typically form one part of a

more complex trading strategy designed to profit from differentials in price movements across different markets or instruments. For example, hedge funds were reported to be increasing buyers of the riskiest equity tranches of synthetic CDOs, which they might seek to hedge dynamically through short equity positions. Reportedly, the amount of money being raised to form credit risk-related hedge funds in the last year has been significant. Increasingly, hedge funds are viewed by the major dealers as significant contributors to the liquidity of the CDS market, where hedge funds frequently trade in both directions based on company-specific views.

Private asset managers are another significant source of risk-taking. Some of these fund managers have a significant appetite for risk and may be the single largest class of investors in the equity tranches of synthetic CDOs. This provides the asset manager with a high-risk high-return investment even though they have not themselves leveraged their investment capital. Fund managers also act as CDO asset or collateral managers and, in some cases, may be compensated by ownership in junior tranches or may be required to take ownership to align their interests with the other investors.

It is important to recognise that hedge funds and asset managers have to raise their capital from various sources, with the former in particular relying significantly on high net-worth individuals. However, there is an increasingly large market in “alternative investments”¹² coming from the very large institutional fund manager community, including pension funds. Traditionally, these alternative investments have made up approximately 5 to 10% of a pension fund’s overall investments. A fund manager interviewed by the Working Group indicated that in the last year, however, there seemed to be a growing trend to push the percentage closer to 15% and in a few cases significantly higher.

In addition to these classes of market participant, members of the Working Group also interviewed one unique entity that has been formed solely to take on credit risk via the CDS market. This firm, whose current notional positions exceed \$6 billion, has sought to acquire a diversified portfolio of investment-grade credit risk through CDS transactions. This firm’s capital has been raised from a small number of entities, including several re-insurers. Unlike a hedge fund, this firm has sought and achieved an AAA rating from the public rating agencies based on its levels of capital and its internal credit risk model calculations, which are shared with the rating agencies. A key feature of its ability to attain such a rating is a stipulation that it bears as little liquidity risk as possible. Accordingly, it provides no collateral to counterparties and its contracts may not be terminated early. Based on discussions with the firm, it appears that its capital levels are well below current bank regulatory requirements for such exposures, although in line with likely requirements under Basel II. The firm has also recently announced its intention to begin participation in the single-tranche synthetic CDO market.

Finally, the Working Group discussed with various market participants the involvement of retail investors in the CRT markets. To date, there appears to have been some involvement of private banking clients in various structures, but little in the way of broader direct retail involvement. However, there are reports that the dealer firms are trying to develop product structures that would be appealing to a broad retail market. In addition, it is important to recognise that retail investors may be participating indirectly through various investment managers that themselves invest a portion of their funds in CRT-related products. These could include mutual funds and other fund management products that specialise in fixed-income related products, and for high net-worth individuals, hedge funds.

¹² While definitions vary, “alternatives investments” include private equity, venture capital, and hedge funds, as well as real estate investments, timberland, and oil & gas properties.

4. Risk Management Issues Associated with CRT Activity

There are a number of different risks associated with CRT activity. The most obvious, of course, is credit risk itself, although there are a variety of aspects to this risk. There are also legal and operational risks that could result in a failure to achieve a clean transfer of credit risk. In regard to the credit risks associated with CRT transactions, it is useful to distinguish the underlying credit risk that is being transferred from the counterparty credit risk that arises from the possibility that the counterparty to the transaction will be unable to perform as contracted over the life of the transaction. Each of these risks is important and in some cases it is also important to consider the linkages or correlations between the two.

Before discussing the individual risk elements associated with CRT transactions, however, it is important to stress the need for firms engaged in such activity to do so within an appropriate overall risk management framework. As has been emphasised in a number of prior reports, in particular the Group of Thirty Practices and Principles on Derivatives, senior management and the board of directors bear ultimate responsibility for the activities and the risks undertaken by the organisation. Discussions with market participants suggest that it has been important for firms that have been growing their CRT activities to review the nature of those activities with senior management (and in some cases with boards of directors) to ensure that all parties are comfortable that the firm's risk management policies and procedures are adequate to address the nature of the activities. This is particularly important as those activities evolve from participation in relatively straightforward products to more complex, structured transactions.

Recommendation 1: Role of Senior Management

Market participants should use CRT instruments in a manner consistent with the overall risk management framework approved by their board of directors or equivalent senior management body, and implemented by their senior management. Before entering the CRT market, policies and responsibilities governing CRT instruments use should be clearly defined, including the purposes for which these transactions are to be undertaken. These policies should be reviewed as business and market circumstances change, for example as the firm enters into increasingly complex transactions. Senior management should approve procedures and controls to implement these policies and management at all levels should enforce them. Senior management should have access to appropriate management information systems covering the extent of CRT transactions undertaken by the firm.

4.1 Credit risk

The underlying credit risks associated with CDS transactions are very similar to those associated with direct exposures to loans or bonds. The specific terms of the CDS contract are of course important, as the discussion below regarding the restructuring clause will highlight. Nevertheless, the risk management challenges associated with owning or trading a portfolio of CDS are closely related to those associated with owning or trading a portfolio of loans or bonds. The particular risk management approaches used often depend on the time horizon of the market participant. A firm that actively trades CDS contracts would typically look at its positions from a market risk perspective, focusing on the daily change in market value and using value-at-risk and/or stress tests to evaluate the risk of the position. Such an approach would likely be quite similar to the approach used to evaluate the risk of an actively traded bond portfolio.

Alternatively, firms that intend to hold CDS positions for longer time horizons typically put greater emphasis on assessing the long-run credit quality of the underlying reference entities. In practice, most CDS market participants undertake a combination of both traditional credit analysis and market risk techniques applied to credit spreads and/or CDS prices. For example, even a trading-oriented firm would often be trading on the basis of news about the fundamental business prospects of the reference entity, even though the firm's risk management system might primarily be oriented around a value-at-risk assessment. While CRT activity does seem to have resulted in some trading whose motivation is more "technical" than "fundamental" in nature, this largely seems to be a case of the credit markets catching up to a long-standing feature of the equity markets.

Several market participants noted the possibility that insurance companies can take on credit risk on both sides of the balance sheet and that this increases the importance of taking an integrated risk management view of both asset- and liability-related risks. This point has been made also by the IAIS, in their 2003 report on Credit Risk Transfer.¹³ From the point of view of property/casualty insurers such as the monoline financial guarantors, the credit risk associated with insurance contracts is construed as technical or insurance risk. The supervisory framework of prudent supervision of insurers is applied. This means that the insurer is obliged to set up sufficient technical provisions.

It is also important for market participants to seek to ensure that their measurement of credit exposures for individual obligors is as comprehensive as possible. For example, for banks active in CRT markets to achieve effective measures of credit risk concentration, they would need to aggregate exposures from direct obligations, such as loans and OTC derivatives, with contingent/indirect exposures resulting from CRT transactions, such as the sale of protection referencing that same obligor. Additionally, it is prudent for the overall measure of credit risk for an obligor to include exposures from trading activities.

Probably the most important credit risk management issue associated with CRT activity is the assessment of correlation in portfolio products. It is critical to the evaluation of the risk of a portfolio of CDS positions as well as to CDO positions. Although there are various ways to quantitatively assess correlation, the core concept relates to the tendency of different credit exposures to deteriorate or default simultaneously. While this concept has always been critical to understanding the underlying risk of a large loan or bond portfolio, the growth of CRT activity has occurred simultaneously with a significant increase in efforts to more precisely measure and quantify correlation effects.

The importance of correlation effects is most clearly seen in the CDO market. Evaluating the relative risk of specific tranches in a synthetic CDO demands some ability to assess the underlying correlation of the different reference entities. Consider a hypothetical synthetic CDO constructed around the TRAC-X NA IG index, which consists of 100 investment grade reference entities. One of the standardised tranches currently traded on this index would absorb losses between 3% and 7% of the reference portfolio. This tranche is often referred to as a "junior mezzanine" tranche, and would have a face amount of 4% (7% - 3%) of the notional value of the reference portfolio. That is, the investor in this junior mezzanine tranche would invest an amount equal to 4% of the notional value of the reference portfolio and would receive an annual or semi-annual interest payment on the outstanding principal amount. If the reference portfolio suffers credit losses of less than 3% over the life of the CDO, the investor loses none of its principal. However, if credit losses on the reference portfolio exceed 7%, all of the principal would be lost. This example demonstrates clearly that

¹³ *Credit Risk Transfer between Insurance, Banking and Other Financial Sectors* dated March 2000. The paper may be accessed at: <http://www.iaisweb.org/03fsfcrct.pdf>

the key risk management issue for the CDO investor relates to the possibility of multiple reference entity defaults. Moreover, even in cases where the investor might not ultimately suffer a principal loss, the value of the investor's position could fluctuate substantially over the life of the transaction, depending upon the timing and magnitude of overall losses.

Market participants indicated that such a junior mezzanine position on the TRAC-X would likely be rated BBB or BBB-. Such an assessment would imply a relatively low level of expected losses and is based on an assessment of the likelihood of multiple defaults during the life of the transaction. In this context, however, it is critical to note that all similarly rated investments do not have the same risk characteristics, even if they have roughly the same level of expected losses as assessed by the rating agencies. Consider holding \$1 million of a BBB rated bond. If the issuer of this bond defaults, and the recovery is 50%, the investor will lose half of its investment. Now consider investing the \$1 million in 100 different BBB bonds (ie, \$10,000 each). Assuming average recovery rates of 50%, all 100 issuers would need to default for the investor to lose half its investment. Finally, consider placing the \$1 million investment in the BBB-rated junior mezzanine tranche of the TRAC-X based synthetic CDO. Again assuming an average recovery rate of 50%, the investor would now lose half its investment if ten of the reference entities defaulted (generating losses equal to 5% of the notional amount). Moreover, if fourteen reference entities defaulted (generating losses equal to 7% of the notional amount), the investor would lose its entire principal, something that could not occur in either of the other two cases (assuming 50% recovery rates).

This example is meant to demonstrate several points. First, investments in CDO tranches – even when the reference portfolio is well-diversified and the investment is not itself leveraged – can exhibit the risk characteristics of more leveraged investments. Second, identical ratings do not guarantee identical risk characteristics: they may have equal probability but unequal severity. This latter point is hardly surprising since investment loss distributions can differ in a large number of ways, while ratings vary along only a single dimension. So what appears to be an identical rating becomes less so as we move through the complexity spectrum (ie from cash markets, through residential and commercial MBS, to structured credit products and, now, CDO-squared). It is precisely because of the uni-dimensional nature of published credit ratings that securities with the same credit rating can trade at significantly different yield spreads. Indeed, it is possible for a lower rated security to trade at a lower yield spread than a more highly rated CDO tranche.¹⁴ Market participants emphasised that with complex securities such as CDO tranches, investors need to understand the structure of the security and its loss distribution. Some market participants encouraged the Working Group to highlight this point in its work. These market participants also noted that the rating agencies rate CDO positions differently than they rate individual company bonds.

In fact, each of the rating agencies publishes its CDO rating methodology and how concentration/diversification effects (ie, correlation) are taken into account. Industry classifications play a large role in these methodologies, which have been evolving rapidly with the growth of the CDO market. However, such classifications may be imperfect. For example, Consecro, Inc. was classified by three major rating agencies as an insurance industry default. Yet not one of Consecro's insurance subsidiaries defaulted, none were placed under regulatory administration, nor did any of the three rating agencies have any of them in either of their respective two lowest credit rating categories during Consecro's bankruptcy.

¹⁴ A recent industry publication provides a chart that shows an AAA-rated CDO tranche trading at a spread of 145 basis points over LIBOR, with various other asset-backed securities with ratings ranging from BBB to AAA trading at spreads ranging from 60 to 120 basis points. (*Bank of America Guide to Advanced Correlation Products, Risk publications, 2004*).

Market participants hold a range of views about rating agency CDO ratings. All cite the fact that the methodologies are public and are given significant attention by qualified professionals within the rating agencies. Nevertheless, as noted, the fact that the CDO rating methods are different from bond rating methods leads some to argue that CDO ratings should be viewed with greater caution than bond ratings (for which the rating agencies have a much longer record of experience). These same market participants expressed concern that some investors rely too heavily on rating agency ratings and not enough on their own analysis or due diligence.¹⁵ These concerns were also highlighted in the context of structures that involve a “principal-only” rating, where often the principal is guaranteed via the purchase of a zero-coupon government security, but where the coupon is subject to substantial risk. Clearly, a very high principal-only rating on such a security does not provide information on the overall risk of the structure, including the coupon portion.

Over the course of the Working Group’s efforts, the so-called CDOs of CDOs, or CDO-squared products have experienced significant growth. These products have the potential to add another layer of implicit leverage for the investor. The key issue again is ensure a sufficient understanding of the full risk characteristics of the instruments, which are not fully captured in the published ratings. Moreover, this task can be quite difficult for these instruments, especially as it may involve the need to assess the potential for correlation not just between individual assets, but between CDO tranches.

The assessment of correlation effects is equally, if not more, important to the risk management of dealer positions and to the risk assessment of the more complex CRT products that have developed in the last several years. Indeed, as the name “correlation trading desk” implies, many products and trading strategies are based on specific views regarding the correlation between different credit risks. Increasingly, the largest dealers have developed complex models that help price and risk-manage these positions. Importantly, many market participants cite the heavy use of assumptions in the development of these models and the attendant model risk that results. Several market participants indicated that they believed there is also too much commonality in these assumptions across market participants.

Market participants highlighted the complexity of the challenges for dealers of risk managing the residual tranches that can result from the structuring and issuance of single tranche CDOs. In addition to the correlation-related issues that have been discussed, the Technical Annex describes why it is particularly difficult to hedge the so-called “jump to default” or “value on default” risk associated with these positions. The Annex also discusses how these risks can give rise to nonlinear price sensitivities (ie, circumstances where an x% change in the value of underlying parameters can lead to changes in the value of the dealer’s position of more than x%) that are similar in nature to the sorts of issues that arise in risk managing options portfolios.

In addition, hedging strategies may involve basis risks between the position being hedged and the position that is intended to provide that hedge. Basis risks may arise for various reasons including differences in the precise legal entities referenced by the contracts, or a mismatch in the remaining maturity of the positions, among other possibilities. Market participants highlighted the need for risk management approaches to review the potential for basis risks carefully, especially in cases where they might be sufficiently subtle that they would not be captured routinely within the firm’s risk measurement calculations.

¹⁵ It should be noted that, in a complementary effort to this Joint Forum report on credit risk transfer, the Committee on the Global Financial System has recently established a Working Group to explore the role of ratings in markets for structured finance instruments, including CDOs. The work on this project is now nearing completion.

A final credit risk management issue that was raised by several market participants relates to the difference between “static” and “dynamic” CDO structures. The majority of synthetic CDOs (ie, those constructed using CDS), especially single-tranche deals, are static in the sense that the composition of the underlying reference portfolio does not change during the life of the transaction. For many cashflow CDOs, and increasingly for some synthetic CDOs, however, the composition of the underlying reference portfolio is dynamic and changes over time as the CDO manager buys and sells reference assets. Market participants noted the potential benefits of dynamic structures because of the possibility that gains on assets that perform better than expected can offset losses on those that perform more poorly than expected. This offset can occur in a dynamic structure because both types of assets can be sold and replaced with assets performing in line with the original targeted credit risk of the portfolio.

Of course, the dynamic management of CDO structures creates a number of issues that do not exist, at least not to the same extent, with static CDO structures. For example, because of the greater discretion accorded to the CDO manager over the life of the transaction, it becomes more important to evaluate the track record of the CDO manager. Market participants also emphasised the importance of covenants governing the actions of the CDO manager, both in relation to the rights to substitute one asset for another within the portfolio, and in relation to the application of asset quality tests governing allocations of cash flows among tranches. Where managers themselves retain certain tranches of the CDO, it becomes particularly important to assess the potential for the manager to divert cash flows to those tranches.

Recommendation 2: Credit Risk

Market participants transacting in CRT instruments should have the capacity to understand and assess the credit-related risks inherent in these instruments. This should include the capacity to understand the major variables on which the valuation of the instrument depends and how the valuation of the instrument will be affected by changes in these variables. Firms, that undertake CRT transactions on both the asset and the liability side of the balance sheet should have the ability to assess on a comparable basis the relevant credit risk regardless of how the transaction appears on the balance sheet.

Aggregation of credit risk: Market participants should seek to ensure that their measures of credit exposures to individual obligors are as comprehensive as possible, for example by including both direct exposures (eg, loans and OTC derivatives exposures) as well as indirect exposures from CRT transactions.

Recommendation 3: Credit Model Risk

Firms that rely on models to assess the valuation and risks of CRT instruments should have sufficient staff and expertise to properly understand the assumptions and the limitations of those models, and to manage their usage appropriately. It is essential that the usage of such models be subject to periodic validation independent of the trading or business area, including independent audits conducted by capable internal or external auditors. Firms should undertake efforts to regularly compare model-based valuations with available market proxies and/or valuations of similar instruments produced by other firms. Management and risk monitoring staff should take into account the assumptions and the limitations of those models in making decisions in relation to CRT instruments.

Correlations: *Firms should thoroughly understand the sources for and roles of correlation assumptions in models used for valuation and risk management of CRT instruments. Firms should regularly assess the impact of changes in correlation assumptions on model outputs, for example via stress testing.*

Extent of risk capture: *Firms should assess the extent to which trading/hedging approaches in CRT instruments may leave the firm exposed to risks that are not routinely captured in the firm's risk management calculations (eg, "jump to default" or other issuer-specific risks and basis risks). In particular, firms should have the capacity to monitor the extent of potential build-up in such risks and be able to incorporate the results of such monitoring into their risk management approach. Firms should regularly evaluate the need to incorporate such risks into their routine risk measurement calculations.*

Recommendation 4: External Ratings

Market participants should understand the nature and scope of external ratings assigned to CRT instruments, particularly CDOs, how these differ from external ratings assigned to other types of instruments, as well as how ratings methodologies differ across the rating agencies. In particular, market participants should seek to understand the extent to which the external ratings are conveying information on probability of default or expected loss as opposed to information on the potential for loss in unexpected circumstances.

Supplementary measures: *Market participants should encourage the rating agencies to continue their efforts to provide information that supplements the ratings themselves. Efforts to provide information on the events and scenarios that would lead to CDO ratings downgrades or information on ratings volatility are examples of additional information that could help market participants better understand the risks of CDO instruments.*

Recommendation 5: Dynamic Management of Structured Transactions

Market participants investing in dynamic structures should evaluate carefully the record of the manager, the nature of the manager's discretion, and the potential for conflicts of interest. Key issues in this regard include triggers that call for or prevent certain actions, provisions governing the diversion of cash flows to various tranches, and the ability/right to substitute reference credits.

4.2 Counterparty credit risk

In regard to counterparty credit risk related to CRT activity, the biggest risk typically arises in relation to CDS transactions. For synthetic CDOs, investors frequently need to fund their positions, especially in relation to riskier tranches, although recent trends suggest some movement toward unfunded structures. Similarly, the synthetic CDO issuer typically invests these funds (as well as CDS income) in high quality collateral to back up the CDO's ability to repay principal. In contrast, CDS transactions do not typically involve an exchange of funds at inception, similar to an interest rate swap. Over time, however, as CDS spreads change, it would be common for one side of the transaction to be in-the-money and for the other side to be out-of-the-money.

Market participants indicated that they manage this counterparty credit risk in various ways. One of the most common is through the use of a collateral support agreement (CSA) that accompanies the other documentation for the transaction. The CSAs typically require periodic marking-to-market and set a threshold exposure (ie, unsecured amount) as well as the requirements to collateralise exposure above the threshold. In practice, dealers typically

have low thresholds for hedge funds, whereas dealers are more comfortable with higher threshold amounts among themselves. Dealers also sometimes purchase CDS where the reference entity is another dealer to reduce their overall exposure to that dealer.

The dealers interviewed by Working Group members confirmed the importance of rigorous due diligence of all counterparties, even those with high public ratings. Several market participants emphasised the need for the due diligence process to incorporate assessments of operational capabilities given the rapidly growing nature of the CRT marketplace and the consequent demands on resources and infrastructure at participating firms.

An additional issue that can arise in regard to the evaluation of counterparty credit risk and the value of credit protection provided by CRT instruments concerns the potential correlation that can exist between an underlying reference entity and the protection seller. For example, if the credit risk associated with a CDS protection seller is highly correlated with the credit risk referenced in the CDS itself, the extent of credit risk reduction for the protection buyer is much less than if the protection seller were largely uncorrelated with the reference entity. Many firms have been developing approaches to measure and manage this “wrong way” risk.

Recommendation 6: Counterparty Credit Risk

Counterparty credit risk arising from unfunded CRT transactions should be managed actively, at least to the same standards applied to other OTC derivatives.

In particular, for risk management purposes, counterparty credit exposures on derivatives, and all other credit exposures to the same counterparty, should be aggregated taking into consideration legally enforceable netting arrangements. Counterparty credit exposures should be calculated frequently (in most cases, daily) and compared to credit limits. All counterparties, regardless of collateral status, should be subjected to a sound due diligence process. Buyers of credit protection should evaluate the potential correlation of reference entities and protection sellers and take account of such assessments within their risk management processes.

4.3 Legal risk

The Working Group focused on legal risk issues in line with the FSF’s concerns regarding clean risk transfer. Market participants agreed on the paramount importance of legal certainty in these types of transactions, but emphasised that this requires significant work to ensure it is achieved. For CDS transactions (or their equivalent), the vast majority are documented using the definitions and master agreements developed by the International Swaps and Derivatives Association (ISDA). The ISDA credit derivative definitions have evolved significantly over the last several years, as various issues have arisen that needed to be addressed. Market participants generally expressed a great deal of comfort with the ISDA documentation and noted that such large default events as Enron and WorldCom did not lead to material litigation in relation to the CDS written on these entities using ISDA documentation. Early reports regarding Parmalat CDS are also encouraging on this front.

One of the most significant issues regarding the ISDA CDS documentation is the issue of restructuring. Because the typical CDS contract calls for physical settlement (ie, an obligation of the reference entity that meets certain characteristics), it contains an implicit cheapest-to-deliver option. Initially, the ISDA documentation incorporated restructuring as an event of default without specifying very narrowly which obligations were eligible for physical settlement. In 2000, Consec neared bankruptcy and negotiated a restructuring of its debt with a group of banks. The terms of the restructuring resulted in a large differential in the

price of Consecos's outstanding debt securities. Because the restructuring event counted as an event of default under the 1999 ISDA definitions, firms that had purchased protection delivered deeply discounted securities (ie, those not positively affected by the restructuring) in exchange for par from the protection seller. This occurred even in those instances where the firms that had purchased CDS had done so in order to hedge bank loans which were not trading at a steep discount.

This and another restructuring event involving Xerox caused ISDA to revisit its restructuring definitions and to more narrowly restrict the securities eligible for physical settlement in the event of a restructuring. This modified restructuring (MOD R) language has been further revised in response to concerns that it was too restrictive. Thus, there are now three different types of restructuring language used in the marketplace – restructuring (OLD R), MOD R, and modified restructuring (MOD MOD R). The MOD R language is most common in the United States, while MOD MOD R is more common in Europe. In addition, in some cases participants strike out restructuring as an eligible event of default (NO R). The latter development has occurred because some counterparties do not want protection buyers to have access to the cheapest-to-deliver option. Market participants are keenly aware of the differences in contract definitions and there is a growing literature on how to appropriately price the restructuring-related option. Nevertheless, the existence of multiple types of contracts does segment the market somewhat, while also giving rise to basis risk in some cases.

Another legal documentation risk issue for CDS has arisen in a series of cases where market participants have entered into contracts on the wrong legal entity. In one well-known case, two major dealers in CDS entered into CDS contracts specifying the holding company of Armstrong World Industries as the reference entity. However, this legal entity did not have any debt outstanding and thus could not default, even though one of its subsidiaries entered into bankruptcy. In other cases, there has been confusion between the buyer and seller of CDS regarding the specific legal entity on which the CDS was written. In response to these concerns, major market-making firms commissioned an effort to develop a common database of reference entities as well as a process to scrub the names of these entities to ensure they meet appropriate guidelines (in particular that they have outstanding debt). The effort to create this Reference Entity Database (RED) has been undertaken by a third-party firm which also supplies market pricing and other information services to market participants. This firm has been assisted by a major UK law firm and by ISDA, and is now providing the service to market participants.

In contrast to stand-alone CDS transactions, the CDS underlying synthetic CDO-related transactions are typically cash settled. The variety of CDO structures is matched by the variety of legal documentation involved. However, the Bond Market Association (BMA) has developed the CDO Transaction Library, a compilation of deal documents on specific transactions. This and additional efforts of the BMA have been aimed at reducing the scope for documentation-related disputes. In addition, the rating agencies examine closely the terms of documentation on CDO structures before granting a rating on the relevant CDO tranches, in particular to determine how the details affect the risks that investors face. Broadly speaking, market participants did not evidence any significant concerns with the legal situation regarding synthetic CDO transactions. However, the lack of standardised documentation for CDOs poses a risk management challenge for CDO dealers, originators, and investors.

One specific class of transactions remarked on by some market participants were CRT transactions structured as insurance contracts. Most market participants express a clear preference for CDS transactions using the ISDA documentation. Some indicated that they will no longer undertake transactions structured as insurance contracts, unless they are with a monoline financial guarantor. There have been problems with traditional surety insurers

forcing protection buyers to sue for payment in the event of default. The monolines are regarded as posing less legal risk because their entire business is premised on providing credible guarantees. Indeed, one of the rating agencies publishes a specialised rating regarding insurance companies that is intended to convey the rating agency's sense of the firm's likelihood of paying promptly without dispute. Among insurance companies, the monolines receive the highest rating in this regard. Firms concerned about purchasing credit protection structured as insurance note that they have the same concerns about undertaking ISDA-documented CDS with banking subsidiaries of insurance companies whose primary source of repayment is a guarantee or insurance agreement with its parent. Although these transformer arrangements were common in the early stages of the credit derivatives market, there now appears to be a greater scepticism with respect to them.

Overall, market participants indicated they are aware of potential legal risks and devote a significant amount of time and attention to them. For example, one major dealer noted that a key element of counterparty due diligence is determining whether the counterparty has the legal authority to enter into the transaction. In this regard, the marketplace has benefited from knowledge of prior disputes associated with the OTC derivatives market. Reviewing the history of the development of the interest rate derivatives market, however, suggests that market participants should also be alert to another potential legal risk. As product structures grow more complex, the possibility of disputes by counterparties or customers on the basis of failure to adequately disclose or advise, with respect to the transaction and its risks, grows. A key set of issues in this regard relates to whether the dealer firm has any obligation to provide information about the transaction or to assess the appropriateness of the transaction for the counterparty or customer, given the role in which the institution is acting in the transaction and the nature of its counterparty. For example, one grey area that dealer firms are currently exploring is their practices in regard to providing ongoing valuations of transactions (eg, CDO tranches).

Another issue that relates to legal compliance risk associated with CRT activity is the question of how banks that participate in the CRT markets as both hedgers and market-makers control access to confidential information (also called material non-public information, or MNPI) obtained from customers with which they have lending or other business relationships. Banks increasingly manage their hedging activity via a business function focused on controlling the credit risks associated with the loan portfolio as a whole. Depending on the organisation of this function within the bank, it may receive confidential information about specific borrowers. In some jurisdictions, market participants tend to agree that it would be inappropriate, unethical, and perhaps illegal to make use of this information to trade ahead of other market participants, either in a credit hedging capacity or in the institution's trading area. In other jurisdictions, however, this issue is not deemed similarly critical. In some countries, indeed, insider legislation only applies to exchange traded instruments and does not cover OTC derivatives. The issue of how to solve potential conflicts of interest and how to reconcile credit risk trading with banks' legitimate interest in credit risk mitigation needs further careful analysis.

This issue was highlighted for some market participants by CDS price movements that anticipated public announcements regarding bank credit line renewals or loan syndications. Some of these episodes prompted public concern from prominent non-bank fixed-income market participants. Partly in response, the major trade associations sponsored an initiative known as the Joint Market Practices Forum to identify practices necessary to ensure that confidential information is not used inappropriately.¹⁶ Market participants interviewed by the

¹⁶ See Joint Market Practices Forum, *Statement of Principles and Recommendations Regarding the Handling of Material Nonpublic Information by Credit market Participants*; IACPM, ISDA, LSTA, TBMA; October 2003.

Working Group noted that, following these steps, there have been fewer cases, but practices are still evolving and there is a perception that problems persist.

Recommendation 7: Legal Documentation Risk

All market participants need to pay careful attention to the legal documentation relating to CRT instruments, such as the range of credit events covered by the instruments and to the clear and unambiguous identification of underlying reference entities. In particular, credit hedging firms should specifically assess whether the reference entity in the underlying contract is the one to which they have credit exposure. A clear understanding of documentation is of particular importance for complex, structured CRT products.

Standardisation: To reduce legal risk arising from CRT transactions, market participants should aggressively continue their efforts towards standardisation of documentation, including for CDOs and other more complex products.

Recommendation 8: Legal Risk and Appropriateness of Transactions

Before entering into a CRT transaction, market participants should undertake the due diligence necessary to clearly identify their legal responsibilities to the counterparty or customer, based on their role in the particular transaction, and to determine that their counterparty or customer has the legal authority to enter into the transaction. Furthermore, originators, dealers and end-users should have in place processes to assess and control potential reputational risks involved in the transaction.

Marketing: When marketing structured CRT products, originators and dealers should seek to foster a complete understanding of the nature and material terms, conditions, and risks involved and should not encourage exclusive reliance on external ratings as a measure of risk associated with the transaction. Originators and dealers should have in place processes for reviewing marketing materials to ensure that such materials present all relevant information fairly and accurately.

Investor Information: Before entering into a CRT transaction, investors should ensure their ability to obtain, both at the outset and on an ongoing basis, the necessary information to properly evaluate and manage the risks associated with their investment. In particular, they should take into account their ability to access information on the valuation and risk profile of the investment.

Recommendation 9: Use of Material Non-Public Information

Market participants, especially banks that lend to firms referenced by CRT instruments, should take care to ensure compliance with all relevant laws and regulations as well as industry recommendations concerning the use of material non-public information (MNPI) as it relates to their participation in CRT transactions. Efforts by banks to ensure a comprehensive approach to compliance with such restrictions can take a number of forms. In each case, however, banks and other market participants with access to MNPI should adopt, and be able to clearly demonstrate that they have adopted, policies and procedures sufficient to address the concern. Supervisors, especially bank supervisors, should review the adequacy of and compliance with such policies and procedures, taking corrective action where necessary.

4.4 Operational risk

In addition to credit and legal risks, CRT activity also gives rise to operational risks. Most significantly, the OTC derivatives market generally has struggled to develop transactions processing and settlement mechanisms that reduce operational and settlement risks. The relevant issues include backlogs of unsigned master agreements and unsigned confirmations as well as the prevalence of manual systems and the risk that they break down with increased volume. In the CDS market, especially, market participants recognised that the problem of unsigned confirmations had reached excessive proportions, with some transactions going unconfirmed for months. This led to the development of several competing initiatives to develop services for a combination of trade matching, trade affirmation, and/or trade confirmation services. One of these initiatives is part of a broader effort targeting the OTC swaps market generally, while the other has focused more narrowly on the CDS market. The latter effort became operational in the fourth quarter of 2003, and seems to be gathering a significant mass of counterparties, including not only major dealers, but also hedge funds and other market participants.

An electronic system of matching and confirming CDS transactions should help to significantly eliminate the current issues associated with backlogs of unsigned confirmations. In addition, such a service may help to reduce risks associated with the practice of CDS contract assignment. As noted previously, it has been standard dealer practice in the OTC derivatives market to adjust positions by entering into new transactions, rather than by terminating or assigning existing transactions. This approach, however, has the disadvantage of leading to the build-up of large netted positions between major market participants. Hedge funds in particular have been concerned about such an outcome, because it typically requires the management of significant two-way collateral flow and associated calculations. Given their frequent “in-and-out” trading, many hedge funds would prefer to assign existing CDS contracts with an intermediary to a new counterparty. While in theory this approach should help to reduce operational and counterparty risks both at hedge funds and at their counterparties, in practice its risk reduction potential has been undercut by the fact that assignments have not always been properly documented, in some cases giving rise to circumstances where market participants were unaware that their counterparty had assigned the transaction to a new counterparty. A service that provides appropriate infrastructure support for CDS assignments therefore has the potential to further reduce risk and the size of large netted books of transactions between major market participants.

More broadly, the rapidly growing market in CRT transactions has placed strains on many firms’ resources and infrastructures. Almost by definition, there is a limited supply of skilled professionals with experience specific to CRT transactions relative to the growing size of the overall market. Similarly, many firms have sought to treat CRT transactions within existing operational processes and procedures, in some cases failing to consider the unique aspects of CRT transactions. These points suggest a need for all CRT market participants, including smaller organisations, to ensure that sufficient resources and attention are devoted to the operational side of these transactions.

Recommendation 10: Documentation and Settlement Risk

Market participants should execute confirmations and any other documentation associated with a CRT transaction promptly after the transaction has been agreed. Market participants should establish clear standards or guidelines for the time periods that should be permitted for the exchange of documents and confirmations. Supervisors should reinforce that significant backlogs of unsigned documentation are unsound by requiring market participants that are unable or unwilling to effectively manage their volume of transactions to adopt corrective measures.

Assignments: While the assignment of CDS transactions has the potential to reduce the ongoing operational risks associated with maintaining large two-way books, market participants should ensure that such assignment occurs in a manner consistent with the underlying documentation and with sound risk management practices.

Recommendation 11: Operational Risk

Market participants should ensure that their CRT activities are undertaken by professionals in sufficient number and with the appropriate experience, skill levels, and degrees of specialisation. Reports to senior management on the performance of areas conducting such activities should seek to encompass these issues as well as measures of financial performance. In addition, before committing to this market, market participants should make sure that their information and technology systems are commensurate with the nature and level of their market activity.

4.5 Market liquidity risk

A final risk that the Working Group discussed with market participants is market liquidity risk. As noted, within the CDS market there are tiers of liquidity with the first fifty to two hundred names substantially more liquid than other reference entities. Importantly, market participants indicated that there has been liquidity in the CDS market even for reference entities that are nearing default. While market participants indicated that a severe market shock such as the default of one of the very largest names or of a major market-maker would almost certainly adversely affect CDS market liquidity, they were quick to note that overall the CDS market had helped add liquidity and price discovery to markets (such as corporate bond markets) that have traditionally been somewhat illiquid in comparison to foreign exchange, interest rate, and equity markets.

Market participants readily acknowledged that secondary market liquidity for CDO tranches is poor. Some of the efforts undertaken by the BMA, such as the development of standardised trustee report templates, have been undertaken with the objective of developing more of a secondary market. However, in many instances, especially as single-tranche structures become more customised, there is not likely to be a reliable secondary market in these instruments. This is almost certainly part of the reason that such positions typically return a higher yield than similarly-rated corporate bonds. However, it also underscores the importance of valuation models for positions that cannot be marked to market directly.

Recommendation 12: Market Liquidity Risk

Market participants should understand the liquidity characteristics associated with the CRT positions they have taken on, including those positions used for hedging purposes. In particular, investors in CDOs and other structured products should be aware of the limitations on secondary market activity associated with such instruments. Firms should periodically consider how their positions in CRT instruments would behave under stressed liquidity conditions and incorporate the results of such assessments into their risk management approach.

5. Outstanding issues

5.1 Financial Stability Implications of CRT Activity

Given the interest of the FSF in the potential financial stability implications of CRT activity, the Working Group spent considerable time discussing this topic. Market participants generally hold highly favourable views regarding the overall benefits of a robust CRT market. They noted the benefits of transactions that allow risks to be transferred and generally seemed to believe that the broad direction of risk transfer represented a reduction in credit risk concentration (ie, away from banks with existing large concentrations of credit risk). Many market participants cited the role of CRT activity in spreading the costs of credit losses during the most recent credit cycle in North America and Europe. The majority of supervisors on the Working Group also found CRT activity a positive development in global markets, but with various caveats, as expressed in this paper.

As noted earlier, however, it is not possible to assess with precision how much credit risk has actually been transferred and thus how important a factor CRT activity has been in reducing the losses to the banking sector. Market participants also cite the benefits of CRT activity in helping to improve the transparency and liquidity of other markets in which credit risk is the major factor. Over the long term, market participants express the hope that CRT activity will help foster significantly more liquid credit markets, which should bring substantial benefits both in the ability of banks to manage risks and in reducing the financing costs for borrowers seeking to raise capital.

Some observers have raised concerns regarding the participation in CRT activity by firms with an insufficient track record or understanding of credit risk. In particular this issue has arisen in relation to the participation of the insurance sector. In this respect, it is important to emphasise that, in some countries, insurance companies have for many years been among the most significant participants in bond and other fixed-income markets, so they are hardly inexperienced with respect to credit risk generally. However, the Working Group is clearly aware of instances where insurance companies have been unhappy with the results of their involvement in credit derivatives and have scaled back their participation accordingly. On balance, such experiences are likely healthy for the continued development of the market because they help to provide a balanced perspective for prospective participants and they alert existing participants to risk management issues and challenges. Continued participation of insurance firms in CRT activity might be viewed positively in the long run (so long as it is properly managed) because it contributes to the diversification of the risks faced by such firms.

A specific concern highlighted by the FSF is whether CRT activity is leading to the build-up of significant concentrations of risk either inside or outside the regulated sectors. At this stage, the Working Group has not found evidence of hidden concentrations of credit risk. Nevertheless, there are some non-bank firms whose primary business model focuses on taking on credit risk. These include the monoline financial guarantors and the specialised CDS entity described above. Other market participants are fully aware of the nature of these firms. In the case of the monolines, credit risk has always been their primary business activity and thus they have invested heavily in obtaining expertise in the analysis of credit risk. The rating agencies also obtain significant data on individual transactions entered into by the monolines. While it is clearly possible that one of these firms could experience unanticipated problems or otherwise misjudge the risks involved, such problems are not likely to be the result of having entered into the business of CRT activity lightly. Given their orientation toward super senior risk, the monolines exhibit more exposure concentration rather than risk concentration.

The concentration of market-making activity is another area that has attracted widespread comment. Needless to say, all markets where the market-making is concentrated are likely to be vulnerable to a disruption in liquidity should a problem with one of the important market-makers arise. Moreover, there is no question that, as in other OTC derivatives markets, the market-making function in relation to credit derivatives is highly concentrated in perhaps half a dozen banks and securities firms. Another aspect of the concentration in market-making activity is the degree to which the major dealer firms are intermediating various risks in a manner that exposes them to either basis risk or model risk. No doubt, the major dealers generally seek to run hedged positions themselves, especially when reasonable profits are available simply on the bid-ask spread. As the products and transactions have become ever more complex, however, it becomes more difficult to assess with certainty whether a set of positions is truly well-hedged. Trading banks often have a diversified book of CRT long and short positions with the implicit expectation that adverse spread movements in one position may be offset by spread movements in other positions at portfolio level. However, it is important to note that the bank would not be hedged in the case of a default where it could lose the entire notional value of the defaulted CDS, because it is extremely unlikely that the loss would be offset by spread movements in other CRT positions. The only way to be completely hedged is to be long and short the same reference entity (taking into consideration the remaining basis and counterparty risk). It is possible that some banks fail to appreciate that jumps to default risk may be as much a concern as pure correlation risk.

A final aspect of concentration risk that the Working Group considered is whether there is a concentration of reliance on a small set of risk management frameworks or approaches. This issue arises in regard to the reported similarity of credit risk models and assumptions used by major market participants. Of course, there is nothing inherently wrong with convergence in risk management approaches. But in this case, given the widespread view that such models are still in their relative infancy, the similarities are perhaps worth noting. This issue also arises in relation to the reliance on rating agency ratings and methodologies regarding CDO tranches and related structures. Ideally, all market participants that are investing substantial amounts in CDOs would have the capacity to undertake their own analysis of the risks, so that the rating agency ratings would function more as a supplement to these analyses. In practice, however, it is likely that substantial reliance is placed on the rating itself, thereby effectively concentrating the risk judgments of many market participants onto those of a small number of public rating agencies. Moreover, as noted above, the CDO ratings methodologies are newer and less tested than those that the rating agencies have developed for bonds and other issuer-specific securities.

Interviewed firms agreed that, in the early days of the CRT market, some CDO investors paid too little attention to the details of the CDO structures they were investing in. These investors did not look past the CDO tranche's credit rating to fully understand the structural features of the CDO. Subsequently, these investors were surprised by the poor performance of some of their CDO investments. Interviewed firms reported that market participants have learned from their mistakes. CDO investors are now more aware of the details of CDO structures and are more willing to negotiate for structural features that are to their benefit. However, some CDO investors, mainly second-tier players, reportedly still focus on the credit rating of CDO tranches when making their investment decisions. Supervisors of second-tier firms that are investing in CDOs should aim to find out whether their firms fall into this latter category and, if so, ensure that these firms either upgrade their due diligence of CDO investments or limit their CDO investments to an amount they can afford to lose.

In considering the implications of CRT activity, it is helpful to consider the linkages between credit derivatives activity and other financial markets. Market participants indicated that CRT markets and other financial markets are increasingly tightly integrated, in part because of the emergence of speculative capital ready to take advantage of profitable arbitrage opportunities between the different markets. One particularly eye-opening example cited by a

major market participant concerned an instance where a particular reference entity was highly sought after as an element of synthetic CDOs because of its high diversification value. This resulted in its credit spreads trading tighter than other companies whose stand-alone credit risk was probably lower. In another case a corporate CFO was unaware that his firm had significantly more synthetic credit risk outstanding than its actual debt, with a different set of investors. Such examples highlight the growing need for corporate treasurers to understand the implications of CRT markets and how they can affect their firm's financing costs.

From the perspective of equity markets, the former example is also illuminating. In equity markets, the concept of differentiating between systematic and unsystematic (or idiosyncratic) risks has been commonplace for thirty years. Conceptually, at least part of what seems to be driving the growth in correlation trading and CDOs seems to be an increased willingness (and ability) to quantify and measure the effect of diversification in credit portfolios, just as it has been standard practice to quantify and measure the impact of diversification in equity portfolios for many years.

The Working Group asked a number of market participants to outline scenarios in the CRT markets that they believed could pose financial stability concerns. In many cases, the answers were tautological: a Great Depression-like wave of simultaneous defaults. In fact one participant described the risk of their super senior exposures as macro-economic rather than credit risk. Others, however, noted uncertainty regarding the impact of the default of a single large dealer, a very large reference entity, or both together. On balance, however, while most market participants would agree that such events would have significant repercussions for the liquidity and development of the CRT market, most also had difficulty outlining how the consequences of such an event would be made significantly worse through CRT activity than they would already have been otherwise.

Given the emphasis that the Working Group's discussions have placed on the role of correlation in many CRT transactions, as well as the heavy role of assumptions in assessing true underlying levels of correlation, one concern that arises is the possibility of a set of market events that could cause a sudden market-wide shift in views about the degree of correlation between different credit exposures. By definition, such a shift would likely come as a surprise to most market participants and thus would likely unsettle the markets for at least some period of time. In this case, what is likely different as a result of CRT activity is the number of specific positions that have been taken on by various market participants whose economic logic depends quite strongly on certain assumptions about the level of correlation between credit exposures remaining in place.

5.2 Accounting and Disclosure Issues Associated with CRT Activity

One of the most common issues raised in discussions with market participants was the accounting treatment of CRT transactions. In this respect, US market participants that issue securities into the public markets are subject to FAS 133 and subsequent standards.¹⁷ Similarly, participants in most other countries expect to be required to adopt a version of IAS 39 when it is finalised and adopted in their jurisdiction. The two approaches are similar in terms of their treatment of credit derivatives transactions. Both set out a relatively stringent set of requirements for firms to make use of hedge accounting rules. Under hedge accounting treatment, for example, a CDS that is settled in cash would be linked to an underlying loan on the books of a bank and the bank would show no change in the combined

¹⁷ FAS 138, FAS 149, EITF 99-20, etc.

value of these two linked positions as the credit quality of the borrower/reference entity moves over time. However, banks and insurers that are subject to FAS 133 indicated that, in practice, the criteria for obtaining hedge accounting treatment are sufficiently strict that many hedging transactions do not meet the criteria. In particular, the most common type of CDS, those that are settled by delivery of a credit instrument, cannot be hedged at all in public reporting.

As a result, under both FAS 133 and IAS 39, CDS are typically marked to market and the resulting gains and losses are reflected in the firm's income statements. Market participants complain that the resulting earnings volatility is inconsistent with their true economic position (since any underlying loans for which the CDS is serving as a hedge are not marked to market). Banks interested in purchasing credit protection have been especially concerned with this earnings volatility as credit conditions have improved, leading to mark-to-market losses on their CDS positions.

Some banks have adopted an approach of hedging single-name concentrations in their portfolio while taking on broad-based credit exposure through an index product to limit the total amount of earnings volatility that results. Others have tried to disclose and explain their hedging strategy and related earnings more fully in an effort to convince equity market analysts not to penalise the company for increased earnings volatility. Some have also limited the total amount of CDS hedging activity they are undertaking. Insurance companies that use CRT in their investment portfolio face the same accounting issue and the same incentive against hedging as do banks. While the Working Group believes it is important to note clearly the strong concerns of market participants in this area, it is not in a position to make recommendations regarding accounting standards.

Other market participants are less affected by these accounting standards, for example securities firms who mark all of their positions to fair value. Similarly for entities that are not publicly traded, there is typically much less concern about any earnings volatility that might result from applying public accounting standards.

The Working Group also discussed the state of CRT-related disclosures with a number of market participants. Many of the larger firms voiced support for stronger disclosure practices. However, few market participants voiced support for increased aggregate regulatory reporting of CRT positions. The Working Group surveyed disclosure made by financial institutions on their CRT activities. The outcome is summarised in Annex 2. As far as banks are concerned, most of them convey some qualitative information, in their annual reports, on the use of credit derivatives for hedging credit risk. In their discussions with the Working Group, banks were concerned about developing an approach to CRT-related disclosures that was consistent with the broader credit risk disclosures they wish to make, as well as with emerging regulatory and accounting disclosure initiatives. Nevertheless, most felt that separate disclosures outlining how the use of CRT transactions had modified the credit risk profile of the bank (potentially including its effects on geographic, industry, and credit quality breakdowns) are desirable and some banks are already moving in that direction.

Concerning the insurance companies reviewed, the purpose for engaging in credit derivative activities is disclosed. Insurance companies in several jurisdictions do make substantial information available regarding their holdings of CDOs as well as other CRT instruments. In general, these disclosures tend to be simple and highly aggregated. This is consistent with the generally low level of usage of CRT instruments by insurance companies who are not financial guarantors. Quantitative disclosures by financial guarantors are more extensive than those for other insurance companies. Financial guarantors, as providers of credit enhancement, report notional amounts, but not the market value, of their exposure to CRT risk. This is due to the fact that the market value of insurance contracts is difficult to

determine. However, market participants (and the rating agencies) highlighted the perception that the CRT public disclosures of the financial guarantors could be improved.

Securities firms tend to view traded credit risk as one of a number of market risks that affect the value of their portfolios. Therefore, they generally discuss in broad terms, in their annual reports, their use of credit derivatives. On the quantitative side, most of the firms give the aggregate notional fair value of derivatives and other contractual instruments, including CRT products. When questioned by the Working Group on how to enhance disclosure of CRT activities, these firms would prefer to focus on incorporating credit risk-related products within their broader market risk disclosures, for example by noting the credit risk-related contribution to VaR or other similar measures. More broadly, there is the question of CRT disclosures by other types of market participants, some of whom are not directly regulated. Market participants acknowledged some value in encouraging a broader awareness of where credit risk is being assumed, but they also noted that such disclosures may not be necessary to ensure appropriate counterparty credit risk assessment, even assuming that counterparties are willing to make the necessary data available. As always, there is also concern that too much disclosure regarding the nature of speculative positions may stifle trading liquidity in CRT markets.

Even for market participants that do not make public disclosures, however, there is often a need to provide reports to boards of trustees or boards of directors. One issue that several market participants brought up in this context relates to the classification of CDO tranches within such reports. Consistent with the earlier discussion of the nature of published ratings, it was suggested that disclosures or internal reports could be improved by separately classifying CDO tranches from other types of rated instruments and/or by classifying such instruments on the basis of yield spread. Such improvements could also usefully be applied in cases where market participants publicly disclose such asset holdings.

In a wider perspective, G10 countries are currently in the process of collecting data on the amounts of CDSs outstanding. This project, initiated by the CGFS, consists in expanding the BIS semi-annual OTC derivative survey with additional information on CDS notional amounts outstanding and market value, the character of the risks being transferred, and the institutional identity of risk-takers and risk-shedders. This regular information, made public to market participants, will help to get a clearer picture of the size and trends of the CDS market.

Recommendation 13: Disclosure

Market participants should continue to work to improve the quality of material public disclosures concerning CRT transactions and the resulting distribution of credit risks.

While disclosures of CRT-related risks need to respect the frameworks within which individual firms present their risk profiles, there is room for improvement in a number of areas. Clearly, the need for improvements varies across firms and the relevance of these recommendations will also vary with the level of CRT activity undertaken by firms. In certain cases (eg, asset managers), the recommendations may be appropriately targeted at internal reports to boards of directors or trustees.

- *Market participants should provide clear qualitative descriptions of the nature of their activities, including a discussion of the purpose and nature of CRT transactions employed.*
- *Market participants, such as banks, that typically provide summary information and breakdowns (eg, by credit quality, industry or geography) of credit exposures for lending portfolios, should consider presenting information that describes how CRT*

transactions affect these summary measures and breakdowns of credit exposure.

- *Market participants that engage in CRT transactions as part of their trading activities should consider providing breakdowns of trading risk exposure and revenue that detail credit-related risks separately from other risk categories such as interest-rate risk (eg, disclose credit-related VAR separately).*
- *Market participants that report asset holdings by ratings categories should not simply aggregate holdings of CDOs with holdings of other types of instruments that are similarly-rated. Because of the differences in risk characteristics, it would be more appropriate to consider distinguishing material holdings by type of instrument (eg, bond vs. CDO) and/or to consider structuring reporting categories by spread amounts.*
- *Market participants, such as insurers, that take on credit exposures as an underwriter, should consider providing information on the amount of such exposures and associated provisions.*

Recommendation 14: Aggregate Information

The efforts of the Committee on the Global Financial System to develop mechanisms that better identify aggregate information on credit risk should be strongly supported by supervisory authorities and market participants.

5.3 Supervisory Approaches to CRT Activity

The Working Group carried out a survey on the regulatory frameworks and supervisory approaches currently used by its members to tackle CRT activities. This survey, which results are detailed in Annex 3, included some questions regarding the application of capital requirements, the existence of regulatory restrictions and/or limits in the use of CRT products and the extent of supervisory reporting required. Approaches vary in a significant way across sectors and jurisdictions.

For banks and investment firms, the most binding regulation for the use of CRT instruments seems to be the capital requirements, whereas, for insurance companies, regulatory restrictions is a more significant factor for controlling the use of CRT products. There are differences across countries, however. In the United States, insurance companies are subject to both capital requirements, linked to the type of business undertaken, and restrictions on the types of instruments institutions can trade. In the European Union, where risk-based capital rules for insurance companies are being discussed, supervisors rely more on regulatory restrictions on the types of instruments institutions can invest in and the types of contracts they can underwrite.

There are also differences in the ways capital requirements are calculated. For banks, CRT products hedging credit risks in the banking book are generally treated similarly to guarantees. Differences can arise across countries in the criteria used for determining eligible hedging instruments. Tranches of structured CRT products receive a treatment that is more or less risk-sensitive according to jurisdictions. The new Basel II solvency framework is aimed at providing enhanced consistency across countries in the treatment of CRT transactions for banks. As regards securities firms and the banks' trading books, capital requirements are generally based on the marked-to-market value of the instruments and the treatment applied is generally similar to that retained for all other OTC derivatives.

As to the reporting requirements, the survey also evidenced that the quality of information reported to supervisors differs across jurisdictions: very few supervisors impose separate reporting for CRT activities and, even when it is the case, data are provided on an aggregated basis and do not allow supervisors to segregate positions by instrument types. In

most cases, in all three sectors, CRT transactions are actually reported within periodic supervisory reporting but are difficult to identify from other types of exposures. Therefore, there is a consensus among supervisors in the Working Group that reporting made by market participants to their supervisory authorities should be improved, particularly when CRT transactions are material.

The Working Group acknowledged that many initiatives are currently under way to improve the supervisory approaches of CRT transactions. At the international level, the Basel II framework for internationally active banks and the Solvency 2 project for EU insurance companies are significant milestones in this process. However, before these new sets of rules are implemented, it may be necessary for each supervisory authority to review their approach to CRT activities in order to ensure that they keep pace with new developments occurring in this market. Indeed, in many jurisdictions, in the three sectors, CRT activities have been tackled by expanding an existing supervisory approach, defined for other types of instruments, such as guarantees, asset-backed securities or OTC derivatives, to CRT instruments. However, as pointed out in this report, the CRT market has evolved continuously since it emerged, ten years ago, so that risks can now significantly differ from risks involved in more traditional CRT instruments. In order for supervisors to efficiently adapt their approach to the specificities of CRT transactions, they should also keep an updated knowledge of all the developments observed on the CRT market. Supervisors directly involved in controlling CRT activities should also be sufficiently skilled and regularly trained. Finally, all supervisors in the Working Group were of the view that the existence of international fora, like the Joint Forum, were of paramount importance for sharing information on the developments of the CRT market and enhancing coordination of regulatory approaches of CRT activities.

Recommendation 15: Supervisory Efforts

Supervisory authorities should undertake the steps necessary to enhance their understanding of evolving market developments in relation to CRT transactions.

This includes the need to attract and retain qualified staff and to implement procedures, such as training programs, to improve staff knowledge and understanding on an ongoing basis. Supervisors would benefit from periodic discussions with market participants regarding developments in this area.

Recommendation 16: Supervisory and Regulatory Review

Supervisory authorities should periodically review regulations, supervisory guidance, and reporting mechanisms that are pertinent to CRT transactions. In many cases, supervisory guidance and regulations applicable to OTC derivatives are not tailored specifically to credit derivatives transactions. While in many cases this is appropriate, there may be circumstances where the regulations, supervisory guidance, or reporting mechanisms need to be adapted to some extent to better fulfil their specific objectives. Supervisors should undertake efforts to understand thoroughly the accounting treatment of CRT transactions and their implications, while also seeking to provide knowledgeable input into the development of appropriate accounting standards for CRT transactions.

Recommendation 17: Supervisory Information Sharing

Supervisory authorities should continue efforts to share information on CRT activities with the objectives of strengthening their mutual understanding of developments, promoting further improvements in risk management practices by market participants, and enhancing supervisory and regulatory approaches. In particular, supervisory authorities should share information on the regulatory approaches adopted in such areas as minimum capital and securitisation to better understand the potential interactions between the different approaches and the incentives that these

interactions could create for market participants.

Annex 1

The risks of credit portfolio products

This technical annex describes the mechanics, economics, risks, and recent evolution of credit portfolio products.

The annex discusses both traditional and new credit portfolio products. In traditional credit portfolio products, such as collateralised debt obligations (CDOs), a portfolio of credit risk exposures is assembled, segmented into tranches and transferred to investors. A CDO's reference portfolio can be assembled with cash credit risk exposures (bonds or loans) or synthetic credit risk exposures (credit default swaps). Traditional portfolio products apply a securitisation "technology" that is familiar from other structured finance products, such as mortgage-backed securities and asset-backed securities.

A new generation of portfolio products has emerged in the last year or two to offer investors even more customised exposures to credit risk. These products include single-tranche CDOs and n^{th} -to-default basket swaps.¹⁸ The new generation of portfolio products are constructed by dealers who rely on financial engineering techniques, such as dynamic hedging, similar to the techniques used for other derivatives products, such as interest rate options or equity derivatives. Only the largest dealers and more sophisticated investors appear to be active in these new generation products.

The concepts covered in this annex are important for understanding why notional exposures are often not a meaningful measure of risk. In addition, credit portfolio products are a key part of the credit derivatives market. Much of the activity in the credit derivatives market, including trading in single-name credit default swaps, is part of the process of creating portfolio products such as synthetic CDOs and single-tranche CDOs.

1. The mechanics, economics, and risks of CDOs

1.1 CDO mechanics

This section is based on a stylised example of a \$1 billion synthetic CDO with three tranches (see Table 1 below). The unrated equity tranche bears the first \$30 million of losses, the single-A-rated mezzanine tranche bears the next \$70 million, and the AAA-rated senior tranche bears any losses above \$100 million. In this example, the reference portfolio consists of 100 single-name credit default swaps of \$10 million each with an average spread of 60 basis points and an average credit rating of single-A. Such a synthetic CDO could be issued by a commercial bank choosing the credits for the reference portfolio based on its desire to hedge loans on its balance sheet.¹⁹ Or, the synthetic CDO could be underwritten by an investment bank on behalf of an asset manager who chooses the reference portfolio based

¹⁸ A credit derivative in which the protection seller provides protection on the 1st, 2nd, 3rd, or Nth default in a basket of names.

¹⁹ Some commercial banks interviewed by the working group have done such transactions in the past to hedge balance sheet risk. However, they currently favour single-name credit default swaps over portfolio products such as CDOs due to greater flexibility and more favourable pricing.

on fundamental credit analysis and has limited rights to actively manage the reference portfolio.

Table 1: A stylised hypothetical CDO
(dollar amounts in millions)

Tranche	Attachment points	Notional amount	Credit rating	Spread (basis points)
Equity	0-3%	30	Not rated	1200
Mezzanine	3-10%	70	A	200
Senior	10-100%	900	AAA	10
MEMO:				
Entire portfolio	0-100%	1,000	A	60

The three tranches are typically sold to different investors. In fact, some of the economic value of a CDO stems from its ability to create credit risk-sensitive assets whose risk-return characteristics are tailored to certain investor classes. The equity tranche, which in our example pays a maximum of LIBOR + 12%, may be sold to a professional asset manager managing money on behalf of institutional clients or to a hedge fund. The mezzanine tranche, paying LIBOR + 2%, may be sold to a regional bank looking to diversify its credit exposures. The senior tranche, paying LIBOR + 10 basis points, may be sold to a reinsurer or other investor looking for low-risk, low return assets.²⁰

In our example, all three tranches are funded; that is, when the CDO is created, investors pay in the principal amount of their tranches and any defaults cause a writedown of principal. Investors' principal is put into a collateral account and invested in government securities or AAA debt.²¹ CDOs with unfunded tranches are also common. Unfunded tranches are structured as swaps with no up-front payments. Investors receive periodic spread payments and are required to make a payment when a default affects their tranche. Because unfunded tranches rely on the investors' future ability and willingness to pay into the CDO, they create counterparty credit risk that must be managed.

Suppose that in the first three months of our stylised synthetic CDO's existence, no defaults occur in the reference portfolio. At the first quarterly interest payment date, the CDO receives quarterly payments on the reference portfolio's 100 single-name credit default swaps, as well as interest on the collateral account. It distributes the interest received according to a "waterfall" of payments. First the senior tranche receives (LIBOR + 10 basis points)/4 on its

²⁰ The weighted-average spread on the three tranches is 59 basis points, compared with 60 basis points on the reference portfolio. If this difference is not sufficient to pay deal structuring and asset management fees, which typically have first priority on the cashflows from the reference portfolio, the most subordinated tranche (the equity tranche) would receive less than its maximum spread of 1200 basis points. Note also that the weighted-average spread on the tranches is expected to decline over time as defaults reduce the principal of the high-yielding equity tranche.

²¹ The CDO tranches are issued by a special purpose vehicle (SPV), which sources credit risk by selling protection via credit default swaps. The government securities support the SPV's obligation to perform on the credit default swaps.

principal balance of \$900 million. (Amounts are divided by 4 because payments are quarterly.) Next, the mezzanine tranche receives $(\text{LIBOR} + 2\%)/4$ on its principal balance of \$70 million. Then, the equity tranche receives up to a maximum of $(\text{LIBOR} + 12\%)/4$ on its principal balance of \$30 million. Some of the equity tranche spread could be deferred to later payment dates through structural means, such as subordination to a reserve account. If any excess spread remains, the details of the CDO structure determine what happens to it. It could be paid out to equity investors, paid out to the asset manager as an incentive fee, held in a reserve account as an extra credit enhancement, or some combination of these.²²

Suppose that in the fourth month, XYZ Inc., one name in the reference portfolio, defaults. If the recovery rate on XYZ's debt is 40%, the CDO will take a loss of \$6 million on the \$10 million notional single-name credit default swap referencing XYZ. This loss will cause a writedown of the principal amount of the equity tranche by \$6 million. Other tranches would not suffer principal writedowns, but their mark-to-market value would fall because the smaller equity tranche now provides less credit enhancement than before the default.

The default event demonstrates how CDOs transfer credit risk. Suppose the CDO's counterparty on the single-name credit default swap referencing XYZ, Inc. was a bank with a loan outstanding to XYZ, Inc. That bank receives a payment of \$6 million on the credit default swap that can offset some of the loss on its loan to XYZ. Investors in the CDO, especially the equity tranche investors, bear the loss. The bank's exposure to XYZ's default has been transferred to the CDO investors.

1.2 CDO economics

How do CDOs make economic sense when they merely rearrange the payment priority of already-existing credit-risk-sensitive bonds and loans? In a recent paper, Duffie and Garleanu give two answers.²³ First, CDOs help investors overcome market imperfections associated with the illiquidity of bonds and loans. Few corporate bonds trade more than twice a day.²⁴ Loans trade even less frequently. Illiquidity makes it costly for credit investors to assemble a portfolio that meets their diversification and risk-return targets. Interviewed banks report that efficiently managing their credit risk portfolio is the dominant motive for their participation in CRT markets.

The economic value of a CDO is apparent in the fact that the CDO's spread income from the reference portfolio can compensate investors in the CDO tranches and also pay deal structuring and asset management fees. The rapid adoption of CDO technology by credit investors suggests that the cost of creating a CDO is less than the cost a credit investor would incur to assemble a portfolio of bonds and/or loans to meet the investor's diversification and risk-return targets. The high cost of investing directly in a portfolio of bonds or loans is presumably driven by the high bid-ask spreads an investor would pay, reflecting the illiquidity of bond and loan markets.

The second motive for CDO activity is that regulatory capital requirements on credit risk are often above the economic capital the market requires to bear the risk (see section 3.3,

²² This description oversimplifies the waterfall – see the appendix for a detailed example of a cash CDO waterfall.

²³ Darrell Duffie and Nicolae Garleanu, "Risk and Valuation of Collateralized Debt Obligations," *Financial Analysts Journal*, January/February 2001, pp. 41-59.

²⁴ Among the roughly 5,000 corporate bonds for which secondary market transaction data are disseminated on the NASD's trade reporting system (TRACE), only about 250, or 5%, traded fifteen times or more in the seven days ending January 29, 2004.

below). Banks cited reducing regulatory capital as a motive for their participation in CRT markets, more so in the early days of the CRT market than today.

1.3 The risk of CDO tranches

Clearly the equity, mezzanine, and senior tranches of CDOs have quite different risk characteristics. Market participants measure the risk of CDO tranches in various ways. In this section, we discuss three risk measures.

- The sensitivity of the tranche's value to credit spreads on the names in the reference portfolio.
- The tranche's expected loss (EL) from defaults in the reference portfolio occurring up to the maturity of the CDO.
- A level of loss due to default that is one standard deviation above the tranche's expected loss. This is one measure of unexpected loss (UL).²⁵

These risk measures are computed using a pricing model that reflects current credit spreads on the reference portfolio, assumptions about default correlations, and other modelling assumptions.²⁶

Before discussing the three risk measures, it is worth noting that risk measures are generally not additive. That is, the risk of a portfolio is generally not equal to the sum of the risk of the underlying elements of the portfolio. This is a well-known property of Value-at-Risk, the most common risk measure used in the market, and it is true for two of three risk measures discussed here, sensitivity and unexpected loss (UL). However, expected loss (EL) does happen to be additive.²⁷

Table 2 shows these three risk measures for the tranches of the hypothetical CDO described above.²⁸ All three risk measures tell the same basic story: The equity tranche, with only 3% of the notional exposure, has by far the most risk. The senior tranche, with 90% of the notional exposure, has very little risk. The message from Table 2 is that, for CDO tranches, notional exposure is not a meaningful way to measure risk.²⁹

²⁵ Other measures of UL are also commonly used among market practitioners. For example, a high percentile of the loss distribution, rather than a standard deviation-based UL measure, is often used for economic capital purposes. While different measures of UL would yield different numbers, they would generally produce the same ranking of risk across tranches.

²⁶ The industry standard model is called the "normal copula model". It is described in a large number of papers, including the following: David Li, "On default correlation: a copula function approach," *Journal of Fixed Income*, March 2000, pp. 115-118; Hans Boscher and Ian Ward, "Long or short in CDOs," *Risk*, June 2002, pp. 125-129; Leif Andersen, Jakob Sidenius, and Susanta Basu, "All your hedges in one basket," *Risk*, November 2003, pp. 67-72.

²⁷ EL adds up across tranches because it is computed as a mathematical expectation. An expectation is additive: the expectation of a sum is equal to the sum of the expectations.

²⁸ The key assumptions behind these calculations, for those who wish to replicate them, are: individual default rates of 1% per year (hazard rates), recovery rate fixed at 40%, constant asset correlation of 30%, and correlations are driven by a single common risk factor, assumed to be normally distributed.

²⁹ Some readers have wondered why the mezzanine and senior tranches have any expected loss at all, given that the EL of the entire portfolio (\$29.2 million) is less than the size of the equity tranche (\$30 million). It is true that most of the time, only the equity tranche will suffer any losses due to default. This implies that the median loss on the mezzanine and senior tranches is zero. However, the EL is computed as the mean (not median) loss. The mean loss on the mezzanine tranche is not zero because there is some positive probability that the equity tranche will take 100% losses and further defaults will hit the mezzanine tranche. In the numerical example used to compute the risk measures in Table 2, this probability is 29%. A similar argument applies to the senior tranche. In the numerical example, the probability that the mezzanine tranche takes

One implication of the disconnect between notional exposure and risk is that traditional credit risk disclosures, focusing on balance sheet exposure amounts, are inadequate for firms that are active in the CRT market. Disclosure is discussed further in the main text of the report.

Table 2: Risk measures of hypothetical CDO tranches (dollar amounts in millions)

Tranche			Sensitivity to 10bp shock to credit spreads		Expected loss (EL)		Unexpected loss (UL)	
	Attachment points	Notional amount	Dollar amount	Percent of notional	Dollar amount	Percent of notional	Dollar amount	Percent of notional
Equity	0-3%	30	1.9	6	15.3	51	27.6	92
Mezzanine	3-10%	70	2.0	3	10.5	15	31.5	45
Senior	10-100%	900	1.0	0.1	3.4	0.4	22.1	2.5
MEMO:								
Entire portfolio	0-100%	1,000	4.2	0.4	29.2	2.9	71.3	7.1

The risk measures in Table 2 can be used to assess the leverage of CDO tranches. Table 3 uses the three risk measures to compare the leverage of the equity, mezzanine, and senior tranches. Leverage is computed by dividing each tranche's risk, expressed as a percent of notional amount, by the risk of the entire portfolio. When computed this way, a cash investment in bonds or loans has leverage equal to one by construction.

Table 3: Leverage of CDO tranches (relative to a cash investment in the entire portfolio)

Tranche			Leverage computed using:		
	Attachment points	Notional amount	Sensitivity	Expected loss (EL)	Unexpected loss (UL)
Equity	0-3%	30	15x	17x	13x
Mezzanine	3-10%	70	7x	5x	6x
Senior	10-100%	900	0.3x	0.1x	0.3x
MEMO:					
Entire portfolio	0-100%	1,000	1x	1x	1x

The leverage numbers in Table 3 suggest that the hypothetical equity tranche has 13-17 times the risk of a cash investment in bonds or loans. (The higher expected return on the equity tranche compensates investors for bearing this risk.) The mezzanine tranche, although it may have an investment grade credit rating, has 5-7 times the risk of a cash investment. The senior tranche has much less risk than a cash investment.

CDO tranches are also exposed to correlation risk. The pricing of CDO tranches reflects investors' expectation of how correlated defaults will be throughout the life of the CDO. A higher correlation of defaults implies a greater likelihood that losses will wipe out the equity and mezzanine tranches and inflict losses on the senior tranche. Thus, the value of the senior tranche falls as correlation rises. Conversely, higher correlation not only makes the extreme case of many defaults more likely, it also makes the extreme case of very few defaults more likely. Thus, the value of the equity tranche rises as correlation rises. Equity tranche investors gain more in a scenario with very few defaults than they lose from a scenario with many defaults (they are only exposed to the first few defaults). The effect of

100% losses and further defaults hit the senior tranche is 7%. The positive ELs of the mezzanine and senior tranches reflect the losses that would occur in these low-probability cases.

correlation on mezzanine investors can go either way, depending on the relative sizes of the equity, mezzanine, and senior tranches. Correlation risk is discussed further in section 2.2 below.

1.4 CDO tranches are sensitive to the business cycle

Because CDOs are sensitive to correlation, and correlation of defaults is typically driven by the business cycle, the correlation risk of CDO tranches can also be characterised, and measured, as “business cycle risk”. Market participants have developed credit risk models where each credit’s default risk depends on a common, macroeconomic risk factor and an idiosyncratic risk factor. (These models are similar to the credit risk model underlying the Basel II proposal.) Using such a model, we can compute the exposure of each of the tranches of our hypothetical CDO to business cycle conditions. Specifically, we can compute the expected loss (EL) on the CDO tranche conditional on a certain value of the common factor.

Table 4 shows such a calculation. Three different business cycle conditions are considered: boom, trend growth, and recession. These correspond to setting the common factor driving defaults at its 10th, 50th, and 90th percentiles, respectively. The table shows both the dollar amount of each tranche’s EL in the boom, trend growth and recession scenarios, and the EL as a percent of the tranche’s notional amount.

Table 4: Expected loss on hypothetical CDO tranches varies with the common macroeconomic risk factor (dollar amounts in millions)

Tranche			Macroeconomic environment					
Attachment points	Notional amount	Boom		Trend growth		Recession		
		Expected loss	Percent of notional	Expected loss	Percent of notional	Expected loss	Percent of notional	
Equity	0-3%	30	1.4	5	14	47	30.0	100
Mezzanine	3-10%	70	0	0	0.3	0.4	44.8	64
Senior	10-100%	900	0	0	0	0	1.3	0.1
MEMO: Entire portfolio	0-100%	1,000	1.4	0.14	14.3	1.4	76.1	7.6

Note: “Boom” corresponds to setting the common macroeconomic risk factor at its 10th percentile, “trend growth” corresponds to the 50th percentile, and “recession” corresponds to the 90th percentile.

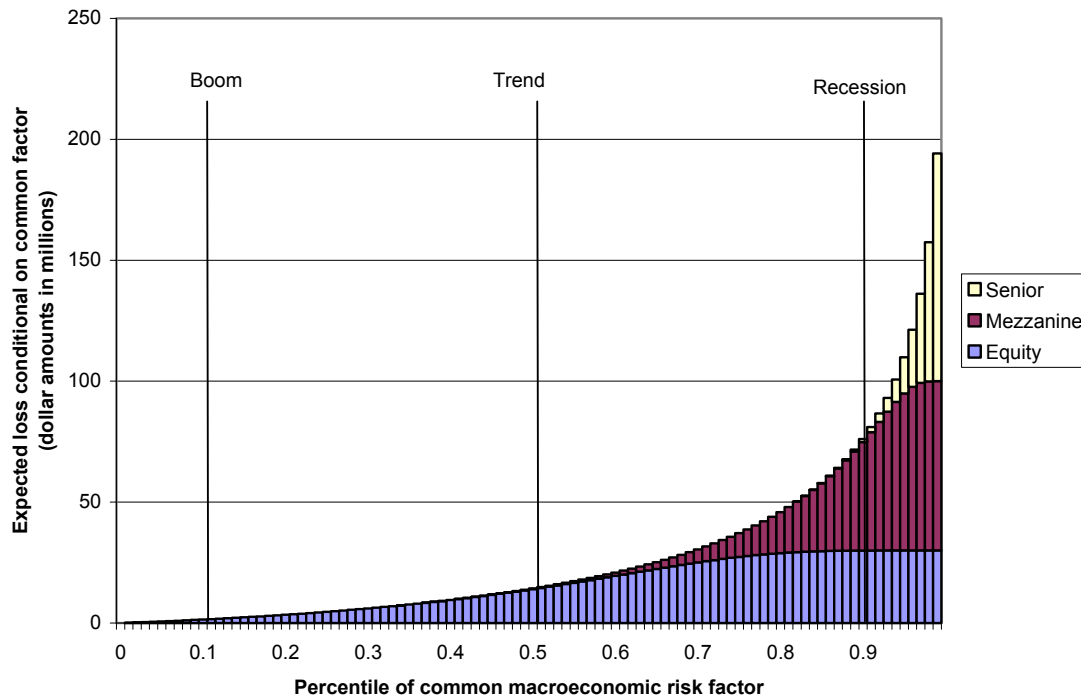
The equity tranche, in a first-loss position, expects to bear defaults of about half its notional amount, even in a trend growth macroeconomic scenario. The equity tranche’s high EL goes hand in hand with the high spread it earns.

The mezzanine tranche, in a second-loss position, suffers no losses in a boom and almost none in a trend growth scenario, but suffers most of the portfolio’s EL in a recession. In this sense, mezzanine tranches are leveraged bets on business cycle risk. Compare the mezzanine tranche with the entire portfolio. An investor would typically earn several hundred basis points more in spread on a mezzanine tranche than on the reference portfolio. In exchange, the mezzanine investor is exposed to a loss of 64% of principal in a recession scenario, compared with 7.6% on the reference portfolio.

The senior tranche suffers very little loss even in a recession scenario. Figure 1 below shows the expected loss on the three tranches across a full range of macroeconomic shocks (1st to

99th percentile). At around the 96th percentile common factor shock, the senior tranche begins to see its principal significantly eroded by additional losses. Of course, prior to maturity, the senior tranche could suffer mark-to-market losses under any scenario, but most particularly a recession.

Figure 1: Correlation between expected loss on hypothetical CDO tranches and macroeconomic conditions



1.5 Risk transfer is limited when the equity tranche is retained

In CDOs that transfer exposures off a firm's balance sheet, the CDO originator often retains the first-loss equity tranche. There are two sound reasons for this practice. First, to limit informational asymmetry: because the CDO arranger chooses which credits are put into the reference portfolio, and often retains monitoring or servicing responsibility for credits they originated, they can influence the performance of the reference portfolio. CDO investors prefer the CDO originator to have its own money at stake, in a first-loss position. This puts the CDO originator's profitability, as well as its reputation, at stake. Second, the CDO originator may find the equity tranche to be a good match for its desired risk-return and diversification targets.

We earlier described how the equity tranche bears a large share of the CDO's risk but only a small share of the notional exposure amount. When a bank transfers credits from its balance sheet into a CDO but retains the equity tranche, it has transferred nearly all of the notional exposure but much less of the credit risk. Banks often did such balance sheet CDOs where equity tranche risk was retained, especially in the early days of the CRT market (late 1990s), but some market participants may not have understood that the amount of risk transfer occurring in these transactions was small.

1.6 CDO structuring

So far our discussion of CDOs has been stylised. In reality, the structure of a CDO transaction can be unique and can dramatically affect the returns that CDO investors earn. Three important elements of a CDO's structure are:

- the payment waterfall: the contractual terms that determine the priority of cashflows out of the CDO;
- “trigger” provisions that give additional credit enhancement to senior tranches by diverting cashflows away from more junior tranches to more senior tranches if the reference portfolio par value or interest proceeds decline below a certain level;
- covenants restricting the CDO asset manager's choice of credits; for example, a lower bound on the average credit rating or average spread of the reference portfolio, or an upper bound on the percent of the reference portfolio invested in assets rated Caa or below.

An appendix to this Annex discusses a hypothetical CDO waterfall for a cash CDO in more detail.

Interviewed firms agreed that, in the early days of the CRT market, some CDO investors paid too little attention to the details of the CDO structures they were investing in. These investors did not look past the CDO tranche's credit rating to fully understand the structural features of the CDO. Subsequently, these investors were surprised by the poor performance of some of their CDO investments.

Interviewed firms reported that market participants have learned from their mistakes. CDO investors are now more aware of the details of CDO structures and are more willing to negotiate for structural features that are to their benefit. However, some CDO investors, mainly second-tier players, reportedly still focus on the credit rating of CDO tranches when making their investment decisions. Supervisors of second-tier firms that are investing in CDOs should aim to find out whether their firms fall into this latter category and, if so, ensure that these firms either upgrade their due diligence of CDO investments or limit their CDO investments to an amount they can afford to lose.

2. The recent evolution of credit portfolio products

2.1 Single-tranche CDOs

In a traditional CDO, the underwriter purchases and warehouses a portfolio of bonds, loans, or credit default swaps and, as close to simultaneously as possible, places the equity, mezzanine, and senior tranches of the CDO's capital structure with investors. Except when the underwriter retains a tranche on its books or earns an ongoing fee as CDO asset manager, its risk exposure is limited to the time from when the credit risk is warehoused until the CDO tranches are sold. After all the tranches of a traditional CDO are sold, the underwriter no longer has exposure to the credits in the CDO's portfolio.

One difficulty for underwriters in a traditional CDO is that all tranches, across the entire capital structure, must be sold in order to do the deal. If no senior investors can be found, the deal cannot be done no matter how eager the equity and mezzanine investors are. Because it has become difficult for dealers to find investors across the entire capital structure at the same time, dealers have recently begun to offer single-tranche CDOs to investors. Thanks to the added flexibility of single-tranche CDOs, they now outnumber full capital structure CDOs among new deals, according to market observers.

In a single-tranche CDO, a dealer sells only one tranche of the capital structure to an investor, effectively buying credit protection on the tranche from that investor. As a hedge, instead of selling protection on the entire reference portfolio as in a traditional CDO, the dealer hedges its exposure on just the single tranche that is sold by selling credit protection on the names in the reference portfolio in an amount that offsets the dealer's exposure to spread movements or defaults in those names. These amounts change over time as the level of credit spreads changes, thus single-tranche CDOs require dynamic hedging.

The three tranches of the hypothetical CDO presented earlier in this section can be used to illustrate the calculation of single-tranche CDO hedge amounts. Table 5 shows the hedge positions that would be needed if a dealer sold one of these tranches singly. The hedge instruments are 5-year single-name CDS on the 100 underlying credits in the reference portfolio.³⁰ Because the hypothetical CDO assumes that all credits in the reference portfolio have the same single-name CDS spread, the hedge position is the same for each of the 100 reference credits.³¹ For example, the second row of the table shows that a dealer who has sold the mezzanine tranche to an investor would sell \$4.71 million of protection on each of the 100 names in the reference portfolio, or \$471 million in total, to hedge the spread risk of the mezzanine tranche. In contrast, a dealer who sold all three tranches in a traditional synthetic CDO would assemble the entire reference portfolio by selling \$10 million of protection on each name, or \$1 billion in total.

Table 5: Hedge positions required for dynamic hedging of single-tranche CDOs
(dollar amounts in millions)

Tranche	Hedge position			
	Attachment points	Notional amount	Protection sold on each reference credit	Total of 100 reference credits
Equity	0-3%	30	4.83	483
Mezzanine	3-10%	70	4.71	471
Senior	10-100%	900	2.17	217

The dynamic hedging of single CDO tranches presents dealers with four new risk management challenges that are not present in traditional CDOs. First, the dealer must calculate the hedge positions (or “deltas”) of each credit default swap in the reference portfolio. These deltas are model-dependent, thus single-tranche CDOs leave dealers with model risk that would not exist with a traditional CDO. Second, as deltas change over time and the dealer dynamically adjusts its hedges, it is exposed to liquidity risk. The credit default swap market may not have enough liquidity for the dealer to adjust its hedge as desired without incurring high trading costs. Third, as discussed in more detail in the following paragraphs, a dealer prefers to be hedged against both small moves in credit spreads (“spread risk”) and unexpected defaults (“jump-to-default risk”). Hedging against both risks adds complexity that the simple example in Table 5 ignores. Fourth, the value of a single tranche CDO depends on the correlation assumption that is used to price and hedge it. Since

³⁰ Computing the size of each tranche's hedge position relative to the tranche notional would produce another measure of leverage and would give comparable numbers to those shown in Table 3.

³¹ In a realistic portfolio, where spreads and correlations can differ across reference credits, the hedge positions also vary across credits. For such a portfolio, each row of Table 5 would have 100 hedge positions, one for each credit in the reference portfolio.

default correlation is unobservable, a dealer is exposed to the risk that its correlation assumption is wrong (“correlation risk”).

Although delta hedging a sold single-tranche CDO can largely eliminate a dealer’s exposure to a small move in credit spreads, it can expose a dealer to the risk that the tranche and the hedge position respond differently to a large move in credit spreads or to a default of one of the underlying credits. Market participants refer to this as “convexity” or “gamma” risk in the case of spread widening, or “jump-to-default” risk in the case of default.

Table 6 shows a measure of gamma risk for the three hypothetical CDO tranches. The top panel of the table considers a large increase in a single reference credit’s spread, including an instantaneous default (“jump to default risk”). The bottom panel considers a large increase in the credit spreads of all the underlying reference credits. “Gamma risk” is measured here as the dealer’s mark-to-market profit or loss on a sold single-tranche CDO that has been delta-hedged by selling 5-year single-name CDS protection on the reference portfolio.

Table 6 : Gamma risk of sold single-tranche CDOs hedged with single-name CDS
(dollar amounts in thousands)

Tranche	Shock to a single reference credit spread				
	Attachment points	Notional amount	+100 bp	+500bp	Instantaneous default
Equity	0-3%	30	33	451	4,572
Mezzanine	3-10%	70	-6	-132	-1,430
Senior	10-100%	900	-18	-193	-1,025
Shock to all reference credit spreads					
			+10 bp	+20 bp	+50bp
Equity	0-3%	30	-134	-455	-2,259
Mezzanine	3-10%	70	12	28	-25
Senior	10-100%	900	88	310	1,690

Three aspects of gamma risk and jump-to-default risk are worth noting. First, gamma (and jump-to-default) risk affect the various tranches differently. The equity tranche and the senior tranche have opposite exposures to gamma risk, with the mezzanine tranche falling in-between the other two. One implication is that a dealer can reduce its exposure to gamma risk by balancing its activity across all tranches of the capital structure. Second, gamma risk for single credit spreads and for all credit spreads generally have opposite signs. Third, the table assumes that 5-year CDS are used as a hedge. Over time, the maturity of the CDO will shrink toward zero, but due to the illiquidity of the CDS market away from the 5-year maturity, the hedges will likely remain at the 5-year maturity point, creating a maturity mismatch. If CDS at maturities other than 5-years were liquid, they could be used to hedge away some of the gamma and jump-to-default risk.

Given the less-than-perfect liquidity of the credit default swap market and the many new risks that a seller of single tranche CDOs has to manage, market participants report that risk management of these products is currently more of an art than a science.

2.2 First-to-default baskets and correlation trading

The growth of new portfolio products, such as single tranche CDOs and nth-to-default baskets, has given rise to what is known as “correlation trading”. By delta hedging a single-

tranche CDO, a dealer can eliminate most, if not quite all, of its sensitivity to the individual credit spreads in the reference portfolio. What remains unhedged is the exposure to correlation. When market participants disagree about the correct correlation to apply to a CDO tranche, they will put different values on the tranche. Those who put a lower value on the tranche will sell to those who give the tranche a higher value. Different perceptions of hedging costs, different model structures or model parameters can also lead market participants to disagree about the value of single CDO tranches.

First-to-default baskets are another example of a correlation product. An investor in a first-to-default basket receives a periodic spread payment and agrees to bear a loss when any one of a specified group of credits defaults. Like equity and mezzanine tranches of CDOs, first-to-default baskets offer leveraged exposures to credit risk and their value depends on correlation. Like equity tranches, first-to-default baskets have a first loss exposure to the reference portfolio. Unlike CDO tranches, first-to-default baskets typically involve small reference portfolios.³²

Table 6 shows a hypothetical example of a first-to-default basket. The five credits in the basket are shown on the left-hand side of the table, along with their single-name CDS spreads at the five-year maturity. The right-hand side of the table shows why first-to-default baskets are a “correlation product”. The table shows the spread at which the first-to-default basket would be priced, for different levels of correlation across credits. An investor who thinks the correct correlation is 0.7 could purchase the first-to-default basket from a dealer who thinks the correct correlation is 0.3 and receive 301 basis points of spread for a risk that the investor thinks should only be worth 217 basis points. The table also shows how the mark-to-market value of the first-to-default basket changes with correlation, assuming an initial correlation of 0.3. As the example shows, investors with different views on correlation will see value in trading correlation products.

Correlation trading is the most sophisticated segment of the CRT market. Reportedly, large dealers and sophisticated hedge funds are most active in this market segment.

Table 7: Correlation risk in a first-to-default basket

Reference portfolio (\$10 million notional in each credit)		Correlation	First-to-default basket par spread (basis points)	Change in first-to-default basket's mark-to-market value from initial correlation=0.3 (dollars)
Name	5-year CDS spread			
BAE Systems	80	0	352	-195,000
Deutsche Telekom	67	0.1	337	-136,000
General Motors	146	0.2	320	-71,000
Nokia	25	0.3	301	0
Norfolk Southern	34	0.4	282	76,000
		0.5	261	158,000
		0.6	240	245,000
		0.7	217	338,000
		0.8	193	438,000
		0.9	168	548,000

³² According to one market survey, five is the most common number of credits referenced in first-to-default baskets.

2.3 New underlying assets in CDOs

The collateral types put into a CDO have expanded beyond investment-grade and high-yield corporate credits in recent years. In particular, it is now common to see CDOs of asset-backed securities, such as residential or commercial mortgage-backed securities and consumer-loan-backed securities. As credit spreads tightened in 2003, lower yields on corporate debt encouraged CDO arrangers to use asset classes other than corporate debt as collateral in CDOs.

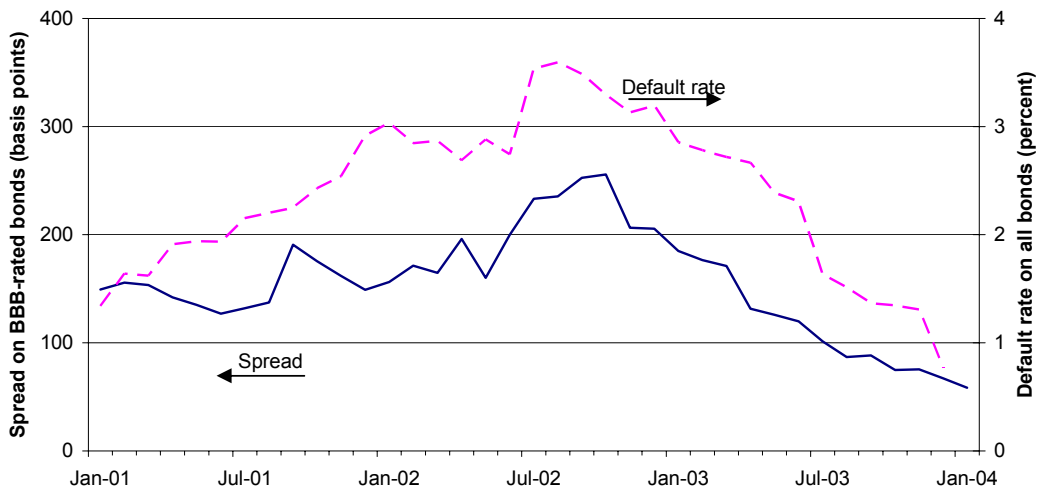
In addition to asset-backed securities, other new collateral types have been used in a handful of CDOs. These include private equity investments, hedge fund-of-funds, and middle market (SME) loans. In addition, CDOs have been issued using CDO tranches as collateral (known as “CDO-squared”). In some cases, these “CDO-squared” deals represent a repackaging of CDO tranches that have become unattractive in the market (perhaps because they have been downgraded). The more sophisticated market participants, including rating agencies, have developed models that look through to the underlying credits in the CDO tranches in order to analyse CDO-squared deals.

2.4 The effect on CRT markets of recent dramatic moves in credit spreads

Another recent development that was cited repeatedly in discussions with market participants is the significant rise and fall in credit spreads and default rates that has occurred over recent years, as shown in Figure 2.

Several market participants indicated that the demand for credit protection grew substantially in the wake of the increase in investment grade default rates witnessed in the years leading up to 2002. As one presentation to the Working Group noted, this “created an environment where default risk was a tangible event and the cost of hedging was a rational expense in relation to the potential losses.” At the same time, wide credit spreads made it relatively easy to structure CDOs using investment grade credits as collateral and have enough spread income to compensate CDO investors, structures, and asset managers.

Figure 2: Spreads and default rates on US corporate bonds, 2001-2003



Source: Merrill Lynch and Moody's Investors Service. Default rate is 12-month trailing average.

Over the course of 2003, however, spreads and default rates declined as credit conditions improved considerably. Market participants noted that both supply and demand factors in the CRT market helped to push down spreads. Demand for protection fell when banks became more reluctant to hedge as credit conditions were perceived to improve. At the same time, the larger spreads in prior years had induced additional sellers of credit protection to enter the market. Narrow spreads made it harder to structure traditional CDOs with investment grade credits as collateral. In response, underwriters shifted to new collateral types (ABS, CDO-squared) and to single-tranche deals.

2.5 The growth of CDS indices

Interviewed firms report that the growth of credit index products is a significant development in the CRT market. Two major families of indices, TRAC-X and iBoxx, have begun trading in recent years. Each index family is promoted by about a dozen dealers and consists of broad market indices segmented by geography (for example, separate indices for the United States, Europe, Japan, emerging markets), by investment grade/high yield, by sector (financials, industrials, etc.), and by maturity (five year/ten year). Although the index composition rules differ somewhat across indices, each index aims to include the large, liquid credits in a particular market segment. The indices trade OTC in funded form (as credit-linked notes) or in unfunded form (as credit default swaps). Exchange-traded forms of these indices are reportedly under development. Dealers are heavily promoting these index products to investors as an easy way to gain diversified exposure to a sector of the credit markets.³³

As an example of the composition of these credit indices, Table 8 lists the names that were included in the TRAC-X Europe (investment grade) and iBoxx CDX.NA.IG (North America Investment Grade) indices at January 2004.

Investors cite liquidity as the key reason for the popularity of credit indices. Thanks to the support of many dealers, investors describe liquidity in the indices as excellent, even when the single-name CDS market is less liquid. It takes only one minute to invest 250 million USD in a diversified credit portfolio using a single trade in an index. To assemble such a portfolio using cash bonds could take two weeks. For those who are actively trading credit risk as an asset class, indices provide a useful trading tool for taking on or hedging macro exposures. Using sector-level sub-indices, index products can be used for taking relative value positions on the outperformance or underperformance of a given sector, just as in equity markets.

Dealers are attempting to create sub-indices that meet investors' needs. One example is the TRAC-X "High Beta" sub-indices, which consist of the high-spread names within a given index sector. This caters to investors seeking a high-risk, high-return exposure to credit risk. Another example cited by one interviewed bank is the Select Aggregate Market Index, or SAMI, created by Credit Suisse First Boston. The reference portfolio for this index is 50 highly liquid syndicated bank loans. The interviewed bank sees the SAMI index as the closest hedge to its own loan portfolio. However, this is a new index supported by one dealer, so it remains to be seen whether it will be successful in the market.

Interviewed dealer firms are actively making markets in indices to meet customer demands. One interviewed bank is currently using indices to increase (by a small amount) its overall credit risk exposure, rather than make new corporate loans, because loan demand is weak.

³³ The TRAC-X and iBoxx indexes merged in mid-year 2004.

Another bank sells protection on an index to offset P&L swings that would otherwise occur when it buys protection on individual names to reduce concentrations.

In the latter half of 2003, tranches on the indices began to trade more frequently. Because index tranches are similar to single-tranche CDOs, index tranches allow dealers to hedge some of their correlation risk from single-tranche CDOs, may improve price transparency in the single-tranche CDO market, and may be attractive to the same investors who invest in single-tranche CDOs.

Table 8: Members of credit indices (as of January 2004)

TRAC-X Europe		iBoxx CDX.NA.IG (North America Investment Grade)	
Abbey National	Iberdrola	Ace Limited	Hartford Financial Services
ABN AMRO Bank	Imperial Chemical Industries	Aetna	Hewlett-Packard
Accor	Imperial Tobacco Group	Albertson's	Honeywell International
Adecco	ING Bank	Alcan	Ingersoll-Rand
Allianz	Investor AB	Alcoa	IBM
Arcelor	KPN	Allstate	International Lease Finance
AXA	Lafarge	Altria Group	International Paper
BAA	Lloyds TSB Bank	Amerada Hess	Jones Apparel Group
BAE Systems	LVMH	American Electric Power	Kraft Foods
Banca Intesa	Metro	American Express	Kroger Co.
Banco Bilbao Vizcaya Arg.	MMO2	American International Group	Liberty Media
Banco Comercial Portugues	Nestle	Amgen	Lockheed Martin
Banco Espirito Santo	Nokia	Anadarko Petroleum	Loews
Banco Santander	Olivetti	Arrow Electronics	Marriott International
Bank of Scotland	Parmalat (until its default on December 24, 2003)	AT&T	May Department Stores
Barclays Bank	Pearson	AT&T Wireless	Maytag
Bayer	Peugeot	Baxter International	MBIA Insurance
Bayerische HypoVeriensbank	Philips Electronics	Bellsouth	MBNA
Bayerische Motoren Werke	Portugal Telecom	Boeing	McDonald's
Bertelsmann	Renault	Bombardier	Meadwestvaco
Boots Group	Reed Elsevier	Bristol-Myers Squibb	MetLife
British American Tobacco	Repsol YPF	Burlington Northern Santa Fe	Motorola
British Telecommunications	Reuters Group	Campbell Soup	National Rural Utilities Coop
Cadbury Schweppes	Rolls-Royce	Capital One Bank	Newell Rubbermaid
Carlton Communications	Royal Bank of Scotland	Carnival	News America
Carrefour	RWE	Caterpillar	Nordstrom
Casino Guichard Perrachon	San Paolo IMI	Cendant	Norfolk Southern
Commerzbank	Siemens	Centex	Northrop Grumman
Compagnie de Saint-Goban	Societe Generale	Chubb	Omnicom Group
Continental	Sonera	Cigna	Progress Energy
Credit Lyonnais	STMicroelectronics	Cingular Wireless	Pulte Homes
Credit Suisse Group	Standard Chartered Bank	CIT Group	Raytheon
DaimlerChrysler	Suez	Citizens Communications	Rohm and Haas
Deutsche Bank	TDC	Clear Channel Comm.	Safeway
Deutsche Lufthansa	Telecom Italia	Comcast Cable Comm.	SBC Communications
Deutsche Telekom	Telefonica	Computer Associates	Sears Roebuck
Dixons Group	TeliaSonera	Computer Sciences	Sempra Energy
Dresdner Bank	Thomson	Conagra Foods	Simon Property Group
DSM	UBS	ConocoPhillips	Southwest Airlines
E.On	Unilever	Constellation Energy Group	Sprint
Electricidade de Portugal	United Business Media	Countrywide Home Loans	Sun Microsystems
Electricite de France	Valeo	Cox Communications	Target
Endesa	Vattenfall	CSX	Textron Financial
Enel	Veolia Environnement	Deere & Company	Time Warner
Finmeccanica	VNU	Delphi	Toys "R" Us
France Telecom	Vodafone Group	Devon Energy	Transocean
GUS	Volkswagen	Dominion Resources	Tyson Foods

TRAC-X Europe		iBoxx CDX.NA.IG (North America Investment Grade)	
Hellenic Telecommunications	Volvo	Dow Chemical	Union Pacific
Hilton Group	Wolters Kluwer	Duke Energy	Valero Energy
HSBC Bank	WPP Group	E.I. du Pont de Nemours	Verizon
		Eastman Chemical	Viacom
		Eastman Kodak	Visteon
		Electronic Data Systems	Wal-Mart Stores
		EOP Operating Limited Partnership	Walt Disney
		Freddie Mac	Washington Mutual
		Fannie Mae	Wells Fargo
		Federated DepartmentStores	Weyerhaeuser
		FirstEnergy	Whirlpool
		Ford Motor	Wyeth
		General Electric	XL Capital
		General Mills	
		General Motors	
		Goodrich	
		Halliburton	
		Harrah's	

Appendix: CDO payment waterfall

In most traditional CDOs, the credit risk of a reference portfolio is divided into tranches with different seniority. The senior tranches are more creditworthy than the junior tranches because they have a higher priority in receiving cashflows from the reference portfolio.

Contractual provisions known as “triggers” give additional protection to senior tranches. If defaults cause the reference portfolio par value or interest proceeds to decline below a trigger level, cashflows from the reference portfolio are diverted to pay down the principal balance of senior tranches before more junior tranches can receive interest and principal payments.

The set of contractual terms governing the payout of interest and principal payments on the reference portfolio is called a “waterfall.”

As an example, take a hypothetical cash arbitrage CDO referencing a portfolio of high-yield bonds and structured as follows:

Reference portfolio	CDO tranches				Fees	
	Class	Amount	Rating	Spread		
EUR 200 million portfolio of high-yield bonds (weighted average coupon=9.85%)	A	150 MEUR	AAA	55 bp	Deal structuring (includes underwriting, legal, trustee, rating agency)	150 bp of notional, amortised over 8 years at 4% interest
	B	13 MEUR	BBB	245 bp	Asset manager	50 bp per annum (senior) + 25 bp per annum (subordinated) + contingent fee after equity tranche hurdle rate is met
	C	9 MEUR	BB	645 bp		
	D	28 MEUR	n.r.	n.a.		

In this example, for each tranche, it is possible to calculate initial and trigger levels of the par value test (also called “overcollateralisation” or “O/C” test) and the interest coverage test for the various hypothetical CDO tranches. The par value, or O/C, ratio of each tranche is the ratio of reference portfolio par value to principal outstanding on that tranche and the more senior tranches. The interest coverage, or I/C, ratio of each tranche is the ratio of interest proceeds on the reference portfolio to the interest due on that tranche plus the more senior interest and expense payments. Results are shown in table 9 below.

Table 9

Tranche	O/C		I/C	
	Trigger	Initial value	Trigger	Initial value
A	115	133	125	199
B	110	123	115	181
C	105	116	105	165
D	n.a. (equity tranche has no O/C or I/C test)			

The interest proceeds waterfall for this hypothetical CDO at the deal's inception (before any defaults in the reference portfolio) is shown in table 10 below, assuming EUR Libor is 5.10 percent. The reference portfolio produces semi-annual interest of €9.85 million to be paid out. The first payments go to the deal structuring fees (amortised over the life of the transaction) and part of the asset manager's fee. Next, each of the A, B, and C tranches receive their interest payments. Because the O/C and I/C triggers have not been breached, there are no early paydowns of principal. After the asset manager receives the rest of its fee, the D (equity) tranche receives the remaining cashflow.³⁴

Table 10

Semi- annual interest	Interest proceeds waterfall at deal inception	Amounts (MEUR)
9.85 MEUR	Deal structuring fees (senior piece)	0.22
	Asset manager fee (senior piece)	0.50
	Interest on A tranche	4.24
	If A tranche O/C and I/C tests are not met, repay principal on A, B, C tranches (in order of seniority) until tests are met.	
	Interest on B tranche	0.49
	If B tranche O/C and I/C tests are not met, repay principal on A, B, C tranches (in order of seniority) until tests are met.	
	Interest on C tranche	0.52
	If C tranche O/C and I/C tests are not met, repay principal on A, B, C tranches (in order of seniority) until tests are met.	
	Asset manager fee (subordinated piece)	0.25
	Residual: pay to D tranche, up to a hurdle rate, then to contingent asset manager fee.	3.63

The hypothetical interest waterfall shown in Table 10, though complicated, is a simplified version of a real-world interest waterfall.³⁵ Certain features often found in actual cash CDOs, such as payments into a reserve account and payments on interest rate and currency hedges, have been omitted. Waterfalls can differ substantially across CDOs, and waterfall features found in some CDOs can be missing from others.

³⁴ The waterfall for a synthetic CDO would be simpler.

³⁵ In addition, there would be a separate waterfall for principal payments, which is not shown here.

If enough defaults occur in the reference portfolio, the O/C or I/C tests can trigger changes in the waterfall. For example, Table 11 shows how the O/C and I/C tests change after several defaults in the reference portfolio. The O/C test for the C tranche is no longer met.

Table 11

Tranche	O/C		I/C	
	Trigger	Current value	Trigger	Current value
A	115	120.0	125	181
B	110	110.4	115	164
C	105	104.7	105	150
D	n.a. (equity tranche has no O/C or I/C test)			

Table 12 shows how the waterfall changes to reflect this. After interest is paid on the C tranche, the interest proceeds are diverted to pay down the principal of the A tranche by €1.5 million, at which point the O/C test is again met. The remaining cashflow goes to the subordinate piece of the asset manager's fee and then on to the D (equity) tranche.

The waterfall has ensured that the defaults in the reference portfolio impact the cashflows to the D tranche first. By using interest proceeds to pay down some of the principal of the A tranche, the credit-enhancing overcollateralisation of the A, B and C tranches has been partially restored.

Table 12

Semi- annual interest	Interest proceeds waterfall at deal inception	Amounts (MEUR)
8.87 MEUR	Deal structuring fees (senior piece)	0.22
	Asset manager fee (senior piece)	0.45
	Interest on A tranche	4.24
	If A tranche O/C and I/C tests are not met, repay principal on A, B, C tranches (in order of seniority) until tests are met.	
	Interest on B tranche	0.49
	If B tranche O/C and I/C tests are not met, repay principal on A, B, C tranches (in order of seniority) until tests are met.	
	Interest on C tranche	0.52
	As C tranche O/C test is not met, repay principal on A, B, C tranches (in order of seniority) until tests are met.	0.50
	Asset manager fee (subordinated piece)	0.23
	Residual: pay to D tranche, up to a hurdle rate, then to contingent asset manager fee.	2.22

Annex 2

Disclosures on credit risk transfers

The Working Group sought to assess the degree of disclosure made by firms to the public on the credit risk transfer activities in which they are involved. It did this by analysing the annual reports to stakeholders and other reports, readily available to the public, of 42 banks, investment firms and insurance companies in nine countries. The survey population includes all those firms on a list of 25 largest CD counterparties.³⁶

It should be kept in mind that not all firms participate in all aspects of CRT activity. Thus, the absence of a disclosure may mean only that the item is not significant for the firm. It would be necessary to analyse a firm's full report, not just the section on CRT instruments, to make reasonable inferences in this regard.

1. Disclosure made by banks

The population reviewed consists of 22 banks in nine jurisdictions.

1.1 Qualitative disclosures

All surveyed banks, with one exception, indicate that they use CDs to hedge the credit risk of their loan portfolios.³⁷ Only one bank explicitly states that it also hedges the credit risk in its derivatives portfolio; a few others imply that they do so. About a third of the banks indicate that they also use CDs to diversify their credit portfolios by taking on credit risk. (Diversification positions tend to be small, and so this activity may be insignificant for many banks.) Two-thirds indicate that they are involved in trading CDs with customers, that is, in intermediation. One bank goes so far as to describe the risk in its trading portfolio (its long and short positions represent different tranches of the same structures).

None of the qualitative disclosures indicate what risks, other than volatility in reported earnings, might be present in CD activity, although (as seen below), a few banks disclose risk measures.

1.2 Quantitative disclosures

About two-thirds of the surveyed banks disclose the aggregate notional size of their positions, while slightly over half disclose market values or credit exposure.³⁸ As mentioned elsewhere in this report, notional amounts are less meaningful indicators of risk exposure than market values. In addition, when national accounting rules require the disclosure of

³⁶ Fitch Ratings, *Global Credit Derivatives: Risk Management or Risk?* (March 10, 2003), p. 12.

³⁷ The exception is on Fitch's list of 25 largest CD counterparties.

³⁸ These proportions do not include CRT positions that are combined with other instruments (eg, commodity derivatives) in the published data.

financial guarantees, the amount guaranteed through credit derivatives is disclosed, even if the bank does not make a more comprehensive disclosure of its position.

The size of trading positions is generally well disclosed. Of the banks that discuss trading in CDs, 60% give the size of the positions in their trading books. Another 33% disclose only aggregate positions, those used for hedging and those used for trading combined. Most of those banks that disclose both the trading and hedging amounts of CDs indicate that the instruments used for trading comprised over 90% of the total. Thus, if aggregate positions are viewed as an approximate indication of the size of trading positions, then over 90% of the banks that discuss intermediation activities may be said to have given an indication of such positions.³⁹

One banking firm gathers all CRT exposures into one four-dimensional table, breaking down both the notional amount and market value by the type of derivative (CDS, total return swap, CLN and other), whether the protection is bought or sold, whether held in the banking book or trading book, and remaining maturity.⁴⁰ More generally, less than a fifth of the banks give information for more than one type of derivative. Some of the others may utilise predominantly just one type (CDS), so that a more detailed breakdown would not be relevant to them. About half of the banks break down their CD exposures by maturity (generally 3 or 4 bands), using notional amounts. Only in rare cases do these breakdowns distinguish between trading and hedging activities. To the extent that most positions are for trading, the distributions to a large extent reflect the intermediation activity.⁴¹ Only a small number of banks disclose the distribution over credit ratings.

A few banks – in at least three jurisdictions – disclose the credit spread component of VAR, giving its average, high and low values over the reporting period. This component reflects two sources: the spread between the bond portfolio and a riskless security and the spread on CDs. There is no indication of the relative contributions of these two sources to the component.

2. Disclosure made by securities firms

Seven investment banking firms in three jurisdictions were reviewed. Although two firms are based outside the United States, the disclosure documents (annual reports) reviewed are all based on US generally accepted accounting principles (GAAP).

2.1 Qualitative disclosures

The reviewed securities firms all discuss the purpose of undertaking CRT activity (eg, hedging proprietary positions, market-making and underwriting activity). All the firms also state that they comply with the US GAAP standard, FIN No. 45, with respect to disclosure of the financial guarantees that they have given through credit derivatives. However, FIN No. 45 does not require disclosure if the contract may be cash-settled and the firm has no basis to conclude it is probable that the counterparty had, at inception, the underlying instruments

³⁹ Not all positions in the trading book are for purposes of intermediation. CDs used to hedge the credit risk of other trading book derivatives would themselves be held in the trading book. Further, some banks may hold CDs, used to hedge credit risk in the banking book, in the trading book because regulatory capital requirements would be lower that way.

⁴⁰ Only nominal values are given for the remaining maturity dimension.

⁴¹ One bank gives a maturity breakdown for its trading positions only.

related to the derivatives contract. It leaves to firms to determine the counterparty's purpose in entering into the contract. Firms make a range of decisions in this regard. Some firms disclose all their protection sold; one firm states that certain large counterparties are excluded, and the rest do not address the issue specifically.

All surveyed firms also discuss their involvement in securitisation transactions. For example, one firm discloses that it acts as a structuring and placement agent, warehouse provider, and market maker with respect to CDO transactions.

2.2 Quantitative disclosures

Surveyed securities firms disclose the notional amount of guarantees and include, without breakdown, CDS. All firms but one also disclose the market value of the total. Just under a third of the firms also reveal the amount of collateral held against their guarantees.

Although the majority of securities firms indicate that they purchase protection through credit derivatives, none makes any quantitative disclosures of the amount. In some cases, the amount purchased may be small, at least compared to other forms of credit risk mitigation such as collateral and netting.

While many of the firms are involved in CDO activity, they vary in the quantitative disclosures they make. Some disclose the amount explicitly, giving both notional and market values, while others combine CDOs with other instruments such as mortgage-backed securities. One firm stated that its CDO positions at the reporting date were not material. Few of these disclosures indicate whether the CDOs are synthetic or traditional.

3. Disclosure made by insurance companies

The public disclosures of thirteen insurance companies in five jurisdictions, including five financial guarantors, were reviewed.

3.1 Qualitative disclosures

All insurance companies reviewed disclose, at least implicitly, their purpose in engaging in credit derivative activities. Financial guarantors are engaged in the business of providing protection for credit risks. Their quantitative disclosures make it clear that they use credit derivatives to this end, but otherwise they do not make more extensive qualitative disclosures. Other insurers state that they use credit derivatives for hedging or for diversifying investment portfolios.

One insurer indicates the creditworthiness of its portfolio by stating that it generally buys only super-senior tranches, while another insurance group states that it writes only on a second-loss basis and then describes super-senior tranches, although these two transactions are not necessarily the same. While some insurance companies are known to use CDS for replication or creation of synthetic structures, only one surveyed company explicitly mentions this in its shareholder reports, although, in the United States, they are reported in the statutory statements (Schedule DB, Part F), that are made available to the public.

3.2 Quantitative disclosures

Quantitative disclosures by the financial guarantors are more extensive than those for other insurance companies. Financial guarantors disclose the notional amounts, but not the market values, of their exposures to CRT risks. This may be caused by the desire to report credit exposures in a consistent manner. One should note that financial guarantors undertake most of their credit risks as insurance liabilities, which do not have readily available market values. The data on CRT instruments are usually broken down by type (for example, CDOs vs. other types of CRT or synthetic CDOs vs. funded CDOs), as is relevant to their business. All of the five guarantors surveyed show the distribution of risk over five credit rating categories. Three of the five give distributions over the type of reference asset (eg, high yield, loans, emerging market, mortgages, bonds, structured credit). Two of the five give the vintage year of the transaction.

Disclosures by other insurance companies tend to be simple and highly aggregated. This is consistent with the generally low level of usage of CRT instruments by insurance companies who are not financial guarantors. As most CRT instruments are undertaken on the asset side of the balance-sheet, both the aggregate notional and market values would generally be disclosed. Disclosures generally pertain to CDS, although one insurer gives separate data for replication and synthetic assets transactions. There may be a breakdown by maturity.

Annex 3

The supervisory approaches for credit risk transfers

This technical annex briefly describes the approaches used by supervisors in the three sectors to monitor credit risk transfer transactions into which organisations in their jurisdictions enter. It is based on the responses provided by the Working Group members to a questionnaire prepared by the group. This survey thus covers nine banking supervisors, three securities commissions and nine insurance supervisory authorities.

By and large, it appears that supervisors of banks, investment firms and insurance companies rely upon a variety of approaches to address CRT activity. These include minimum capital requirements, supervisory guidance, admissible and inadmissible CRT investments and/or limits on various types of admissible CRT investments, reporting requirements, and supervisory review and analysis of risk management systems. In some cases, supervisors have developed regulations and supervisory approaches specifically focused on CRT activities, although in many cases supervisors are relying on their existing supervisory approach to address CRT-related activity.

1. Minimum capital requirements

1.1 Capital requirements for banks

Minimum capital requirements differ for single-name CRT products used for hedging underlying exposures and structured products, like CDOs. There are also differences between CRT products booked in the banking book and those in the trading book.

1.1.1 CRT hedging banking book exposures

When credit derivatives are used by banks to hedge an underlying exposure in the banking book, all supervisors surveyed treat the transaction in the same way as a guaranteed exposure. When a credit derivative purchased for hedging purpose fulfils certain minimum requirements, the purchasing bank substitutes the risk weight of the protection seller for that of the underlying reference entity (this is the so-called substitution approach). For instance, a loan to a corporate is generally 100% risk-weighted according to international solvency standards. If the bank hedges a corporate loan by purchasing a CDS referencing the same company name from an OECD bank, the purchasing bank then substitutes its original corporate loan risk weight for a new one on this OECD bank, generally 20% risk-weighted, for regulatory capital purposes. Such a transaction thus allows the credit hedging bank to reduce its capital requirements by a factor of five. In turn, banks selling single name credit derivative protection will incur a capital charge as if the selling bank had funded a loan to the reference entity directly.

Eligibility criteria for such a treatment vary across jurisdictions. All supervisory authorities participating in the survey require that the credit derivative be irrevocable and unconditional, and that the hedged exposure and the hedging instrument be perfectly identifiable, like other kinds of guarantees. The exact meaning given to these conditions can diverge however, with regard to some specific issues:

- Asset mismatch: three supervisors noted that they do not recognise the hedge when there is a mismatch between the underlying exposure and the reference entity. Others still recognise the benefit of the hedge in such cases but impose an add-on to the capital requirement.
- Maturity mismatch: two supervisors require the maturity of the hedge to equal or exceed the maturity of the underlying exposure for the hedging institution to obtain a capital benefit. Other supervisors permit maturity mismatches but decrease the regulatory capital benefit of the hedge.
- Restructuring: European supervisors generally require that the credit derivative cover the restructuring of the underlying exposure to be recognised for regulatory capital purposes, whereas others do not or have not fully resolved the issue yet.
- Eligible protection providers: some supervisors require that the credit derivative be sold by another bank or investment firm in order to be recognised as a hedging instrument, whereas others also recognise protection provided by other kinds of financial institutions (eg, insurance companies).

Basel II will provide a more uniform framework for the calculation of capital requirements for exposures hedged by credit derivatives. First, asset and maturity mismatches will be accepted under some circumstances but the benefit of the hedge will be reduced according to the maturity difference between the credit derivative and the underlying exposure. Second, restructuring clauses will not be required, but the benefit of the hedge will be reduced when restructuring is not a covered credit event. Finally, any protection provider will be recognised as long as its external rating is single-A, or higher.

1.1.2 Requirements for portfolio CRT products

As regards structured CRT products, like CDOs, two main approaches can be drawn from responses to the regulatory questionnaire: some supervisors apply the requirements set out for corporate bonds or loans, while others have developed a set of specific rules for cash and synthetic CDOs.

In the majority of cases, the capital treatment for banks purchasing a tranche of CDO follows the rules for bonds and loans: the bank thus applies the risk weight to the riskiest asset included in the underlying portfolio, on the whole amount of the CDO or of the tranche bought. Since the portfolio is generally comprised of corporate names, the bank incurs a capital charge against a 100% risk-weighted asset on the whole amount of the tranche. However, different from bonds or loans, when the tranche covers the first losses (ie, equity tranche), the bank must deduct the amount of the tranche from capital. This treatment, equivalent to a 1250% risk-weight, is designed to reflect the higher risk of first-loss pieces and is generally subject to a low-level exposure rule. Under this rule, the amount of capital required for CDOs or CDO tranches is limited to that which would be required, should the bank hold directly the underlying assets.

Some supervisors have established a specific treatment for CDO tranches and other asset-backed securities, taking into account the external rating of the tranche. Such a risk-based approach has been developed, notably in the United States, where banks holding rated

tranches of CDOs apply different risk weights to the amount held, according to the external rating of the tranche.⁴²

Table 1: Risk Weight applied according to the rating of the tranche

External Rating	Risk Weight
AAA or AA	20%
A	50%
BBB	100%
BB	200%
B or unrated	Rating based approach does not apply

When this rating-based approach does not apply (ie, for tranches rated below single-B, or unrated), a “gross-up” rule applies, requiring banks purchasing such tranches to hold capital against the amount of the position plus all more senior positions. For example, if a bank purchases an unrated mezzanine tranche of a CDO that assumes losses over 30% but below 40% of the underlying pool, its 10% position would be grossed up to include the 60% piece that is senior to it. Therefore, the position to be risk-weighted would be 70% of the total amount of the CDO.

Finally, banks originating assets underlying a CDO incur a dollar-for-dollar capital against the amount of retained positions, but the low-level exposure rule does not apply. This means that the amount of capital required for tranches retained can be higher than the amount that would be required if the originating bank held the underlying assets on its balance-sheet. This reflects the fact that risks, initially spread across the portfolio, have been repackaged and concentrated into these retained positions. It also reflects the markets’ view of the amount of capital required for these assets (ie, the amount of equity amount needed to support the underlying assets).

In some other jurisdictions, the principles of the loan or bond-type approach apply, but some aspects of the risk-based approach have been introduced. For instance, in Switzerland, senior tranches of CDOs are 100% risk-weighted, mezzanine tranches receive a 250% risk-weight and all junior or first-loss pieces are deducted from capital. Furthermore, the low-level exposure rule does not apply for Swiss banks purchasing CDO tranches. In the same vein, in Belgium and France, all unrated or non-investment grade subordinated pieces are deducted from capital, but the low-level exposure rule sets a limit to the total amount of capital to be required for a CRT structured transaction.

The Basel II framework is intended to achieve a common treatment of cash and synthetic securitisations across jurisdictions and to eliminate the differences of approaches currently in use. Basically, the principles of the risk-based approach will apply based on either external or banks’ internal ratings. All first loss positions will have to be deducted from a bank’s capital base. For highly rated pieces, banks relying on internal ratings will apply a risk-weight depending on the presence of an external rating, the granularity of the underlying pool and the thickness (ie, the absolute notional size) of the tranche.

⁴² This treatment is set out in *Capital Treatment of Recourse, Direct Credit Substitutes and Residual Interests in Asset Securitizations*, released in November 2001, jointly by the Office of the Comptroller of the Currency, the Federal Reserve System, the Federal Deposit Insurance Corporation and the Office of Thrift Supervision.

1.1.3 Treatment in the trading book

All banking supervisors surveyed make a clear distinction between CRT products held in the banking book, which receive the treatments mentioned above, and those held in the trading book. The latter follows the international standards set out in the Basel Committee's framework for the treatment of market risk.⁴³ For CRT products held in the trading book, banking supervisors require banks to hold an amount of capital against general and specific risk. This amount is calculated on a net basis, according to the rules set out for the reference securities: banks can apply a standardised approach or their internal model as long as it fulfils qualitative and quantitative criteria and it has received the preliminary approval from the supervisor. Since CRT products are traded over-the-counter, they require capital against this counterparty credit risk. This amount is calculated by applying a specific add-on to the instrument's marked-to-market value.

Differences among jurisdictions involve the criteria set out for booking CRT products in the trading book. The general principle is that only liquid instruments purchased with a trading intent can be recorded into a bank's trading book. However, this principle can be interpreted in different ways. In some jurisdictions, all positions in CRT portfolio products are deemed illiquid and, therefore, cannot be included in banks' trading books. Nonetheless, a majority of supervisors surveyed have moved in the past few years towards a more flexible approach, where such positions can be included in the trading book provided that they are marked-to-market daily and, in some jurisdictions, externally rated. The Basel II framework will harmonise these eligibility criteria by setting out common rules for the prudent valuation of trading book items.

1.2 Capital requirements for securities firms

In all jurisdictions surveyed, there are capital requirements for securities firms that are product risk focused, rather than credit risk focused. Therefore, the calculation of required capital varies depending on whether the instrument is a security, such as a bond, or a non-traded instrument, such as a receivable, either secured or unsecured.

These charges capture the risk taken by protection sellers, on CRT instruments, like for any other instruments. As regards to securities firms buying protection, in two jurisdictions surveyed, they do not get relief for using credit derivatives as hedges for credit risk, whereas they do in a third one.

An example of capital requirements is given by the US Securities and Exchange Commission's (SEC) rules. For the US securities firms, indeed, all securities are marked-to-market daily and their value is given a haircut, for capital purposes. In the case of a bond, for example, the amount of the haircut is determined by its maturity and rating. The haircut can vary between one-eighth of 1% and 100%. The rule, however, provides capital relief for certain hedges. In general, unsecured receivables are subject to a 100% haircut. Other receivables, such as stock borrowed, repurchase agreements and margin loans, to the extent they are secured by liquid instruments, are generally not subject to a haircut. It should be noted, however, that margin rules sometimes require that the value of the collateral exceed the value of the receivable. Moreover, in all cases, collateral is marked-to-market on a daily basis. Other receivables may also not be subject to haircuts, such as the interest due on a bond. The underlying instrument, however, would be given an appropriate haircut.

⁴³ See Basel Committee on Banking Supervision, *Amendment to the Capital Accord to Incorporate Market Risks*, January 1996.

Such capital charges, required by the SEC, capture risk taken on CRT instruments. For example, for protection sellers, a credit default swap (CDS) would be viewed essentially as a notional bond and treated in accordance with the rules described above. The receivable associated with the CDS, if not secured, would be subject to a 100% haircut. Generally broker-dealers would not get relief for using credit derivatives as hedges for credit risk. Thus, for broker-dealers, counterparty risk arising from CRT instruments is captured in the sense that there is a 100% haircut for any unsecured receivables.

With regard to US broker-dealers, in imposing capital charges, no distinction is made between trading activities and other business. The calculation of capital charges is different for a securities firm that is part of a Consolidated Supervised Entity (CSE).⁴⁴ A CSE affiliated broker-dealer must charge its capital for any unsecured receivable except as follows.

The CSE may use mathematical models to calculate net capital requirements for market risk and derivatives-related credit risk. A securities firm takes a deduction for market risk (that is, the haircut) generally equal to the sum of the amounts computed using models, such as value-at-risk (VaR), for those securities and derivatives positions for which the use of models has been approved plus standard haircuts for those positions for which the use of models has not been approved.

A securities firm that is part of a CSE must take a deduction for derivatives-related credit risk equal to the sum of the following three categories of charges: (i) A counterparty exposure charge, (ii) concentration charges by counterparty, and (iii) a portfolio concentration charge for all counterparties. A securities firm must compute a counterparty exposure charge for each counterparty equal to the net replacement value in the account of each counterparty that is insolvent, in bankruptcy, or has senior unsecured long-term debt in default. For counterparties that do not meet these criteria, the charge will equal the “credit equivalent amount” of the securities firm’s exposures to the counterparty, multiplied by the credit risk weight of the counterparty, then multiplied by 8%. The “credit equivalent amount” is calculated based on a specific formula that relies on the use of a VaR model. The credit risk weights and the 8% multiplier are based on the Basel Standards.

Thus, the deduction for credit risk that a US CSE affiliated broker-dealer must take specifically considers counterparty risk. Moreover, with respect to these types of securities firms, the deductions for credit risk would recognise appropriate offsets as a result of hedging strategies for CRT instruments.

Finally, the rules applicable to a certain type of dealer, the OTC Derivatives Dealer,⁴⁵ are similar to those imposed on a CSE affiliated broker-dealer.

⁴⁴ The SEC adopted rules amendments that established a voluntary, alternative method of computing deductions to net capital for certain securities firms. This alternative method permits securities firms to use mathematical models to calculate net capital requirements for market and derivatives-related credit risk. A securities firm that uses this alternative method is subject to enhanced net capital, early warning, recordkeeping, reporting, and other requirements, and must implement and maintain an internal risk management system. Moreover, as a condition of its use of the alternative method, a securities firm’s ultimate holding company and affiliates must consent to group-wide Commission supervision.

⁴⁵ SEC Regulation §240.3b-12, promulgated under the Securities Exchange Act of 1934, defines the term *OTC Derivatives Dealer* as “any dealer that is affiliated with a registered broker or dealer (other than an OTC derivatives dealer), and whose securities activities: (a) are limited to: (1) engaging in dealer activities in eligible OTC derivative instruments that are securities; (2) issuing and reacquiring securities that are used by the dealer, including warrants on securities, hybrid matters, and structural notes; (3) engaging in cash management securities activities; (4) engaging in ancillary portfolio management securities activities; **and** (5) engaging in such other activities that the Commission designates by order; **and** (b) consist primarily of the activities described in paragraphs (a)(1), (a)(2), and (a)(3); **and** (c) do not consist of any other securities activities, including engaging in any security that is not an eligible OTC derivatives instrument, except as permitted under paragraphs (a)(3), (a)(4), and (a)(5).”

1.3 Capital requirements for insurance

Risk-based capital requirements for CRT activities, in the insurance sector, vary considerably across jurisdictions. Capital frameworks for CRT investment activities, and more generally for credit risk, range from none at all in some jurisdictions to specific capital requirements for derivatives in others. And, while most jurisdictions had risk based capital requirements for insurance underwriting activities, many did not have distinct capital requirements for credit underwriting and none had a special requirement for non-traditional types of credit/surety (eg, insurance of financial instrument). Most insurance regulation is based upon the legal entity and not on the consolidated group (seven of nine insurance regulators surveyed).

In the EU, many jurisdictions do not have explicit capital/solvency requirements for credit risk. The relevant EU Directives for non-life insurance prescribe that the capital requirement is derived using the highest of three figures (claims-based result, premium-based result, minimum capital level). For life insurance, the variable “mathematical provisions” and “capital at risk” (equals risk sum minus mathematical provisions) is used. Hence, the capital requirements are not linked to the amount of risk in the investment portfolio. The idea is that the capital requirements are designed to cover risks that are not already covered by rules concerning the adequacy of technical provisions and rules concerning the mix, spread, liquidity, profitability and safety of investments that are equivalent to technical provisions. In the case of CRT insurance, as with other P/C branches, the higher the premium volume, the higher ceteris paribus the capital requirement. The minimum capital requirement for insurers that provide credit insurance is EUR 2.6 million (to increase to EUR 3 million), which is the highest minimum level regarding P/C business lines.

The current EU supervisory regime does not provide any requirements dealing with minimum capital requirements on the level of the single reinsurance undertaking. There is a proposal for a new EU Directive which will close the gap (see section 3.3.3 of this Annex).

The EU Insurance Group Directive prescribes a minimum capital regime for insurance groups. Reinsurance undertakings are included in the solvency calculation. The calculations build on the rules that are applied for insurers. As is the case for insurers, the capital requirements are not directly linked to the investment risk.

The “Solvency II”-project of the European Union aims at introducing a more risk-oriented supervisory structure that will include the use of risk-based capital models. In the United Kingdom, discussion papers were published to prepare the introduction of “Enhanced Capital requirements”.

In the United States, the regulation of insurance is applied on a legal entity basis and applies to both insurers and reinsurers. Indeed, there is no distinction between primary and reinsurance *companies*, but only between *lines of business* written directly or indirectly, as reinsurance. Most state insurance laws contain fixed minimum capital requirements that vary depending on the type of business underwritten. In addition, insurers are subject to the National Association of Insurance Commissioners’ (NAIC) risk based capital framework (RBC). The RBC framework is applied to life and non-life insurers, including reinsurers.

The RBC framework determines capital charges for credit risk assumed via both investment and underwriting activities. Capital charges for investments vary depending on the type of investment (eg, equities, bonds, real estate) and the issuer.⁴⁶ CDOs are treated as bonds and have capital charges that vary by rating category. CDS have capital charges that

⁴⁶ The NAIC’s RBC regime is much closer to BIS II than to BIS I in this and other regards.

recognise both reference entity and counterparty credit risks, but there is no RBC relief for protection purchased. In the case of CDS used for purposes of replicating a permitted investment, the risk based capital charge varies with the credit rating of the replicated asset and counterparty. Of the other eight responding insurance regulators, only two capture counterparty risk in their solvency regimes.

RBC charges for underwriting vary by business lines and separate factors are determined for surety and credit business. These factors are designed to capture the risk in both reserving and pricing for these businesses. Notably, however, RBC does not distinguish between traditional and non-traditional surety.

The RBC calculation contains an indirect correlation adjustment for invested assets through a penalty for concentrations and relief for diversification, but it does not extend to the liability side (ie, it is not an asset-liability, “ALM”, credit risk adjustment).

Mono-line financial guarantee insurers are not subject to RBC because a separate set of solvency/contingency reserves, pre-dating RBC, serves that purpose. Capital requirements vary by line of business (ie, *munis v. ABS*), amount insured, collateral and/or type of obligation and obligor.

2. Regulatory restrictions and limits

2.1 Framework applicable to banks

2.1.1 *Regulatory restrictions for the use of CRT products*

As mentioned above, in some jurisdictions, there can be regulatory restrictions on the counterparty of the transaction for the hedging bank to benefit from a lower capital requirement. In those cases, the range of eligible counterparties is limited to banks and investment firms. Outside this limit, there is generally no restriction in the types of instruments a bank can purchase, or transactions it can enter in. It is generally reported by survey participants that banks cannot offer insurance-type products. One jurisdiction, however, reported that banks could sometimes take on credit risk through products that resemble financial guarantees, via independent undertakings.

2.1.2 *Large exposure limits*

Many supervisors limit large exposures, based on single and connected names, and calculated as a percentage of regulatory capital. For a vast majority of them these limits are deemed to capture the exposures on assets underlying CRT transactions on the same basis as direct exposures held through traditional bonds and loans. In one jurisdiction, however, supervisors reported that the general limits on large exposures did not apply to exposures underlying CRT, or for that matter, any derivative transactions. Similarly, almost all banking supervisors surveyed apply these large exposure limits to the counterparty credit risk arising from CRT products held in the trading book.

2.2 Framework applicable to securities firms

Two of the three securities commissions surveyed have rules that limit credit risk concentrations for investment firms with regard to single name exposures for CRT instruments (and also “traditional” assets). In these two countries, firms are not subject to limits connected names, industry sectors, countries, rating classes or types of assets.

The reference factor for limit calculation varies in these two countries: in one of them, it equals two third of the risk-adjusted capital of firms, whereas on the other one, the tentative net capital (ie, net capital before haircuts) is the limiting reference factor. In the latter, the limit is 10% of tentative net capital.

In the United States, a securities firm that is part of a CSE must take both a concentration charge by counterparty and a portfolio concentration charge as part of its deduction for credit risk. The concentration charge by counterparty accounts for the additional risk resulting from a relatively large exposure to a single party and applies when the current exposure⁴⁷ of a securities firm to a single party exceeds 5% of the firm's tentative net capital.⁴⁸ The portfolio concentration charge addresses the risk of holding a relatively large amount of unsecured receivables. The charge is the amount, if any, that the securities firm's aggregate current exposure for all counterparties for unsecured exposures exceeds 50% of the firm's tentative net capital.

2.3 Framework applicable to insurance

2.3.1 Regulatory restrictions on investments in CRT instruments

Most jurisdictions have credit limits and large exposure rules on investments by insurance companies, with limits related to single names, connected names, and countries. Limits relating to rating classes are less common. Most jurisdictions have limits on the uses of CRT investments, both on the purposes and extend to which they are used. Common limitations include limiting the use of CDS to buying protection and limiting CLN and CDO to a certain percentage of invested assets. Jurisdictions that permit the use of CRT as hedges are split as to whether they capture exposure to counterparties.

EU insurers have to comply with specific investment rules that refer to mix, spread, profitability, liquidity and safety. These rules refer to traditional asset classes and include large exposure rules (limits) with respect to single names (spread) and countries and specific classes of investments (mix). The limiting reference factor is a percentage referring to the amount of investments that are equivalent to technical provisions.

Due to the complexity of CRT, in Germany, France and Italy additional rules were established. In Germany, there are permitted and non-permitted investments. CDSs or total return swaps are not permitted. The amount of ABSs/CDOs or CLNs with an investment-grade-rating is limited to 7.5% of investments that are equivalent to technical provisions. In France, the counterparty risk is limited to 0.5% of assets that are equivalent to technical provisions.

In the United Kingdom, CRT investments have no admissible value as assets unless the investments can be justified on the grounds of efficient portfolio management or reduction of investment risk.

In Germany, insurers have to establish internal guidelines concerning their investments. These guidelines also include rules and limits defined by the undertaking.

⁴⁷ A securities firm's "current exposure" to a counterparty is the current replacement value of the counterparty's positions with the securities firm, after apply certain netting agreements with the counterparty.

⁴⁸ For purposes of a securities firm that is part of a CSE, the term "tentative net capital" means "the net capital of the [securities firm] before deductions for market and credit risk computed pursuant to [the CSE rules], if applicable, and increased by the balance sheet value (including counterparty net exposure) resulting from transactions in derivatives instruments that other wise would be deducted by virtue" of the standard net capital rule. 17 CFR 240.15c3-1(c) (15).

In many countries, reinsurers are supervised indirectly or only partially, compared to primary insurers. This means that only parts of the “supervisory toolkit” for insurers are applied to reinsurers. For example, the EU prescriptions for assets (quantitative rules for asset mix and spread) are not valid for reinsurers. A new Directive dealing with reinsurance supervision is on the way.

In the United States, insurance regulatory requirements address both the types of CRT investments and the extent to which they are used. CDOs are a permitted investment and are generally treated in the same manner as bond investments. CDS are only permitted for purposes of hedging, replications, and income generation (writing covered calls). In New York, for example, derivatives of all types are limited to 7.5% of admitted assets (3% for options written) and replications are limited to 10% of admitted assets.

US insurance regulatory requirements also address insurer and reinsurers credit risk concentrations. These requirements can vary by type of organisation (eg, life v. non-life v. FGI). Regulatory limits apply to investments with respect to single names, connected names, countries, and rating classes. While state laws may vary, typical investment limits might include limitations as a percentage of admitted assets. Using New York again as the example, single/connected names are limited to 5% and 3% for P&C and life insurers, respectively. Life companies are limited to no more than 20% below investment grade whereas P&C companies must have at least 50% of statutory capital in A-rated or higher assets. For FGI, single name limits on investments are 3% on entities whose obligations they have insured.

2.3.2 Regulatory restrictions on CRT liabilities

EU insurers must have a licence, in order to provide CRT insurance. Activities performed by unregulated institutions on the credit insurance market would be illegal. Prudent insurance regulation in the EU requires that insurers have sufficient technical provisions. Insurance of credit and surety risk, whether traditional or non-traditional, is covered by this framework.

It should be pointed out that credit insurance in the European context is very different from financial guaranty insurance, both in its original US context and in Europe. Credit insurance is primarily insurance of trade credit (eg, accounts receivable), tax bonds, and import/export credit. Financial guaranty is predominantly, if not exclusively, a capital market product. Credit risks in the former are typically small to medium size enterprises, whereas the latter are obligations of major corporations and governments.

The supervisory framework for reinsurers in Germany is to some extent similar to that for primary insurers. For example, for each P/C branch, reinsurance undertakings have to build equalisation provisions so that business fluctuations are covered. Additionally, like primary insurers they have to report branch-specific information to the supervisory authority (eg premium volume and results for the branch credit insurance).

In the United States, multi-line insurers that underwrite “traditional” surety insurance have no formal rules that limit credit risk assumed via insurance policies (except perhaps a 10% of net worth single risk limit). However, examinations and other oversight activities may identify and/or limit potential credit risk taken by these insurers.

Several states limit the underwriting of financial guarantee insurance to mono-line companies. The largest mono-line FGI companies are domiciled in New York and subject to New York Insurance Law, specifically its Article 69, whose major constraints are:

- Insured average annual debt service subject to single name limit of 10% of net worth plus contingency reserves, and unpaid principal insured limited to 75% of net worth plus contingency reserves.
- No less than 95% of insured portfolio must be investment grade.
- A special contingency reserve requirement, to provide a cushion in the event of a severe economic downturn, of the greater of 50% of premiums written or as a percent of principal insured. This latter ranges from 0.55% for municipals to 2.5% for industrial development bonds. For CDOs it is 1.0% on investment grade and 2.0% for below investment grade.

However the necessity for a FGI to retain triple-A credit ratings⁴⁹ is generally a tighter constraint than regulation (ie, triple-A is a higher hurdle than simply “solvent”).

All US insurers must annually obtain an Opinion of a qualified actuary on the adequacy of their reserves. The Opinion relates to reserves in the aggregate (and would include, but not separately address credit insurance related reserves). In addition, statutory accounting principles require that reserves for each business line be adequate.

3. Reporting requirements, guidelines and supervisory oversight

3.1 Reporting, guidelines and supervisory oversight in banks

3.1.1 Reporting requirements

The reporting requirements on CRT seem to differ widely across jurisdictions surveyed. A large majority of banking supervisors have in place general reporting requirements on credit risk exposures that capture the main CRT transactions. In one jurisdiction, CRT is not yet captured in the general reporting framework, but will be from next year on; so far ad hoc reporting has been required. In another one only guaranteed amounts of credit exposures are reported, which means that other positions in CRT instruments remain outside the scope of supervisory reporting. In other jurisdictions, the reporting requirements for solvency purposes provide information by broad categories of credit risk exposures (loans and loan performance information, asset-backed securities and derivative instruments).

Nevertheless, few jurisdictions require specific reporting for CRT transactions. In France, banks entering CRT transactions are required to report semi-annually on the amounts of credit risk assumed or sold by instrument types, by counterparties and according to the booking (banking book or trading book). This information is aggregated industry-wide. A similar reporting is required in Italy, monthly for single-name derivatives, and quarterly for asset-backed securities. In Japan, a reporting by instruments types on contractual amounts, market value and net gains and losses is required. In these three jurisdictions mentioned, supervisors seem to get a clear picture of positions in CRT instruments. In the United States, banks report various information on securities they hold that are backed by commercial loans and other assets. Similarly, banks report credit derivatives by notional amounts but the information is not sufficiently granular to identify positions by instrument types.

⁴⁹ For certain niche players and reinsurers the triple-A is not as crucial.

3.1.2 Guidelines and supervisory oversight

In most jurisdictions surveyed, the supervisory reporting of CRT transactions seems to be the primary source of information for overseeing these activities. A few supervisors (at least three among those surveyed) ask banks to get their prior approval before entering any CRT transaction. In such cases, supervisors can check whether the intended CRT transaction complies with international standards, national supervisory rules and/or sound practices. Another one, the United States, developed and is currently updating guidance for banks using CRT instruments: the Office of the Comptroller of the Currency (OCC) is in the process of developing a handbook for credit derivatives that will review the risks of the activity, sound policies for the management of these risks and the OCC's policy in this area. Similarly, the Federal Reserve has issued several guidance letters on risk management and capital treatment of credit derivatives.

In addition to the supervisory reporting, prior approval of CRT transactions and/or specific guidelines, some banking supervisors undertake regular on-site inspections specifically focused on CRT. In the United States, for instance, bank examiners maintain a permanent presence at the large banking organisations that conduct CRT activities and the bank examining staff includes those who specialise in capital markets. In France, specific on-site inspections are devoted yearly to CRT activities. These activities can also be monitored off-site, through ad-hoc questionnaires.⁵⁰

Some supervisors, however, expressed concerns as to their own understanding of CRT structure. As the complexity of CRT products increases, the tools used for the valuation and risk assessment become more technical, compelling examiners to upgrade their skills on an ongoing basis. Another issue of concern regards a better understanding of counterparty credit risk arising from end-users of these instruments. With the development of a secondary market for CRT instruments, it becomes more difficult, if not impossible, to identify end-users and to assess precisely the counterparty risk arising from exposures to them.

3.2 Reporting, guidelines and supervisory oversight in securities firms

The three securities commissions surveyed impose reporting requirements on credit risk that capture CRT instruments, as is any unsecured receivable. In Japan, exposures to CRT instruments are included in the overall risk amount reported each month. In all countries, however, positions are aggregated and reporting does not provide sufficient information to identify overall positions in particular CRT instruments. In the United States, however, the SEC staff can identify overall those positions not directly reported to it, through its inspection and examination procedures. The SEC obtains periodically (usually monthly) additional information concerning CRT activity from major broker-dealers on an informal basis.

Furthermore, in the United States, a securities firm that is part of a CSE is subject to additional reporting requirements on credit risk that would be applicable to CRTs, although the rules do not refer specifically to CRTs. Specifically, a securities firm must provide reports on overall current exposure, current exposure listed by counterparty for the 15 largest exposures, the 10 largest commitments listed by counterparty, its maximum potential exposure⁵¹ listed by counterparty for the 15 largest exposures, its aggregate maximum

⁵⁰ See, for instance, the "Results of the French market survey of credit risk transfer instruments", in Banque de France, *Financial Stability Review*, No. 4, June 2004.

⁵¹ "Maximum potential exposure" is the VaR of the counterparty's positions with the securities firm, after applying netting agreements, taking into account the value of certain collateral received from the counterparty, and taking into account the current replacement value of the counterparty's positions with the securities firm.

potential exposure, a summary report reflecting its current and maximum potential exposures by credit rating category, and a summary report reflecting its current exposure for each of the top ten countries to which it is exposed (by residence of the main operating group of the counterparty).

3.3 Reporting, guidelines and supervisory oversight in insurance

3.3.1 Reporting requirements for CRT investment activities

In some jurisdictions, like Germany and the United States, every single permitted CRT investment has to be reported. The reports provide the basis for an analysis of the specific investment and the sectoral involvement in CRT investments on an aggregate basis.

In the United States, all US licensed insurance companies must file quarterly and annual statements, prepared in accordance with statutory accounting principles, with their state regulator(s). These statements provide detailed financial information and are available in the public domain. In particular, investments and derivatives are reported individually, transaction by transaction.

CDSs are reported in Schedules DB of the statutory financial statements. Part E of Schedule DB provides summary information on counterparty exposure and Part F provides information on replicated or synthetic assets (RSATs). Such assets are a combination of a derivative with a cash security combined to replicate a permitted investment. CDOs are disclosed along with all other bonds in the statutory financial statements. However as they are sub-totalled with certain other MBS, ABS, and CMBS they are somewhat difficult to differentiate.

3.3.2 Reporting requirements for CRT underwriting activities

Many EU countries (Germany, France, Italy, Netherlands, Belgium), have reporting requirements (premiums, results) for credit insurance. Typically, these reports encompass both traditional and non-traditional credit insurance. In Germany, branch-oriented reporting duties are also applied to reinsurers. Hence the supervisory authority is well-informed about volumes and results in this business line. In the United Kingdom, some insurers have provided this analysis; from 2004 onwards, it will be required of all insurers.

The supervisory framework for reinsurers in Germany is to some extent similar to that for primary insurers. For example, for each P/C branch, reinsurance undertakings have to build equalisation provisions so that business fluctuations are covered. Additionally, like primary insurers they have to report branch-specific information to the supervisory authority (eg premium volume and results for the branch credit insurance). This reflects the idea that although reinsurers are not supervised, as is the case with insurers, they have to comply with specific supervisory rules that contribute to the safety and soundness of the reinsurance sector. In other countries (eg, United Kingdom), such reporting duties for reinsurers do not exist.

In the United States, for multi-line insurers, statutory financial statements provide premium and loss information for credit and surety business lines. However premium and loss information for surety on what are primarily, or ultimately, financial risks can not be separately identified.

Mono-lines also provide statutory financial statements. However, some mono-lines make separate, supplemental, and public disclosures that are much more detailed than statutory reports on guarantees of CDOs.

3.3.3 Guidelines and supervisory oversight

Supervisors use ad-hoc queries as necessary (eg, if reporting duties on a permanent basis are not in force). In France and the Netherlands, ad-hoc-queries are used as a tool to gather data for the whole sector as regards the involvement of CRT activities. In France, an ad-hoc query also took the assets side into account. In Germany, ad-hoc queries were used to gather data on insurance activities in non-traditional insurance activities and reinsurance activities (investments and reinsurance coverage relating to non-traditional CRT insurance). In the U.S. such queries may be formal circular letters, a by-product of examination work, or less formal meetings or surveys.

Supervisors expect insurers and reinsurers to have adequate risk management systems in place. On-site inspections assess and validate risk management practices and parameters as well as the skills of those responsible for risk management.

The EU Financial Conglomerates Directive introduces group-wide supplementary supervisory elements encompassing capital adequacy rules, intra-group transactions, risk concentrations, risk management. Concentrations for credit risk have to be reported to the supervisory authority. This includes a cross-sectoral analysis. The supplementary supervision starts in 2005.

On 21 April 2004, the European Commission presented a new draft EU Directive that deals with the supervision of reinsurers. The main elements are:

- Licensing for the reinsurance business,
- Capital adequacy regime for reinsurance undertakings,
- Reporting duties,
- Obligation to create an equalisation provision for credit reinsurance.

The Solvency II project of the European Union aims at introducing a capital regime in which capital requirements are more risk-sensitive. Several working groups have been set up. Within this project, the whole supervisory framework will be analysed.

The United Kingdom expects to introduce new capital rules in 2004 for life insurers that capture credit risk taken on in CRT instruments. The capital requirement will taper as credit spreads widen.

The Task Force Re⁵² of the IAIS has worked out a framework for collecting, processing and publishing global market statistics covering a significant proportion of the global reinsurance market. The project aims at enhancing transparency and disclosure in the reinsurance sector. This will lead to a global reinsurance market report. The first report will be published in the fourth quarter of 2004. The aim is to increase transparency and comparability in the reinsurance sector. The report will provide information, among other things on the participation in CDSs and CDOs, and on the key counterparty exposures by sector of counterparty (eg, selected assets, key liabilities regarding banks).

⁵² More formally, the „Task Force on Enhancing Transparency and Disclosure in the Reinsurance Sector“ The full report is available at: <http://www.iaisweb.org/143taskforcerereport5april2004.pdf>

Annex 4

Members of the Working Group on Risk Assessment and Capital

**Co Chairmen: Darryll Hendricks, Federal Reserve Bank of New York
Roger Cole, Board of Governors of the Federal Reserve System**

Belgium	Mr David Guillaume	Commission Bancaire et Financière
Canada	Ms Jane Lamb	Office of the Superintendent of Financial Institutions
France	Ms Nadège Jassaud Mr Roland Moquet Mr Benoît Sellam	Commission Bancaire Ministère de l'Economie, des Finances et de l'Industrie Commission de contrôle des assurances, des mutuelles et des instituts de prévoyance
Germany	Mrs Jana Klein Mr Reinhard Köning	Bundesanstalt für Finanzdienstleistungsaufsicht
Italy	Ms Laura Pinzani	Banca d'Italia
Japan	Mr Yoshinori Nakata	The Bank of Japan
Netherlands	Mr Klaas Knot	De Nederlandsche Bank NV
Spain	Ms Marta Estavillo Ms Maribel Herrero	Banco de España Comisión Nacional del Mercado de Valores
Switzerland	Mr Roland Goetschmann	Eidgenoessische Bankenkommission
United Kingdom	Mr John Carroll Mr Piers Haben Mr Ronald Johannes	Financial Services Authority Bank of England
United States	Mr Michael Gibson Ms Anna Lee Hewko Mr John DiClemente Ms Elise Liebers Mr Richard Mead Mr Jack Buchmiller Ms Teresa Rutledge Mr Kurt Wilhelm Mr Michael Macchiaroli Mr George Lavdas	Board of Governors of the Federal Reserve System Federal Deposit Insurance Corporation Federal Reserve Bank of New York New York Insurance State Department Office of the Comptroller of the Currency Securities and Exchange Commission
EU Commission	Mr Peter Smith	
FSF	Ms Kristel Grace Poh	
IAIS	Mr Alex Lee	
IMF	Mr Todd Groome	
Secretariat	Mr Laurent Le Mouël	Secretariat of the Basel Committee on Banking Supervision