EUROPEAN CENTRAL BANK

CREDIT RISK TRANSFER BY EU BANKS: ACTIVITIES, RISKS AND RISK MANAGEMENT

MAY 2004

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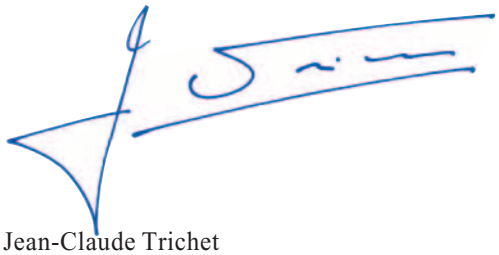
FOREWORD

The purpose of publishing this report is to share with a broader audience the main findings of a recent and extensive survey of EU banks' involvement in credit risk transfer (CRT) markets and the risks they face there. The survey was carried out by the Banking Supervision Committee (BSC) of the European System of Central Banks, a forum of co-operation among the European Central Bank and national central banks and supervisory authorities of the EU.

The BSC continuously monitors the development of the sources of risk that banks face. More generally, it assesses banking stability and explores measures that might be warranted to maintain financial stability. The exponential growth, complexity and relative opaqueness of CRT instruments such as credit derivatives and collateralised debt obligations has made it necessary for monetary and supervisory authorities to pay close attention to these markets.

CRT markets allow large amounts of credit risk to be reallocated across the financial and non-financial sectors of the economy. The report's overall assessment of trends in this market is positive. Improvements in the ability of banks and other financial institutions to diversify and hedge their credit risks are helping the financial system to become more efficient and stable. For example, the CRT markets enable banks to reduce their sensitivity to fluctuations in local markets or traditional lines of business. Nevertheless, the report identifies important issues for authorities and market participants to consider. These include transparency and sound risk management practices, upon which the overall integrity and stability of the market depend.

Looking ahead, the banks surveyed expect CRT activities to continue growing at a rapid pace. This means that authorities must continue to monitor them. Useful cross-sectoral co-operation between authorities – covering banking, securities and insurance sectors – has already started within the EU. Global initiatives are also under way. This work will provide a fuller picture of the sharing of credit risk across the different segments of the financial system.



Jean-Claude Trichet

President of the European Central Bank

EXECUTIVE SUMMARY

This report, prepared by the Banking Supervision Committee of the ESCB, examines the activities of EU15 banks in credit risk transfer (CRT) markets and the risks they face in these activities.[1] It is the most comprehensive survey undertaken to date by EU supervisors and central banks on the use of CRT instruments by banks. Over 100 banks from 15 EU countries plus five large, internationally active, non-EU banks and securities houses operating in London were interviewed. Most of the interviews were conducted in the latter half of 2003. The report covers small and medium-sized banks as well as the major counterparties in CRT, and it focuses on the fastest growing CRT instruments, which can also be traded in capital markets. These include *credit derivative instruments* (credit default swaps (CDSs), credit linked notes (CLNs) etc.) and *structured products* (asset backed securities (ABSs) and synthetic collateralised debt obligations (CDOs)).

MOTIVATION FOR THE INVOLVEMENT OF BANKS IN CRT ACTIVITY

The different ways in which the surveyed banks were involved in CRT activities can be separated into two broad categories. "*Portfolio management banks*" use CRT instruments for credit risk shedding (protection buying) and/or risk taking (protection selling) purposes. "*Intermediaries*" trade CRT products actively and make markets in credit derivatives. In this activity, banks typically aim to run matched credit risk positions.

The survey reveals that for the *portfolio management banks* that were involved in risk-shedding, the main motivation was to reduce the risks related to single entities, to obtain capital management benefits and regulatory capital relief, and to access funding through securitisation. For the banks that used the market to take on credit risk, the main reason given was to diversify credit risk by acquiring claims on firms that would otherwise not be accessible to them through regular client acquisition. Some banks also hoped to improve their income via higher-yielding CRT instruments. In *intermediation,* the generation of fee income was given as the main objective.

SIZE OF CRT ACTIVITY

For the majority of banks surveyed, the importance of CRT instruments remains limited. However, some banks already make significant use of CRT markets. In a few countries, the use of structured products to shed risk was reported as being particularly high. Credit derivatives were generally used less to shed risk than structured products. Risk shedding through credit derivatives was often below 1% of total assets, although several banks reported significantly higher figures. As regards risk taking, some individual banks reported making relatively substantial use of structured products or credit derivatives, with a volume amounting to close to 10% of total assets.

With regard to intermediaries, the survey covered around ten institutions located in Germany, France and the United Kingdom that actively trade in global CRT markets. However, there are also other EU banks with significant intermediary functions (in Belgium, the Netherlands, Spain and Italy).

Banks which use CRT instruments for portfolio management purposes were reported as dealing mostly with the large intermediary banks (often with significant concentrations of counterparty exposure). In all, over 80% of the total CRT activity of EU banks took place with counterparties resident outside their respective domestic markets, with few exceptions. London was reported as being the main international financial centre for CRT activity.

1 The interviews were conducted and the report finalised before the ten new Member States joined the EU. For the sake of simplicity, throughout the report "EU" refers to countries that were members of the EU before 1 May 2004.

NET RISK TRANSFER BY BANKS THROUGH CRT MARKETS

On the basis of notional amounts, banks from Belgium, Spain, Ireland (medium-sized banks), France, Italy, the Netherlands, Portugal and Sweden were mostly reported as being *net protection buyers*. *Net protection sellers* were smaller regional German banks, as well as Danish, Greek, Luxembourg, some Austrian banks and two large Irish banks. However, the actual net positions (typically only a fraction of the gross volume) can be difficult to measure.

Trading in CRT instruments, which accounts for the bulk of the volume in CRT markets, was found to be increasingly a *bank-to-bank business*. At the time the survey was conducted, there were signs that the investment appetite of some *insurance companies* that had earlier entered the market was declining quite significantly. It was unclear whether this reflected a permanent change in strategy or the narrowing of credit spreads through 2003. However, some insurance companies may still have significant open risk positions in CDOs and other ABSs. As the survey did not cover the risks of non-bank financial institutions, scope remains to collect more information.

According to some reports, intermediary banks had increasingly retained the riskiest first-loss (equity) tranches of synthetic CDOs (and also senior tranches) at least temporarily, thereby reducing the amount of net risk transfer by banks.

The involvement of *hedge funds* was reported to be increasing. Hedge funds have helped intermediary banks to hedge their short CDO positions. They have also become increasingly willing to take on credit risk in the form of CDOs and distressed debt.

BANKS' VIEWS ON THE FUNCTIONING OF CRT MARKETS

In general, banks considered CRT markets to be functioning well, although some said that secondary market liquidity could be improved in some smaller market segments. Banks also saw scope for improving trading in debt instruments issued by domestic firms and considered as a shortcoming the fact that the market is limited to large, investment-grade obligors. Importantly, there was a widespread perception among the banks interviewed that the CRT markets are opaque.

Interviews with major market participants indicated that the rapid pace of growth and innovation in the CRT markets continued in 2002 and 2003 and that *market liquidity* had improved markedly. The growth in trading of CDSs and synthetic CDO tranches, as well as the emergence of single-tranche CDOs and CDOs of CDOs, were seen to be the most dynamic aspects of the market in 2003. However, single-name CDSs continued to be the most important instruments for hedging individual exposures. The banks surveyed underlined the importance of the guarantees offered by *monoline insurance* companies – which are specialist providers of guarantees – for the functioning of CDO markets.

Traditional ABS structures have also gained momentum and are expected to continue to play an important role for EU banks, including regional banks. Besides reducing funding pressures for banks, they can offer enhanced liquidity to investors.

The potential for disruption of the CRT markets was, in general, considered to be small. However, some *systemic events* that could pose challenges to market functioning were identified. These included the exit of a major counterparty, a large credit event leading to settlement difficulties, or fraud leading to a loss of confidence in the market. Additionally, legal, tax, or regulatory changes were identified as factors that could undermine market confidence.

A double default of a major underlying firm and a counterparty, although highly unlikely, could potentially test the market, since the associated losses could be larger than in correlated events in other derivative markets.

RISKS RELATED TO CRT TRANSACTIONS

Banks were also surveyed on the types of risk that could be faced by individual participants in CRT markets. Several different types were identified, and the banks provided their views on the most important risks.

In portfolio management, protection sellers ranked *credit risk* and *model (including pricing) risks*, and to a lesser extent *liquidity risk* (the inability to hedge or sell instruments when necessary to adjust risk profiles), as important sources of risk. Investors in CDOs saw *model* and *rating risks* (including the ratings of monolines) as well as a *lack of transparency* in the market as being the most important sources of risk.

Protection buyers saw *counterparty risk* (perhaps reflecting the absence of collateral or netting agreements) and, in some instances, the legal robustness of documentation as potential sources of risk. *Correlation risk* (between reference entities and counterparties) was also put forward as a potential source of vulnerability. In the case of the originators of CDOs, a major source of risk was seen to be *reputation risk* as regards reference entities, i.e. the risk that the underlying assets may not perform well. Some originators of CRT instruments also saw retained first-loss positions in assets sold as sources of vulnerability. Broader risks included *regulatory risk* (the risk of changes such as the introduction of a requirement to consolidate securitisations on the balance sheet) and *liquidity risk* (the loss of a funding source).

In intermediation, *credit risk* (which is often dynamically hedged), *liquidity risk* and *model (including pricing) risks* were seen as the most important sources of risk. *Correlation risk* between reference entities, counterparties and collateral was also highlighted. *Counterparty risk* was seen to be less important, presumably because of the extensive use of collateral and netting agreements. However, banks noted the difficulty of gauging their exposure to monoline insurance companies, both directly as counterparties and indirectly because of "wrapped" (i.e. guaranteed by monolines) CDOs that banks had arranged. A minor source of risk arose from the possibility of *settlement backlogs*. This is because confirmations of transactions have not kept pace with market innovations.

Legal and documentation risks were considered significant potential sources of risk by many respondents, irrespective of their role in CRT markets. However, attempts have been made to improve the contractual framework for CRT instruments, and significant progress has already been achieved.

RISK MANAGEMENT

Most portfolio management banks stated that they carefully assess risks before entering into new types of CRT transaction. Existing risk management tools (internal and external ratings, market-based estimates of probability of default and credit portfolio models) were largely regarded as adequate as long as a bank's CRT activities remained relatively limited.

Banks involved in intermediation saw a need for sophisticated risk management systems. These banks reported that they have put systems in place based on enhanced risk models and information technology: credit risk limits that are marked-to-market daily, consolidation of credit risk positions across business lines, correlation estimates based on stressed market conditions, and strengthened internal credit allocation processes. Banks indicated that they mitigated the risk of high correlation between the borrower (the underlying entity) and the protection guarantor in several ways, including

collateral agreements, executing trades on a funded basis and restricting transactions on the basis of correlation modelling. The growth in CDOs has highlighted the risks from correlations, price jumps and reliance on market liquidity for dynamic hedging. At the same time, the increased availability of credit indices has provided an important tool to hedge CDO tranches.

BUSINESS MODELS AND STRATEGIES

CRT instruments allow credit risk to be traded, thus blurring the borderline between banking and trading books. CRT is likely to influence banks' business models over the long run, particularly as regards larger corporate customers. However, it is likely to have fewer consequences for lending to small and medium-sized enterprises.

According to the banks surveyed, the changes in business models and strategies have not been dramatic so far. However, they foresee important developments in the future: (i) the traditional strategy of granting and holding loans will tend to shift towards attracting loans and transferring them to the parties most willing to bear the risk; (ii) a more integrated approach to credit risk assessment and management is likely to develop, including more market-based pricing; (iii) increased banking competition is expected, leading to a greater focus on comparative advantage, and, in Europe, increased consolidation in the banking sector.

POLICY IMPLICATIONS

The survey findings suggest some new policy implications arising from the use of CRT instruments and bring out new aspects of previously recognised implications. Such issues are grouped in the report under macro-prudential and micro-prudential oversight. Supervisory authorities and central banks are paying increasing attention to this area – as evidenced by the preparation of this report. The authorities are ensuring that the risks to individual banks and, more broadly, financial stability remain in check. Further work to examine linkages across the sectors of the financial system is also ongoing in other European and international fora.

I INTRODUCTION

This report, prepared by the Banking Supervision Committee of the ESCB (BSC)[2], is based on local interviews with over 100 banks from 15 EU countries plus five large, internationally active, non-EU banks and securities houses operating in London.[3] Most of the banks were chosen based on their known CRT activities. The majority of the interviews was conducted in the latter half of 2003. One third of the banks were large international institutions, while two thirds were smaller (national or regional) banks. Interviews with these banks focused on asset-backed securities (ABSs), including cash collateralised debt obligations (CDOs), as well as synthetic CDOs and credit derivative instruments such as credit default swaps (CDSs) and credit-linked notes (CLNs), etc. These instruments are described in Box 1.

A number of earlier studies set the stage for this report. The analysis builds largely on the conceptual framework and market description presented in a report prepared by the Committee on the Global Financial System (CGFS).[4] Useful information has also been provided in various market reports prepared by FitchRatings and Standard & Poor's.[5]

The main body of the report, which sets out the interview findings in detail, is organised as follows. Section 2 discusses the structure of the CRT markets and the latest developments in these markets reflecting the views of major market participants included in the survey. Section 3 presents a summary of the main motivations that lie behind the involvement of banks in CRT markets, as well as the extent of activities of EU banks. Section 4 reports on banks' views regarding the functioning of CRT markets, and Section 5 discusses the risks faced by banks as well as risk management issues. The views of surveyed banks as to their business strategies are summarised in Section 6. The report concludes with a discussion of key policy implications emerging from the survey (Section 7).

2 The BSC is a forum of cooperation among national central banks and supervisory authorities of the EU and the ECB.

3 The number of banks interviewed by country was the following: Belgium 3, Denmark 4, Germany 10, Greece 3, Spain 4, France 3, Ireland 46, Italy 4, Luxembourg 3, the Netherlands 7, Austria 8, Portugal 4, Finland 3, Sweden 4, United Kingdom 5 (+ 5 non-EU). The Irish authorities conducted extensive interviews with a large sample of banks in order to obtain a broader view of the activities of Irish banks in CRT, rather than focus only on banks that were already known to be active in the CRT area. However, this does not affect the discussion and conclusions of the report. As a result of the uneven number of banks per country, any quantitative data are not totalled in the report.

4 See "Credit Risk Transfer", CGFS, December 2002.

5 See "Global Credit Derivatives: Risk Management or Risk?", FitchRatings, March 2003; "Global Credit Derivatives: A Qualified Success", FitchRatings, September 2003; and "Demystifying Banks' Use of Credit Derivatives", Standard & Poor's, December 2003.

2 FEATURES OF CRT MARKETS

2.1 OVERALL MARKET STRUCTURE

CRT is a well-established feature of financial markets. Credit risk has been transferred between counterparties since at least the 1970s, when bank loan syndication emerged as a widespread activity, followed shortly afterwards by the now traditional securitisation. But, even before that, credit risk had been transferred through loan guarantees and credit insurance.

CRT activities can be classified under two headings: "*banking/capital market solutions*" and "*insurance solutions*" (see Table 1). In the latter category, typical insurance products (credit insurance, financial guarantees) cannot be traded in the capital market, but are bought by customers of insurance companies and are held until the insurance protection expires. This report does not cover these products directly, although it does make some reference to the role of specialised monoline insurance companies in providing guarantees as they are crucial for the functioning of the CDO markets.

Banking/capital market products such as credit derivatives and ABSs are instruments that can be bought and held by investors, such as banks and insurance companies, but they can also be actively traded. This report focuses on these instruments. While the provider of an insurance product can only be an insurance company, the provider of capital market CRT instruments can be any (though usually financial) company.

The CRT markets have grown very rapidly in recent years due to the progressive demand for and development of new innovative instruments in the banking/capital market sphere. These instruments are also increasingly traded. A number of factors have contributed to this growth. These include the increased focus of financial institutions on risk management and risk diversification; lower funding costs associated with taking risk positions; new risk/return profiles offered by structured products; and the availability of "arbitrage" gains arising from tax, accounting and capital regulations.

Table 1 Overview of the credit risk transfer markets

	"Banking/capital market solutions"				"Insurance solutions"		
	Credit derivatives	Structured products		Loan sales	Surety bonds	Underwriting of guarantees	Credit insurance
		Asset-backed securities	Synthetic products				
Typical products	Credit default swap, Total return swap, Credit spread option, Credit-linked note	Asset-backed commercial paper, Mortgage-backed securities etc., Collateralised debt obligation (CDO)	Synthetic CDO	Syndicated loans	Construction, Performance, Customs bonds	Financial guarantees	Trade credit insurance, Export credit insurance
Typical protection buyers *(risk shedding)*	Banks (as well as insurance companies, other financial institutions)			Commercial banks (secondary loan market)	Banks, other financial institutions, non-financial firms		
Typical protection sellers *(risk taking for investment purposes)*	Banks and investment banks, insurance companies, other financial institutions			Various investors	Not relevant; no transfer to third parties typically occurs		
Typical intermediaries/ providers (insurance solutions)	Banks and investment banks			Commercial banks	Specialised surety companies and multilines	Monolines (and multilines)	Credit insurance companies

Box 1

CRT INSTRUMENTS

A. Definitions [1]

Structured products [2]

Asset-backed securities
Asset-backed securities (ABSs) transfer the risk inherent in a pool of related assets from the originator of the assets to investors in the ABS. Popular asset pools include mortgages, credit card receivables and car loans. Collateralised debt obligations (CDOs), which are based on pools of corporate debt, are examples of ABSs.

ABSs depend on the performance of the underlying assets to deliver interest and principal payments to investors. In the event of non-performance, losses are allocated to investors according to the seniority of the issued securities. To protect against the effects of non-performance, investors may also be offered some "credit enhancement". Common forms of credit enhancement include collateral, equity capital and third-party insurance.

Synthetic collateralised debt obligations
A synthetic CDO redistributes the risk inherent in a portfolio of credit default swap (CDS) contracts across a number of tranches that have a strict seniority ordering. If defaults occur, protection payments are initially triggered from sellers of the most junior tranche, which is often called the equity tranche. If default losses exceed the "detachment point" of the equity tranche, and hence pass the "attachment point" of the second most junior tranche (one of the "mezzanine" tranches), protection payments are then required from protection sellers with this tranche. This pattern continues through any remaining mezzanine tranches, to senior and super-senior tranches. A synthetic CDO produces equivalent payoffs to a traditional CDO (see above) by using credit derivatives but avoids the need to fund the underlying debt investments.

Credit derivatives

The cashflows of credit derivative instruments are determined by the credit quality of an underlying asset or assets. Examples of credit derivatives are:

Credit default swaps
A credit default swap (CDS) transfers the credit risk associated with a particular corporate or sovereign borrower – the "reference entity" – from one party (the protection buyer) to another (the protection seller). This is achieved by a net transfer from the protection seller to the protection buyer that is equal to the difference between the face value and market value of the reference entity's debt. The transfer is made only if a "credit event" occurs. Credit events include the bankruptcy of the reference entity, the restructuring of its debts, or a failure to meet its scheduled debt repayments. Most CDS contracts are based on physical settlement, where the protection seller pays the face value of the debt to the protection buyer in return for the

1 It should be noted that the categorisation of CRT instruments can vary from source to source.
2 In this report, synthetic CDOs are grouped under the heading of structured products. It should be noted, though, that synthetic CDOs could also be grouped under credit derivatives since they are based on these instruments.

corresponding securities. The alternative basis is cash settlement, where the protection seller simply pays the difference between face value and market value in cash. In return for this insurance, the protection buyer pays a regular (usually quarterly) premium to the protection seller. Premium payments cease if a credit event occurs.

Portfolios of credit default swaps and indices
CDS portfolios are indices constructed from numerous single-name CDS contracts. Protection on indices may be bought or sold by market participants who wish to hedge or express views on the future direction of particular sectors of the credit market. TRAC-X and iBoxx are the two most-traded index families. They are both made up of numerous regional and sectoral sub-indices. Any credit events affecting these indices are settled physically and the weights of affected CDS contracts are adjusted in relation to the scale of losses.

Credit-linked notes
A credit-linked note (CLN) is essentially a funded CDS, which transfers credit risk from the note issuer to the investor. The issuer receives the issue price for each CLN from the investor and invests this in low-risk collateral. If a credit event is declared, the issuer sells the collateral and keeps the difference between the face value and market value of the reference entity's debt. Any residual is transferred to the investor. The issuer benefits from insurance against credit risk and pays a regular coupon to the investor. In contrast to a CDS, where the protection buyer is exposed to counterparty risk, the issuer of a CLN is exposed to the risk of a decline in the value of collateral.

Credit spread options
A credit spread option grants the buyer the right, but not the obligation, to purchase a bond during a specified future "exercise" period at the contemporaneous market price and to receive an amount equal to the price implied by a "strike spread" stated in the contract. Spreads may be based on government bond yields, asset swap rates or prices. The exercise period may be a single date (European options), multiple dates (Bermudan options) or a range of dates (American options).

Total return swaps
A total return (TR) swap is a bilateral financial contract under which one party (the TR payer) makes payments equal to the total return on a security to another party (the TR receiver). In exchange, the TR receiver pays the TR payer its (fixed or floating) funding cost plus a spread. Total returns are equal to capital gains plus any coupons, interest or dividends paid on the security. Total return swaps are often based on equities, equity indices, bonds or portfolios of loans or mortgages. In contrast to most credit derivative instruments, where cashflows are determined by particular credit events, total return swaps transfer insurance against loss of value regardless of the underlying cause.

B. Instrument characteristics

CRT instruments can be classified by their specific characteristics. One key characteristic is the *number of credit items* involved in the risk transfer. Instruments that transfer the credit risk of a single borrower are known as "single-name" instruments and include credit default swaps and total return swaps (as well as guarantees, insurance contracts and loans traded in the secondary

markets). Instruments that transfer the credit risk of several borrowers are known as "portfolio" instruments, for example default swap baskets (including first-to-default swaps), credit indices, and ABSs, including single-tranche CDOs.

A second characteristic by which CRT instruments vary is their *funding basis*. If funds are transferred to the protection buyer when the credit risk transfer occurs, the CRT instrument is a funded instrument. ABSs, including cash CDOs (as well as loans traded in the secondary market), are examples of funded credit risk transfers. If, by contrast, the credit risk transfer occurs without funds being transferred to the protection buyer, the CRT instrument is an unfunded instrument. Credit default swaps and synthetic CDOs are examples of unfunded credit risk transfers, as are guarantees and insurance contracts.

A third characteristic by which CRT instruments differ is whether the risk transfer is *direct,* from protection buyer to protection seller. Credit default swaps, basket default swaps and total return swaps are all examples of CRT instruments that transfer risks directly from protection buyers to protection sellers. Alternatively, credit risk may be transferred *indirectly* from seller to buyer via special purpose vehicles (SPVs). For instance, in ABS structures loans, bonds or receivables are transferred to an SPV that holds them as collateral to back the securities issued to investors.

A final characteristic by which credit derivatives and more traditional CRT instruments differ is the *timing of payment* when credit events occur. For credit default swaps and other credit derivatives, protection payments are more or less immediate. By contrast, insurance contracts, for example, do not issue payment until loss verification and compliance checks have been carried out.

2.2 THE ROLE OF BANKS IN CRT MARKETS

Banks represent the major share of CRT market activity. Their involvement falls into two broad categories. First, banks use CRT instruments for purposes such as diversifying or hedging risks in their banking book or to improve funding (see Section 3). These activities are grouped under the heading of *portfolio management*.

Second, some large universal banks are involved in (matched) *intermediation* of CRT instruments.[6] In this activity, the ("trading") banks have typically largely offsetting positions in CRT instruments. Thus, they do not engage in major credit risk shedding or taking, but provide investor services by devising and intermediating CRT products and making markets for credit derivatives. One should note that individual banks can be involved in both portfolio management and intermediation activities depending on their strategy.

In both portfolio management and intermediation activities, banks can be engaged in the *origination* of CRT instruments. In the case of portfolio management, a bank generates CRT products from its balance sheet assets. The usual motivation is improved funding or capital management or relief (see below). In the case of intermediation, a bank can create CDOs from a set of available loans or bonds (not necessarily assets on its own balance sheet) to meet customer demand for funding and investment opportunities at the same time.

6 The most cited counterparties in the survey were J.P. Morgan, Deutsche Bank, BNP Paribas, Citibank, UBS, Dresdner Bank, Goldman Sachs, Lehman Brothers and Crédit Suisse First Boston. See also the list of the top 25 counterparties in credit derivatives (commonly quoted counterparties) in "Global Credit Derivatives: A Qualified Success", FitchRatings, September 2003.

2.3 OTHER INSTITUTIONS IN CRT MARKETS

Even though the survey did not cover other financial and non-financial institutions, this section provides a short overview of the activities of these institutions as reflected in banks' answers.

Insurance companies are the largest buyers of credit risk outside the banking system, motivated by the opportunity to diversify their asset holdings (which have traditionally included a significant component of credit risk). Different insurance companies tend to focus on different CRT markets. Life insurance companies, for example, tend to purchase funded instruments such as ABSs, whereas general insurers have tended to acquire unfunded instruments, such as portfolios of CDSs. Credit risk is not new for the insurance industry. However, investment in the more sophisticated CRT products is quite distinct from the traditional ways of taking on credit risk in loans or bonds or via credit insurance products (see Table 1).

In some countries, insurance companies are not allowed to enter directly into derivative transactions. However, they can instead sell conventional insurance contracts to an entity known as a "transformer", which then buys credit risk through derivative contracts. Transformers are located in jurisdictions such as Bermuda where these restrictions do not exist.

Monoline insurers have developed their business from insuring only US municipal bonds in the 1970s to selling protection on senior or super-senior AAA-rated tranches of ABSs. This insurance is likely to be called only in the event of very extreme market events.

Managed investment funds, e.g. hedge funds and pension funds, are also important sellers of protection, often taking positions via portfolio instruments, such as ABSs. Growth in the managed funds market resulting from the introduction of private pension schemes in a number of countries may further enhance this part of the CRT market. Additionally, in the last few years hedge funds have become more active on both sides of the market (selling or buying protection) in single-name instruments, where they have used a variety of trading strategies in, for example, convertible and distressed debt.

Non-financial companies make relatively little use of novel, tradable CRT instruments at present. Some have entered the CRT markets by securitising their receivables or transferring the risk inherent in trade credit extended to customers (or by purchasing risk insurance, for example on trade credit).

2.4 BANKS' VIEWS ON LATEST MARKET DEVELOPMENTS

The banks surveyed reported that the markets for CRT instruments evolved very rapidly in 2002 and 2003, both globally and in the EU. Innovative instruments continued to develop, notably single tranche CDOs and other types of repackaging such as principal-protected notes and combo structures, as well as credit indices. These instruments also experienced the strongest growth. The market went through a cyclical turn in credit spreads, with a compression of spreads from around autumn 2002 onwards.

CRT *market liquidity* has improved markedly. Banks reported that some CDSs have become more liquid than the underlying cash instruments, such as corporate bonds. Some 200 corporate names, mostly large companies, were reported to be actively traded as CDSs. Around 1,500 CDS names were traded in total, most of which were investment grade. The CRT market has so far focused on high quality credit risks (underlying assets mainly of investment grade), but the report found some evidence of increasing involvement of lower rated or unrated assets.

Credit indices, including iBoxx and TRAC-X helped improve liquidity in the credit

derivatives market in 2003. This market has become quite sophisticated in a short period of time because it has been able to take its underlying "technology" from other markets. The banks surveyed expected credit spread index trading to grow further in volume.

Although they have been available for many years, traditional securitisation structures have also gained considerable momentum in the EU. Banks generally held the view that these structures will continue to play an important role in the CRT activities of EU banks, including regional banks. A significant factor was seen to be the enhanced liquidity offered to investors by the securitised instruments. The enhancement has been particularly valuable in ABSs and CDOs of corporate bank loans (sometimes referred to as collateralised loan obligations or CLOs), for which liquidity in the underlying market has been perceived to be limited. It would appear that re-securitisation (known as CDOs of CDOs) has also been motivated to a significant extent by desire for enhanced liquidity, rather than a means of seeking increased leverage. However, at a time of cyclical compression of corporate spreads, CDOs of CDOs have also been a means to obtain higher yields. In addition, CDOs of CDOs improve diversification, although they increase opacity regarding information on the underlying assets.

With regard to country-specific developments, in particular in Germany, the "True Sales Initiative" may substantially foster the development of a large-scale securitisation market.

3 BANKS' INVOLVEMENT IN CRT

3.1 MOTIVATIONS FOR AND AGAINST CRT ACTIVITY

In general, the banks surveyed cited very similar motivations for their various roles in CRT markets. However, there were some key differences. These differences reflected the size of the economy, nature of the financial markets, the bank's customer base and portfolio structure, as well as its strategy vis-à-vis the new instruments.

On the *portfolio management* side, the main motivation for a bank to *buy protection* was generally to hedge both aggregate risk and single-name concentration risk. Some banks felt that this role may intensify in the future, as banks that are active intermediaries of CRT instruments have an increasing need for dynamic hedging.

With regard to portfolio management by *originating* CRT instruments, the key specific motivations were reported to be capital management (regulatory arbitrage and capital relief), improved access to funding via collateral made available by securitisation, followed by the need to manage individual credit lines and concentrations related to customers. In some countries, securitisation was driven by funding and liquidity needs due to high lending growth. CRT instruments were also seen to enable banks to reshape business development strategies by allowing them to establish long-term relationships with enterprise counterparties without creating excessive exposure to these clients. Some banks have reportedly engaged in CRT origination to gain further knowledge of these instruments.

The key motivation for banks to *sell protection* was the diversification of risk. In some countries, a need to find profitable additional investments was also regarded as an important motive, especially if the volume of deposits outweighed that of loans.[7] Some banks considered CRT business to be a good substitute for traditional credit businesses since it was seen to provide higher margin income than e.g. corporate bonds of similar rating. Protection selling was also seen to provide the means to diversify the product range offered to customers as well as to optimise economic capital.

Intermediation was reported to be conducted mainly to earn fee income. It was also seen to help broaden the services offered to customers through product innovation and market making and to provide access to a new range of investors. Managing a bank's own portfolio was mentioned to be of secondary importance in this activity.

As regards banks which reported that they were not involved in CRT, many did not see their inactivity as a disadvantage. Many of them said that their customers had no need for such instruments. Such banks also often felt that their information systems were not sophisticated enough to deal with the risks involved. They said that even though reasons for smaller institutions not to engage in CRT will be partly offset by the need for funding, improved risk diversification and new high yielding products, they will remain largely valid in the years to come.

3.2 CRT ACTIVITIES AND INSTRUMENTS USED

According to survey reports, CRT is of relatively limited importance in the EU in aggregated terms. However, several individual banks already make significant use of CRT markets, while the activities were reported to vary greatly with regard to the instruments used.[8] It should be noted that banks with the highest CRT involvement, as measured by in relation to total assets, were not located in countries where the large, internationally active, intermediary banks were resident. For example, as regards protection buying for *portfolio management* purposes, certain

7 This was the case particularly in Luxembourg.

8 Caution is warranted when interpreting these results as detailed information was not available for all countries on the importance of different instrument classes.

Spanish and Portuguese banks were reported to have quite a high involvement in structured products, as measured against the total assets of these banks (see Table 2).

Most banks were involved to at least some degree in origination. This varied from a relatively limited involvement in countries such as Luxembourg, Netherlands, Austria, Finland and Sweden to representing a large proportion or even the majority of CRT activity in Spain, France, Italy and Portugal (structured products). In Denmark, Austria, Portugal, Finland and Sweden, trading in CDSs and origination of CDOs was reported to be limited by a small market and the availability of only a few corporate names suitable for such instruments. Partly owing to these limitations, origination often took the form of securitisation of mortgages (see below).

While markets were reported to be dominated by only a few large intermediary banks (see above), *intermediation* was considered to represent a significant share of the overall notional CRT volumes.[9] As regards net positions of intermediary banks, they were reported to usually cancel each other out or sometimes weigh on the side of net protection buying. The intermediation role was seen as potentially becoming even more important in the future, as corporate clients and also government entities/municipalities are increasingly interested in originating securities, in particular ABSs, which banks could sell on to investors.

CREDIT DERIVATIVES

The use of credit derivatives seemed to be relatively limited in most EU countries at the time the interviews were conducted. In most cases structured products were the most popular CRT instruments. On the basis of the information provided, risk shedding using credit derivatives varies between 1% and 13% of total assets, while risk taking was up to 10% of total assets at individual institutions (see Table 2). As regards the nature of credit derivatives, single-name instruments were clearly the most used.

The major intermediary banks were reported to be active in market making and trading in credit derivatives. Intermediary banks also use these instruments to hedge CDO positions and to create synthetic CDOs. These institutions are

9 See also the reports by FitchRatings and Standard & Poor's.

Table 2 Protection buying and selling by individual banks according to the survey

	Protection buying % of total assets	Protection selling % of total assets	Number of institutions surveyed
Germany[1)]	7.8% credit derivatives	8.7% credit derivatives	10
Greece	0.02%	0.2%	3
Spain	3-15% structured products	n.a.	4
France[2)]	0.6-12.9% credit derivatives 0.2-1.5% structured products	0.3-9.6% credit derivatives, 0.1-8.5% structured products	3
Ireland	0.13-4% credit derivatives 1-10% structured products	0.6-7% credit derivatives 0.2-0.6% structured products	Protection buying: 6 Protection selling: 9
Italy	0.5-5% credit derivatives 0-6.5% structured products	0.1-5% credit derivatives 0.2-7.5% structured products	4
Luxembourg	0.5% credit derivatives 0.5-1% structured products	1.7% credit derivatives 1.5-2.5% structured products	Estimate for the entire national banking sector
Austria	0.7% credit derivatives	3.4%	8
Portugal	5-30% structured products	2-3% credit derivatives	4

1) Protection buying and selling reported as an average of the ten surveyed banks.
2) Data as at end-June 2003.

resident mainly in Germany, France and United Kingdom.[10] Some banks in Italy and Ireland also reported relatively large-scale use of credit derivatives (mainly for portfolio management purposes) as measured against total assets of interviewed banks in the respective countries. There were reports of increased interest in these instruments, which suggests continued growth in credit derivatives markets.

STRUCTURED PRODUCTS

Among the surveyed banks, risk shedding via structured products reached as high as 30% of total assets (see Table 2), while risk taking varied up to 9% of total assets. According to the interview reports, banks' involvement in these instruments (specifically their own securitisations), correlates negatively with their involvement in credit derivatives, with the exception of some French (protection selling) and Italian banks, which had fairly strong positions in both. In Germany, securitisation was reported to be much smaller in relation to total assets than in the other countries.

On the basis of the latest developments, it seems probable that structured products will continue to play an important role in the CRT activities of EU banks, including regional banks.[11] A significant factor facilitating banks' structured product business has been the enhanced market liquidity.

UNDERLYING ASSETS

In the case of credit derivatives, the underlying assets were usually reported to be loans (including credit lines) and bonds issued by firms (both financial and non-financial), the public sector or even sovereign governments. This applied to both protection buying and selling. In structured securitisation deals, the underlying assets were mainly mortgage, consumer and corporate loans (sometimes SME) as well as credit card or leasing receivables.[12]

The quality of underlying assets is one of the key ingredients in assessing the amount of risk transfer. It is commonly perceived that trading in CDSs (and CDOs) involves mainly high-quality assets,[13] whereas lower-quality CDSs and tranches of structured products are typically held by banks, but often temporarily, before being sold to investors such as life insurance companies or hedge funds.

The surveyed banks provided some data on the quality of underlying assets, particularly in credit derivatives. These were largely reported to be investment grade, often very highly rated, especially in protection selling. In the surveyed French banks, investment grade underlying assets in derivatives varied between 68% and 88% for protection bought and between 86% and 96% for protection sold (AAA/AA rated: 12-40%). The German banks said that approximately 75% of underlying assets for protection sold and 72% for protection bought were investment grade (AAA/AA: 22-26%). Figures were also available for two Italian banks, which reported that approximately 85% of all credit derivative activity was based on investment grade assets (AAA/AA: 65%).

Taking CRT activity as a whole, clearly only a small part involves assets rated BB or below,[14] or non-rated SMEs[15] and non-performing loans. It should be noted that securitisation of non-performing and doubtful assets is not allowed in some EU countries (e.g. Portugal).

10 See also "Global Credit Derivatives: Risk Management or Risk?", FitchRatings, March 2003; "Global Credit Derivatives: A Qualified Success", FitchRatings, September 2003; and "Demystifying Banks' Use of Credit Derivatives", Standard & Poor's, December 2003.

11 In many countries, conventional guarantees and loan sales are also important. However, these are outside the scope of this study.

12 In particular, small and medium-sized banks used mortgage loans and credit card receivables in their securitisation deals.

13 Approximately 90% of assets underlying CDSs are investment grade, according to Standard & Poor's. See "Demystifying Banks' Use of Credit Derivatives", December 2003.

14 Some survey responses indicated that assets rated BB and below counted for less than 10% in protection buying and selling in all instruments. At interviewed German banks, for example, 6-8% of all underlying assets were rated BB or below.

15 The maximum reported share was 20% of protection buying and selling.

3.3 NET PROTECTION BUYING OR SELLING?

With regard to net positions in protection buying and selling, the general notion is that protection against credit risk is bought by banks, whereas other sectors, such as insurance, act as sellers of protection. However, the issue of net CRT positions seems to be far less clear in the case of banks than is generally thought. Protection buying is not necessarily always optimal or feasible for a bank. As discussed above, the choice of various CRT instruments would seem to be better explained by national factors such as the size of the economy and the nature of the financial markets, as well as by a bank's customer base and the heterogeneity of its banking book assets.

According to the interview reports, banks with a specialised or narrow customer base have resorted to protection selling in order to diversify the credit risk in their banking book, particularly as the ability to originate CRT instruments to shed risk can be quite constrained by the nature of a bank's assets (for example, non-rated SME loans). In the case of banks with a wider customer base and more widespread activities (lending, asset management, investment banking), versatility has enabled them to buy protection on one side while selling it on the other. An additional factor contributing to the observed diversity of CRT involvement is the novelty of these instruments.

The different structural factors and approaches adopted by banks are reflected in the mixed roles reported by most banks. Some said that they originated CRT instruments from their loan portfolio while at the same time taking on credit risk with the aim of diversifying risk exposure or investing excess funds. In general, however, EU banks were found to be more active in protection buying than in selling, mostly through their own securitisation transactions.

The majority of banks were reported to be net protection buyers in 2003. Based on notional amounts, these included banks from Belgium, Spain, Ireland (medium-sized banks), France, Italy, the Netherlands, Portugal and Sweden. Net protection sellers were large Irish banks[16] and smaller regional German banks, as well as some Austrian, Danish, Greek and Luxembourg banks, which generally had a relatively limited involvement as measured by the ratio of CRT activity to total assets.

Particular care should be taken when assessing net positions using notional amounts of risk transferred. Banks may ultimately retain at least part of the first-loss tranche while transferring more senior tranches to investors. The net impact of these transactions on their balance sheets could well be an increase in credit risk (relative to balance sheet size) rather than a reduction. Hence, computing banks' net positions in CRT from notional amounts can provide only a rough estimate at best and may be misleading at worst. Assessment of actual net positions would require information on the nature of the assets underlying CRT instruments and the risks transferred. Precise netting is possible only with same or very similar entities, and banks often incur some degree of basis risk in their hedging arrangements.

In the case of banks mainly involved in *portfolio management*, net positions are likely to be easier to compute, as most of the instruments are held in the banking book for longer periods. However, in the case of *intermediary banks*, the issue is the degree to which intermediary banks are hedged in their trading books, as also mentioned in the Standard & Poor's report.[17] This is not a simple thing to measure given the very dynamic nature of CRT activities in these institutions.

16 Two out of the three large credit institutions interviewed reported that they sell protection in net terms as at end June 2003.

17 It was mentioned as an example in the Standard & Poor's report (December 2003) that it is theoretically possible to have a long position in one set of reference entities and a short position in a completely different set, so that while the difference between the amount of protection bought and sold is zero, the actual amount of the unhedged positions is the sum of the two.

4 THE FUNCTIONING OF CRT MARKETS

4.1 SECTOR AND GEOGRAPHICAL LOCATION OF COUNTERPARTIES

CRT markets appear to have increasingly become a *bank-to-bank market*. The importance of large, internationally active, intermediary banks is clear, particularly in credit derivatives markets and in synthetic CDOs. According to the interview reports, large intermediary banks are key counterparties in most credit derivative transactions. In some countries, the proportion of universal banks as counterparties was very high, even 80% (Germany). Securities houses, investment firms and hedge funds were also relatively important (10-30%). Some banks also mentioned non-financial firms, in line with some of the market reports.[18] According to interview reports, the share of insurance companies varied between 1 and 10%.

Even though on the whole a relatively small share of trading in credit derivatives was reported to take place across sectors owing to the importance of large intermediary banks, the actual amount of credit risk transferred is difficult to estimate. It is useful to look at available market reports to obtain a view of the overall size of the markets. In those reports the assessment of the credit derivatives market in the latter half of 2003 varied between USD 3 trillion (notional amount of credit derivatives outstanding according to Standard & Poor's[19]) and USD 1.7 trillion (gross protection sold according to FitchRatings[20]).

The assessments of the net risk transfer activity by banks to other sectors using credit derivatives (as defined in the respective reports) vary between USD 100 billion (Standard & Poor's) and USD 230 billion (FitchRatings). This would indicate that the actual net risk transfer from the banking sector to other sectors is quite small relative to the total trading volume, and is consistent with the bank interviews conducted for this report.

According to the interviewed banks, some *insurance companies* (in particular general and reinsurance companies) reduced their involvement in CRT markets towards end-2003. It was also reported that owing to higher funding costs, CDO tranches rated AAA became less attractive for some banks and insurers. However, even if there was some pulling back, the insurance sector was still a significant counterparty in protection selling, owing to its existing investments.[21] According to the FitchRatings' report of September 2003, the largest net seller of credit protection was the global insurance industry (including monolines) with a net protection selling position of USD 303 billion in credit derivatives. Excluding monoline insurers, net investments in credit derivatives of the insurance industry amounted to USD 137 billion.

Monoline insurance companies (or financial guarantors) were reportedly major counterparties for investors in CDOs through their "wrapping"[22] of senior tranches, especially because of the volume of outstanding obligations. They were also considered important counterparties for protection buyers via synthetic CDOs.[23] Conscious of the tight scrutiny of their asset quality by rating agencies, the appetite of monolines has reportedly moved towards more highly rated risks.[24]

18 See for example "Demystifying Banks' Use of Credit Derivatives", Standard & Poor's, December 2003.
19 See "Demystifying Banks' Use of Credit Derivatives", Standard & Poor's, December 2003.
20 See "Global Credit Derivatives: A Qualified Success", FitchRatings, September 2003.
21 Some interview reports mentioned that specific insurance companies have invested in higher risk equity and mezzanine tranches (they do not usually invest in CDSs). Life insurance companies, for example, may use CDO tranches as collateral for retail policies, in preference to traditional credit investments. Insurance companies and asset managers invest in (funded) CLNs, typically on an accrual rather than mark-to-marked basis, which permits losses to remain unrecognised.
22 Credit wrapping involves the provision of a financial guarantee of the obligations of the underlying issuer. The guarantee itself is an unconditional and irrevocable guarantee of principal and interest on a security.
23 According to the FitchRatings' report (September 2003), ten key monolines had wrapped USD 56 billion of cash-funded CDOs. In addition they had sold protection in the amount of USD 166 billion via synthetic CDOs.
24 See also FitchRatings, September 2003.

Hedge funds were reported to be increasingly taking on credit risk, including first-loss tranches. Hedge funds' use of CRT markets was originally motivated mainly by convertible arbitrage, but more recently other strategies have involved the use of CRT instruments. In particular, long/short strategies were mentioned. Typically, hedge funds' take long positions in the bond market (which also provides them with collateral) and take short positions in CDSs. This strategy is necessitated by the still underdeveloped state of the repo markets in corporate bonds.

Cross-border activities were reported to be very high in CRT activities, usually between 80-100% with only few exceptions. However, usually in the case of products involving non-rated firms, counterparties were reported to be domestic as these instruments require knowledge of local firms. In terms of a location of counterparties in credit derivatives for protection buying and selling, banks located in US and EU clearly had a strong role. Also Switzerland, Australia (protection sold) and some emerging markets (protection sold) were mentioned but to a lesser extent. London and to a lesser extent New York were specifically mentioned as cities where many of the counterparties reside for CRT activities.

4.2 MARKET CONCENTRATION

As noted, *concentration* seemed to be an issue particularly in the novel instruments (credit derivatives and CDOs), where large internationally active banks were reported to have a central role. Typically, it was reported that banks involved in portfolio management via credit derivatives and structured instruments had a direct relationship with intermediary banks. As the very largest intermediary counterparties number about five to ten US, Swiss and EU names, some "tiering" would seem to be observable at the global level. The concentration of counterparty dealings may be further amplified by the fact that the institutions acting as the largest counterparties in the CRT area play a similar role in the more traditional derivatives markets (e.g. OTC interest rate and currency swaps).

As regards potential changes in the future, most banks held the view that the degree of concentration in CRT business will decrease owing to growing liquidity and a broader range of counterparties (such as hedge funds) and reference obligors in the market. However, opposite opinions were also expressed, based on the notion that the financial sector as a whole will continue to experience concentration and consolidation in the future.

4.3 POTENTIAL PROBLEMS RELATED TO MARKET STRUCTURE

DEFAULT OR EXIT OF A MAJOR COUNTERPARTY BANK

With regard to the question of what could constitute a major shock to the smooth functioning of CRT markets, the answers varied somewhat. However, the majority of banks thought that the default of a major counterparty could cause difficulties. It is important to note that the *exit or default of a major counterparty* was seen as a risk to the functioning of the market as a whole rather than to the stability of the individual institution, as most banks generally thought that that they were adequately managing their own counterparty risk.

If a major counterparty were to discontinue its CRT business, the banks generally envisaged only a short-term impact. However, the severity of the short-term market unrest was seen to depend strongly on the reasons for the exit and whether they were orderly or not. If a major counterparty were forced to leave the market because of massive losses or bad risk management practices, this might cause major disturbances. The situation in the CRT markets could worsen particularly if the exit was seen to have systemic implications, as similar institutions might suffer from contagion, i.e. general distrust in the markets. The situation would clearly be less severe if the exit of a

counterparty were due to strategic reasons. In this case, short-term liquidity could be affected, although in the medium-term these effects would disappear. However, banks questioned whether a failure of one dominant player could really induce a widespread systemic problem, as net exposure of these large intermediaries is usually relatively limited.

Banks expressed some worry that experiences related to, in particular, Argentina, WorldCom and Enron defaults could drive the insurance sector to reduce significantly its presence in the CRT markets. It was also indicated that monoline insurers might withdraw to some degree from CRT markets because of changes in accounting rules. With regard to the exit of an insurance company active in CRT, views varied as to how serious an impact this would have. Taking into account that the insurance sector is a clear risk-taker in CRT markets, the exit of such counterparties could reduce the supply of protection against credit risk to a certain extent and increase concentration further among the big internationally active banks involved in trading in CRT instruments. On the other hand, the arrival of other counterparties to supply protection in the CRT markets – such as hedge funds – could quickly fill the void if insurance companies continued to leave.

ADDITIONAL PROBLEMS CAUSED BY THE LIMITED NUMBER OF MAJOR PLAYERS

In general, banks viewed the CRT markets as functioning properly. However, several problems were mentioned that could result from the *limited number of players*. Among other things, it was mentioned that the small number of players could result in prices not fully reflecting the underlying risk, as the market mechanism may function imperfectly because there are few opportunities for arbitrage. This problem could be partly mitigated by product standardisation.

Despite the generally improved *liquidity*, it was nonetheless thought still unsatisfactory in some smaller market segments. This could be improved by increased market making by the existing intermediary banks. However, market making among only a few key counterparties can create a "false sense of liquidity", as high concentration can render markets more vulnerable to market exits.

On the protection selling side, concentration among monoline counterparties was considered high by some banks. Partly in relation to the reported opaqueness of the information on insurance counterparties, banks expressed the view that it was not clear where the losses from the three major *credit events* to date – namely those relating to Argentina, WorldCom and Enron – had ended. Some banks thought it possible that they were concentrated in on and off-balance sheet positions of counterparties that had not yet revealed them. To resolve this problem, it may be desirable to improve the disclosure of actual consolidated exposures by financial intermediaries.

OTHER POTENTIAL PROBLEMS

Many interviewed banks also questioned whether the institutions involved truly understood and recognised the risks they were taking on. In particular, the opaque pricing and risk characteristics of structured products, such as CDOs, were mentioned in this respect. A substantial involvement of insufficiently sophisticated institutions could make the CRT markets prone to event risk, thus reducing its attractiveness.

The differences in capital or transparency of information requirements between the insurance sector, hedge fund and banking sectors were also highlighted. In addition some banks said they were worried about the *opacity of the financial reporting* of monoline companies, because it is difficult for banks to assess their exposure to these counterparties.

Many banks feared that changes in current *legal, tax or regulatory conditions* could have an adverse impact on the business. Some feared specifically that legislators might decide to consider CRT products as insurance products and that they should be treated as such for

accounting and tax purposes. Disputes on existing legislation and standards could also constitute a problem.

Some banks raised as a major worry the *possibility of mispricing* as a result of banks engaging in CRT for regulatory arbitrage rather than credit risk management. It was also feared that mispricing could arise from aggressive pricing of CRT instruments by smaller institutions trying to increase their share in the highly concentrated CRT markets. This would hamper an efficient reallocation of credit risks via the CRT markets. It was mentioned, however, that the upcoming New Basel Capital Accord (Basel II), which introduces risk-sensitive capital requirements, would likely improve the pricing of credit risk, as it would reduce the difference between regulatory and economic capital.

4.4 LIMITATIONS TO THE USE OF CRT MARKETS

As expressed by banks, limitations to the use of CRTs are usually connected with a small loan book size (limited number of corporate customers suitable for risk mitigation via CRT instruments) judged on an international scale and high transaction costs compared with alternative funding sources. It was also mentioned by some banks that the spread earned on loans at the time of the interviews was not sufficient to cover the transaction costs.

Limitations to the use of, for example, single name CDSs can also come from the nature of a bank's customer base. The average corporate credit portfolio size of small and medium-sized banks, the lack of external ratings and actively traded corporate bonds can be a problem. In addition, lack of liquidity in the secondary bond markets as well as in asset and mortgage-backed bonds can hinder growth in these instruments. In countries where this is a problem, the main credit risks have traditionally been hedged by selling the loans or by using guarantees and credit insurance. In some cases, this has been supported by a strong role for specialised financing companies owned by the government.

In some EU countries outside the euro area, limitations can also relate to a lack of instruments in national currency, as available credit derivatives are normally quoted in major currencies.

5 CRT RISKS AND RISK MANAGEMENT

5.1 SOURCES OF RISK

In discussions with the banks surveyed, a wide-ranging set of sources of risk was identified (see Box 2). Not only the risks mentioned by each bank but also the order in which they were ranked varied in the survey according to the CRT role concerned (portfolio management or intermediation) and according to the products involved. Particular risks were mentioned in the case of structured products.

Box 2

RISKS IN CRT INSTRUMENTS

The identified risks, which differ in some cases according to the CRT role concerned (i.e. portfolio management and intermediation), or type of instruments used, are as follows:

Credit risk refers to credit exposures. It may refer to an outright exposure (e.g. incurred through protection selling), to a first-loss position (e.g. incurred through securitisation with recourse to the originating bank) or to the need to dynamically hedge an exposure (e.g. incurred through delta hedging of protection sold by an intermediary bank). For a bank acting as CRT investor, the credit risk assumed via CRT instruments is held on the banking book, often until maturity. This bears a close resemblance to traditional lending activities and is often managed accordingly. However, an intermediary has to dynamically hedge its positions while maintaining a consolidated view of credit risk in both its banking and trading books.

Model and pricing risks refer to potential errors made in modelling and pricing the exposures arising from a loan portfolio, e.g. in assumptions about correlation between reference entities and modelling of embedded options in structured products.

Liquidity risk refers to market liquidity and the potential inability to execute CRT transactions over a short time period in the desired size. Desire for liquidity could include the following, for example: protection sellers reducing exposures following some company news; intermediaries adjusting hedges following a large price movement; investors in a CDO tranche wishing to sell the asset; and originators of securitisations seeking a funding source.

Counterparty risk refers to credit exposure to counterparties in derivative or structured product transactions if they fail to honour their obligations. Counterparty risks may be mitigated by netting arrangements or collateral supplied under credit support agreements (CSAs).

Counterparty correlation risk refers to the possibility of a correlated deterioration in the credit standing of a counterparty and the underlying reference entity; or, where applicable, to a correlation between counterparty, reference entity and collateral.

Basis risk refers to the possibility of loss from imperfectly matched risk positions in two related markets. Examples include exposure to a loss from a maturity mismatch caused by a change in the shape of the yield curve and the variability of returns stemming from possible changes in the pricing basis or the spread between two rates or indexes.

Legal and documentation risks refer to the risk that CRT contracts may not prove legally robust, i.e. that one party's (notably, the protection buyer's) understanding of the contractual

arrangements could be overturned by a court challenge. A concern, which arises particularly for intermediaries, is *settlement risk* arising from differing or incomplete confirmations of transactions.

Systemic market disruption risk refers to the potential for major disruptions e.g. in market making and price quoting, or in the availability of credit protection.

Reputation risk refers to the risk that banks may undertake transactions at a substantial loss, despite no contractual obligation to do so, in order to maintain their good reputation.

Rating risk refers to the risk that, first, underlying entities and counterparties may, as a whole, prove to be less creditworthy than implied by ratings; and, second, that structured products such as traditional securitisations and CDOs may prove to be less creditworthy, perhaps because of mistaken correlation assumptions in the rating process.

Regulatory risk refers to the risk of adverse changes that would disrupt business practices being introduced by rule and standard-setters, such as supervisors and regulators (and, interpreted broadly, accounting standards bodies).

In portfolio management, *protection sellers* ranked *credit risk* and *model (including pricing) risks* as serious concerns, and to a lesser extent, *liquidity risk* (the inability to hedge instruments when necessary to adjust risk profiles).

Protection buyers were above all concerned about *counterparty risk*. Indeed, a number of portfolio management banks listed this risk among the key risks, even though it has been mitigated, according to many interviewed banks, partly owing to tight selection of counterparties as well as collateral requirements and netting.[25] However, as many banks still report it to be important, it is likely that risk mitigants are not used to the fullest extent by all banks. The relevance of this risk also seemed to vary depending on the instruments in which banks were mostly involved. Finally, *correlation risk* between reference entities, counterparties and collateral was considered significant in protection buying. A double default of a major underlying firm and counterparty was considered to constitute a severe shock scenario, with larger associated losses than in correlated events in other derivative markets.

In *intermediation,* the major concerns were *credit risk* (which may have to be dynamically hedged), *liquidity risk,* and *model (including pricing) risks*. *Correlation risk* between reference entities, counterparties, and collateral is also an important concern on the protection buying side.

Counterparty risk figures relatively low among intermediaries' concerns, because of the extensive use of collateral and netting agreements. Banks often mentioned the counterparty risk exposure to monolines, both directly as counterparties, and indirectly because of "wrapped" (guaranteed) CDOs that intermediaries have arranged.

Legal and documentation risks were mentioned by many banks, largely irrespective of their activities in CRT markets. With regard to the severity of these risks, there was very little evidence of legal disputes regarding CRT. Banks reported however that, although International Swaps and Derivatives Association (ISDA) documentation had so far

25 There were reports that collateral can reduce the derivatives counterparty credit risk by almost 50%.

worked well, contracts under ISDA have not been seriously legally challenged as yet. Hence, it would seem that banks were worried about the uncertainty about the legal strength of these contracts in future rather than existing legal problems. In particular, multiple jurisdictions and non-harmonised regulatory treatment across countries were seen to be problematic. A minor concern was the possibility of settlement backlogs because confirmations (of transactions) have not kept pace with market innovation.

As regards individual institutions' attempts to mitigate the legal risks, banks reported that they used call options in their CRT contracts or sought advice from external consultants. There have also been wider attempts to improve the contractual framework for CRT instruments, in which significant progress has already been achieved.

RISKS RELATED TO STRUCTURED PRODUCTS

In structured products, interviewed banks that *sell protection* in CDOs were concerned about *model (including pricing) risk*, *rating risk* and *lack of transparency* in complex products (especially in synthetic CDOs). Model and pricing risks were seen to be potentially very severe, since they may discourage banks from investing in, particularly, non-standardised CRT products. This could hinder the widening and deepening of some market segments and hence result in low liquidity. An additional concern was mentioned to be the lack of *liquidity*, which may force an investor to buy and hold. As regards *rating agencies*, exclusive reliance on assessments prepared by these institutions in the case of structured products was mentioned as a risk by some banks. Rating agencies may also have a strong indirect impact on structured product markets via the ratings they give to monoline companies.[26] Owing to the nature of monoline companies' business, a downgrading from a status of AAA could have serious consequences for the ability of these companies to conduct business.

For *protection buyers*, a major concern was reported to be *reputation risk*, i.e. the risk that the underlying assets may not perform well, inducing non-contractual efforts to recover the losses. Broader risks mentioned included *liquidity risks* (the loss of a funding source) and *regulatory risk* in the case of origination. Banks were worried about regulatory changes, particularly when origination is driven by motivations other than risk shedding and diversification, such as funding needs. These motivations may also result in increased credit risk. For example, banks often retain at least part of the first-loss tranches of the structures originated by them. Regulators have responded to this by requiring a 100% regulatory capital charge on the retained tranches.[27]

Pricing and modelling risks were seen to be especially relevant in *intermediation.* The scope for these risks was considered to increase when is the model is driven by only a small amount of information on asset pools or on the key parameters. In addition, many banks considered a problem the lack of information on the number and the level of sophistication of end investors.

5.2 RISK MANAGEMENT

According to the banks surveyed, changes implemented in bank risk management systems are associated with the level of involvement in CRT markets – more sophisticated CRT products and trading strategies have necessitated enhancements in risk modelling and information technology infrastructure. Major banks involved in *intermediation* of CRT instruments have already implemented significant changes to their risk management systems to accommodate active trading in these instruments. For the more active banks, risk management infrastructure improvements were

26 For additional discussion, see "Credit Risk Transfer", CGFS, December 2002.

27 See Kiff J., Michaud F-L. and Mitchell J. "An Analytical Review of Credit Risk Transfer Instruments", Banque de France Financial Stability Review No. 2, June 2003 and National Bank of Belgium Financial Stability Review 2003.

stimulated by the recent economic slowdown and the possible losses from CRT instruments. However, most EU banks that are involved mainly in *portfolio management* have not seen it necessary to modify their systems, since their involvement in the CRT markets is smaller.

It should be noted that while banks are generally confident about adequacy of their own risk management practices, some of them expressed concern about other banks' as well as other financial institutions' ability to manage the risks in CRT instruments. Some were worried about smaller market players, specifically in structured products. The concern was whether involved parties really understood the amount and the type of risk they were buying from the market. As regards financial institutions other than banks, some concerns were expressed about the potentially low level of risk management sophistication at insurance companies.

PORTFOLIO MANAGEMENT BANKS

Small and medium-sized European banks reported that they operate cautiously in new markets, not engaging in new activities before risk management systems are able to cope with them. Some banks reported that the decision to engage in CRT instruments had to pass through the filter of several committees, composed of all relevant departments. Training of staff involved in the CRT business was seen to be a high priority and a key factor for success by most banks.

After the reported cautious first steps, most banks were confident that limited CRT activity could be handled within their existing risk management framework. Most *portfolio management* banks said they did not have any specific framework for managing risks related to CRT instruments. They used their existing risk management systems on the grounds that all the actions taken as part of internal control measures used in other market activities also applied to the various CRT instruments (volume limits, assessment of the quality of the counterparty as well as open positions, maturities, size of the operation etc.) To complement the analysis, market data were reported to be actively used. Banks which are not active market-makers try to mitigate risks related to double defaults by carefully selecting counterparties, by using the existing counterparty limit systems on these trades, or by not engaging in trades where a double default could become a concern.

A non-consolidated credit risk management approach was reported to be usually used, particularly if the use of CRT instruments was considered marginal to total activities. However, as the relative importance of these activities has increased, demand has reportedly grown for a more group and business area-wide risk management infrastructure. This was also deemed necessary to calculate economic capital needs in view of the implementation of Basel II and requires specially trained staff.

The generally increased sophistication of the latest credit risk models was mentioned as a benefit to CRT risk management. For example, banks reported that they had sophisticated systems in place already or that they were in the process of improving their credit risk management systems at the time of the interviews. While these improvements help CRT activities, credit risk arbitrage and the deepening of credit derivatives markets have improved the pricing of risks involved in traditional loan portfolios, hence contributing to a better management of overall credit risks.

INTERMEDIARY BANKS

Intermediary banks said they use high quality information technology for pricing, valuation and monitoring of the credit risk in their CRT businesses. There are a number of specific risks related to intermediation activities that require careful management (see above). Owing to high volumes, banks reported that it has been necessary to put in place sophisticated tools for managing specific aspects of these risks.

The banks said they mitigate the risk related to high correlation between the borrower/obligor

and the protection writer (guarantor) by means of collateral agreements, executing trades on a funded basis and restricting transactions on the basis of correlation modelling. Relatively low levels of correlation risk are mitigated by trading (buying or selling) broad indices as tranched securities. CDOs and the associated delta hedging give rise to special risks of a technical character:[28] (i) on residual equity, which typically requires hedging at a large delta, and therefore gives rise to liquidity risk; and (ii) on senior tranches, where the risk is price gapping i.e., discontinuous price movements that cannot be covered by delta hedging. As regards technical risks related to CDOs, banks responded that they have put into place sophisticated risk management systems based on enhanced risk models. They also use a number of other tools, such as credit risk limits which are marked-to-market daily, consolidation of credit risk positions across business lines, correlation estimates based on stressed market conditions and strengthened internal credit allocation processes.

By and large, credit risk management in major intermediary banks appears to have improved greatly over recent years. However, the innovative evolution of the market does mean that new kinds of risk can appear, or old risks gain new prominence. The growth in single-tranche CDOs[29] has highlighted the risks from correlations, price jumps and reliance on market liquidity for dynamic hedging. At the same time, the growth in credit indices has provided an important tool to hedge bespoke CDO tranches created to meet demand from customers. In addition, CDS indices have proved helpful for not only hedging, but also pricing of CDS books. Single name CDSs continue to be important for hedging large individual exposures.

THE ROLE OF RATING AGENCIES

The interviewed banks suggested that the reliance on rating agencies was weakly inversely related to the level of sophistication of a bank. For banks that were large and internationally active *intermediaries* with highly developed pricing models, rating agency information was used as complementary information or a as "second opinion", particularly when information on asset pools was considered poor. *Portfolio management* banks also mentioned that they mainly complemented their own assessment with rating agency as well as other external information. However, as the internal analysis tools of smaller banks are often less developed, a rating agency view may have a large impact on their decisions regarding CRT. In the case of structured products, the role of rating agencies was considered particularly important by portfolio management banks. However, here, too, banks reported that they usually complemented rating agency assessments with data from their own models. Overall, full reliance on rating agencies was reported not to be very common.

5.3 IMPACT ON BANKS' LOAN LOSSES OVER THE BUSINESS CYCLE

According to available reports, most banks thought that CRT activity had affected their credit losses over the latest credit cycle only to a limited extent. Some Austrian banks said that they had experienced few credit events related to CRT instruments because they had invested mainly in investment grade instruments. In Germany, only one bank considered CRT instruments as having been an important factor during the late 1990s, when banks were transferring risk to more thinly capitalised or less regulated industries. Three banks claimed

28 A delta-hedge is a risk-offsetting position that matches the market response of the base or underlying position over a narrow range of price or rate changes. Because one side of the net position has option characteristics, the position must be modified to maintain delta neutrality if the price or rate moves beyond a narrow range.

29 At a time of cyclical compression of credit spreads, major intermediary banks have increasingly been retaining first-loss (equity) tranches of synthetic CDOs and also senior tranches (partly reflecting reduced activity by monoline insurance companies), giving rise to the "single-tranche" CDOs, purely a second-loss or mezzanine tranche. Retained tranches are delta-hedged.

that loan loss provisions were avoided by the use of CRT instruments. It should be noted that active protection selling by banks may also create increased need for provisioning; in the case of Germany, for example, there were some reports of this.

As regards the future impact of CRT on credit cycles, the banks' views varied. However, many thought that CRT instruments would help to optimise the relationship between asset quality and provisioning in the future. Therefore, there may be less need for provisioning as CRT instruments help banks to diversify credit risk across economies with divergent credit cycles. It was considered possible that by the time the credit cycle turns again, the number of players may have grown sufficiently to amplify the positive implications for business cycles from CRT.

6 IMPLICATIONS OF CRT FOR BANKS' STRATEGIES

According to the interview reports, drastic changes in banks' *business models* are yet to be seen. Most of the banks said they thought of CRT as part of their existing strategy, relatively easily integrated into their present business model, rather than as a means to do business in a new way. Within their main strategy, some, mainly intermediary banks, mentioned an explicit business and risk strategy for CRT.

Deepening and widening of the CRT markets were seen as potentially enabling banks to make major changes to their business strategies. According to a number of interview reports, CRT could make it possible for banks to separate lending from customer relationship, as they would be able to manage the amount of customer-specific risk without limiting primary lending. This could also drive supply of new services to customers. Constraints on a bank's ability to meet customer needs could hence be effectively reduced. Initial signs of these developments were already visible in some banks' reports. Also, instruments such as CDOs were seen to allow certain risk areas to be isolated and transferred in a way that was impossible a few years ago, allowing solutions to be tailor-made for customers with particularly specific requirements.

A more universal, consolidated approach to credit risk assessment and management, involving no distinction between the various instruments used for taking on credit risks, was also foreseen. Pricing and management of credit risk in its various forms would hence converge. Loan pricing was also seen as likely to become more transparent.

Easier access to diversification through the use of CRT products was seen to enable more specialised banks to compete more effectively with banks that have a more diversified customer base. This will allow banks to focus more and more on the activities in which they have a competitive advantage without having to be concerned about the concentration of risks. CRT also enables banks to engage in larger loan and bond transactions without increasing credit risk or lending capacity.

With banks' risk pricing models improving, it was considered possible that the nature of lending business might change in the near future. Banks foresaw that they would be able to choose more easily the size of the balance sheet they were able to hold. However, they said it was unlikely that banks could develop into purely fee-driven businesses, as this was seen to be too risky. A relatively stable balance sheet-based income flow was expected to remain part of the business models of banks in future. This view was supported by many banks that saw themselves continuing with traditional banking business, as CRT would make it easier to optimise the risk-return of the banking book without needing to resort to loan sales. It was argued that lending could even be positively influenced, as the access to credit protection gives more flexibility to commercial development.

7 POLICY IMPLICATIONS

The findings of the survey provide a basis for identifying some new policy implications for the authorities represented in the Banking Supervision Committee (BSC) as regards the use of CRT instruments and they bring out new aspects of some implications previously identified in international fora. This reflects the responsibility of the authorities and the Committee to monitor the evolution of banks' risks and, more generally, financial stability and to explore the responses that may be needed to maintain financial stability. The nature of the issues raised call for attention from supervisory authorities and central banks. However, they do not call for any specific regulatory response. This section summarises the issues for central banks and supervisory authorities arising from the survey. The issues are categorised under macro-prudential and micro-prudential oversight. Further work is also clearly needed in cooperation with securities and insurance supervisors to complete the picture on CRT activities and to evaluate the need for cross-sectoral supervisory responses. Indeed, work is already underway in the EU framework.[30] Finally, future accounting regulatory changes may have an important impact, which will need to be assessed.

7.1 MACRO-PRUDENTIAL OVERSIGHT

SYSTEMIC MARKET DISRUPTIONS

A few banks interviewed considered that a systemic market event is a potential, though unlikely, threat that might arise from the default of a major intermediary, a large credit event leading to settlement difficulties, or a fraud leading to loss of confidence in the market. Additionally, legal, tax, or regulatory changes could undermine market confidence. For actively trading banks, a useful way to assess risks is to simulate scenarios of stress and the operational and information issues that would arise.

The increased involvement of *hedge funds*, including convertible arbitrage and distressed debt funds, as leveraged investors in the highest risk spectrum of CRT instruments might raise some concerns. Generally, hedge funds are important in providing liquidity to the market and, therefore, are a positive influence on market efficiency and stability. They can also provide an alternative to the views and models of more established market participants (such as rating agencies). Experience suggests, however, that their capacity for increasing leverage and the speed with which they may move into and out of markets may lead to instability, implying an inherent vulnerability. Additionally, hedge fund participation may make the identification and resolution of a crisis more difficult.

The involvement of unregulated and possibly opaque entities in a crisis could have implications in both an ex ante and an ex post sense. Their activities should ideally be monitored, to the extent feasible. Before the onset of a crisis, the lack of supervisory oversight of such institutions could mean that a build up of financial vulnerability goes largely unnoticed, exacerbating the magnitude of any crisis. And, once signs of a crisis emerge, it may be more difficult to establish all the facts needed to effect an orderly resolution. The involvement of unregulated entities therefore necessitates continued close cooperation between supervisory authorities on crisis arrangements. From the financial stability perspective, the key importance of banks having appropriate risk management vis-à-vis their hedge fund exposures was made very clear by the case of Long-Term Capital Management (LTCM).

COUNTERPARTY RISK AND CONCENTRATIONS

Market disruptions stemming from the failure of a major intermediary (at worst correlated

30 The BSC has already started close collaboration with the level three EU supervisory committees for securities and insurance – the Committee of European Securities Regulators (CESR) and the Committee of European Insurance and Occupational Pension Supervisors (CEIOPS), respectively – to monitor CRT activity in EU and assess the policy implications.

with the failure of a major underlying entity) are very unlikely events. The banks surveyed said that concentration risk among intermediaries mattered primarily because of potential (systemic) market disruption, rather than individual counterparty exposure. The high level of concentration in trading in CRT and other derivative markets is recognised to be a latent danger. It can offset the basic benefits of financial innovation, notably the spreading of risk more widely in the financial system. For these reasons, continuing attention should be paid to the strength of market infrastructure, the capacity of the market to quickly repair damage to itself and ways in which confidence could be restored if undermined.

The "comfortableness" banks expressed with individual counterparty exposures was based on collateral and netting arrangements. It is important, therefore, to maintain the integrity of the arrangements (e.g. documentation).

A different concern arises from exposure to *monoline insurers*. In principle, exposure to the specialist monolines is no different from other exposures subject to special examination by supervisors if warranted. In practice, the prominence of the monolines in the CDO market does raise the issue of the opacity of their financial reporting. Banks say that they find it difficult to quantify their true exposure to monolines. Insurance supervisors are aware of these issues, and may seek to collect more information on monolines as they judge appropriate.

NET TRANSFER OF RISK

Some techniques of credit risk transfer (i.e. securitisation, syndication, guarantees) have already existed for a long time and have become a regular part of banking activity. The novel techniques covered in this report are more complex and opaque, involve new players such as those mentioned above and have a very high growth rate, which are the main reasons they have attracted the attention of authorities.

Most banks interviewed reported that their CRT activities had not, by late 2003, made much difference to their loss experience. In some individual cases, however, the positive or negative influence of CRT activities on the bank's loss experience had been notable. In some cases, the reason for the minimal difference is simply the small scale of activity. However, the use of CRT instruments could also reflect structural market features rather than the need to hedge or diversify risks. Most importantly, funding needs can be the main motivation for traditional securitisation transactions (ABSs). The actual net risk transfer is reduced when banks retain the first-loss positions in structured products or when they buy protection on investment grade credit. This should also mitigate concerns that banks could cease to monitor the asset quality of customers subject to CRT (i.e. moral hazard). At any rate, information on the actual nature of the risk transfer is important as it complements information inferred from banks' monitoring activities.

As a result of all these factors, there appears to be a relatively low degree of actual net risk transfer. To assess the potential risks in national banking sectors requires ongoing monitoring of the structural issues and actual underlying motivations for the use of CRT by banks. In addition, the degree of risk transfer should not be prejudged, but rather the specifics of particular transactions examined. One way of reconciling CRT data sources would be further to investigate cross-sectoral net risk transfers.

The survey indicated that some banks can be significant risk takers in CRT markets. The economic case for this can be sound. In particular, these markets allow them to invest in assets which improve credit portfolio diversification. However, a note of caution is warranted, since a positive outcome relies on the transactions being well conducted; i.e. that correlation analysis, pricing of instruments and risk management are sound. The databases and methodological tools needed in this area still seem to be under development.

SETTLEMENT AND DOCUMENTATION

Some concerns have been expressed among EU banks over documentation and settlement issues. One concern is that documentation (including ISDA-type contracts and guarantee instruments of an insurance industry character) has not been subject to robust tests in the courts (though it is conceded that they have been subject to market tests). In the trading markets, concerns appear to centre on settlement and its ability to keep pace with market development, as evidenced by the time (days or weeks) it takes to agree confirmations of transactions. Additionally, there has been a continuing concern over restructuring of debt and the definition of a credit event. "Modified-modified" restructuring (in the European market) and "modified" restructuring (in the North American market) have sought to limit the maturity of the deliverable obligation and to make it a transferable or conditionally transferable obligation. The issue bears further watching to determine whether these concerns should be considered merely "teething" problems of a new market, or whether they indicate deeper structural problems.

TRANSPARENCY AND DISCLOSURE

Though CRT instruments potentially improve efficiency in financial markets, a major problem at present is the opacity of CRT market. Consequently, transparency and disclosure continue to be important areas for improvement. There are four areas in which improvements could be made:

(i) *pre- and post-transaction disclosure* to investors in CRT instruments about the risk characteristics of the specific transactions;

(ii) *public disclosures* of CRT activities by individual institutions, which would help other market participants to assess counterparty risk and enhance market discipline;

(iii) *compilation of statistics* in aggregated form, e.g. through the Bank for International Settlements (BIS) semi-annual derivatives survey, which could help to assess systemic market risks; and

(iv) incorporation of CRT transaction exposures, as well as the various associated mitigating measures used, into *consolidated credit risk positions*, so as to help supervisors to assess economic exposures more precisely than may be possible from standard accounting and reporting requirements.

As regards the first issue, the survey points to a concern that some banks and other market participants might not have an adequate understanding of the full risks they engage in, especially as regards the most complex transactions. The increasing complexity of the instruments (e.g. CDOs of CDOs, credit indices, correlation trading) can significantly increase the opacity of the information on the underlying assets and institutions' risk positions. However, the survey results do not shed much light on whether this is due to the supply of or demand for information being too limited. Hence, supervisors might wish to focus more on the adequacy of the information on which the investment decisions are made.

The second and third issues have been discussed in a variety of official circles.[31] The general attitude of banks towards further sharing of information was found to be positive in the survey. They also stressed the mutual benefits of providing more information to authorities and other financial institutions. The fourth issue of supervisory information is discussed under micro-prudential oversight below.

31 Besides varying degrees of disclosure in individual bank accounts, the one established channel of regular public reporting on credit derivatives is the Office of the Comptroller of the Currency (OCC) quarterly report in the United States, which covers a number of major European banks.

7.2 MICRO-PRUDENTIAL OVERSIGHT

The present work finds that banks use CRT in a great variety of ways – ranging from active trading to traditional securitisation and small-scale protection buying – and have a commensurate variety of risk management systems. The innovative and dynamically evolving nature of the CRT markets (including the increased participation of hedge funds) suggests that supervisors will continue to give some priority to monitoring banks' use of CRT instruments. In EU countries where the overall scale of CRT activity remains low, however, the priority will not be high and attention will be focused on specific banks.

Over the longer run trends in banks' business strategies warrant monitoring, notably the implications for incentives to monitor debtors, which may be weakened for the initial lender to the extent that it has bought protection. Market-based pricing of credit risk and possible effects on competition and consolidation in the financial sector should also be watched. Issues of regulatory oversight of CRT, including differences in regulatory arrangements across countries and sectors, are currently being examined at the international level.

SUPERVISORY INFORMATION

One area where progress has varied across banks is in the incorporation of CRT exposures into *consolidated credit risk positions*, so as to help assess economic exposures more precisely than may be possible from standard accounting and reporting requirements.

Especially in the credit derivatives market, care must be taken in interpreting the various accounting measures of CRT activity. Notional gross amounts outstanding may be a misleading guide to underlying risks without additional information. For example, an assessment of counterparty exposures requires information on the use of collateral and netting. The surveyed market participants suggest that an alternative measure of positions might be premiums paid and received. Mark-to-market values may be more a measure of activity and balance sheet size than of risk. It is possible for perfectly offsetting economic positions not to be offsetting on mark-to-market values; indeed, the mark-to-market values could be of the same sign (both positive or both negative). An alternative measure of portfolio risk exposure is the sensitivity to movements in credit spreads e.g. the portfolio delta on a five-year equivalent basis, which is the industry standard. Ultimately, measures of credit risk transfer need to be accurate and meaningful, and to be incorporated in an overall credit position. Some banks – probably the most active trading banks – will have this information readily available. For some other banks, supervisors may need to continue to press for it.

RISKS AND RISK MANAGEMENT

The innovative character of the CRT market and the complexity of the instruments point to the important principle that the sophistication of a bank's risk management goes hand-in-hand with the sophistication of the instruments that it employs. The interviews carried out with banks indicate that risk management systems vary considerably within each of the groups (intermediaries or portfolio managers), suggesting that banks ought to be compared with the best practice of their peers.

The character of the market suggests that there will be an ongoing concern with "naïve players" entering particular market segments. For instance, there have been a small number of European insurance companies that bought the riskier tranches of CDOs, suffered significant losses, and withdrew from the market. It appears that some of these risky products were heavily marketed. In itself that marketing is not a concern, but it does raise the issue of protecting less sophisticated investors, who may need to improve their knowledge of the risks. Monitoring and oversight are warranted, therefore, in respect of the degree of understanding of novel risks. Minor mispricing of risk is perhaps a matter for market

participants to remedy rather than a regulatory concern; mispricing becomes a concern if it is large and systematic.

In CDOs, it is possible that some investors fail to appreciate that jump-to-default risk (discontinuous price movements, contrary to model assumptions) may be as much a concern as pure correlation risk. Correlation estimations themselves are of considerable importance because of growth in the size of the CDO market. It might also be that some actively trading investors are under-pricing the risk of market liquidity drying up, and are relying on the assumption that they will be able to dynamically hedge their positions in the market.

The policy implication for risk management is that actively trading banks should stress-test correlation estimates (and indeed recovery rate estimates on CDO portfolios) and have in place both adequate models to assess and evaluate all material risks related to these instruments and appropriate risk controls.

PRICING AND REGULATORY ARBITRAGE

Some concerns have been expressed that pricing in the CRT market may be heavily influenced by *regulatory arbitrage* across financial sectors,[32] rather than by information on credit risk exposure. However, the banks surveyed said that regulatory arbitrage was not to be over-emphasised. It was not found to be the main motivation for using CRT. The main motivation was to optimise economic capital (i.e. by reducing balance sheet credit exposure), to improve access to funding and to offer broader services to clients. To the extent that the involvement of insurance companies has declined, concerns over cross-sectoral regulatory arbitrage have declined as well. In other words the increased bank-to-bank character of the market has, perhaps, lessened concerns over regulatory arbitrage. One should note again that the survey sheds no direct light on the risks borne by insurance companies and hedge funds, as its focus is on EU banks.

BANKS' RELIANCE ON RATING AGENCIES

The banks surveyed said that in general they did not rely primarily on rating agencies' assessments. The degree of reliance seemed to be inversely related to the size and sophistication of the bank. Irrespective of whether or not external ratings are better than internal credit risk assessment systems, one policy implication is that banks which engage in the more complicated CRT transactions (such as tranched synthetic CDOs) and rely excessively on external ratings may warrant special scrutiny by supervisors. This is because reliance solely on external ratings may be indicative of a bank not having adequate risk management systems in place. A standardised approach of using external ratings may, of course, be an adequate guide for banks engaged in simpler transactions.

32 In this context, regulatory arbitrage is used in the wider sense of arbitrage between sectors (banking, securities and insurance), as distinct from the narrower sense of arbitrage across business lines.