Credit Derivatives – Overview and Implications for Monetary Policy and Financial Stability

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1 Introduction

Despite a variety of structural changes, the risk profiles of banks in the euro area are still dominated by the development of credit exposure. Credit risk measures potential losses arising from the default of a debtor, or, more generally, from the deterioration of its creditworthiness. According to a survey by Duffie and Singleton (2003), credit risk is defined as the loss associated with unexpected changes in credit quality. It is not only incurred through the issuance of loans, but also takes the form of positions in corporate bonds or transactions in over-the-counter (OTC) markets, which involve the risk of a counterparty's default.

Compared to equity markets, debt markets show a number of particular idiosyncrasies which complicate the management of credit risk and pose significant challenges to financial institutions. First and foremost, there are the problems of market imperfections – adverse selection and moral hazard – which academic literature has studied in detail.[1]) As trading does not take place in an active and liquid market, the quality and dissemination of information is rather limited, its distribution asymmetric and its transparency low. Second, the holding period of assets is relatively long. Finally, the empirical distribution of credit risk is skewed because the probability that a debtor improves its creditworthiness is lower than the likelihood of a downgrade.

The credit markets and therefore also banks' activities have changed within the last few years owing to a number of parallel and interdependent developments:

– The increasing importance of capital markets: The growth in disintermediation and the larger role of investment banking activities have changed the structure of loan and credit markets.
– The development of the Single Market and the introduction of the euro: Together with disintermediation, the integration of capital markets in the euro area has led to strong growth in corporate bond markets. Credits have achieved the status of a separate asset class.
– Changes in the public debt markets: The reduced importance of government bonds as benchmark assets has made instruments that are not entirely free of default risks more important. A prominent example is bond issuance by agencies such as Freddie Mac and Fannie Mae.
– The LTCM crisis: The collapse of this highly leveraged market participant has increased the awareness for counterparty risk in over-the-counter markets.
– The impact of the Basel II process: Once introduced, a key objective of the new regulatory framework is to improve the treatment of credit risk by better aligning regulatory and economic capital. This process has pronounced effects on the pricing, trading and risk analysis of both private and public debt instruments.
– The growing use of securitization: Securitization is a transaction where a pool of assets is sold in the form of a tradable security. A common example is a large set of mortgages pooled in an asset-backed bond and then sold to investors from a bank's loan book. In parallel, syndicated loans and

1 *A discussion of these issues is offered in chapter one of Duffie and Singleton (2003).*

the secondary market for loans have shown growth tendencies.

– The increasing frequency of defaults: Currently, we observe a rise in the number of insolvencies owing to the economic slowdown and the persistent decline in stock prices. Recently, there has also been an accumulation of very large cases of insolvencies, such as Enron and WorldCom in the U.S. and Railtrack or Swissair in Europe.
– Improvements in risk management methods: For a number of years, supervisory authorities have required banks to measure their exposure to market risk and to compute their capital requirements accordingly. For the modeling of market risk, the value at risk (VaR) concept has become generally accepted. The VaR predicts the amount of money a bank may lose on its trading activities over a certain time horizon. Applying the VaR concept has prompted the introduction of more sophisticated methods to measure market risk and to implement the corresponding risk management procedures.
– More research on measuring credit risk, both by academics and commercial providers.

In reaction to these conditions and to a general change in the overall environment, new financial products have emerged. The latest example of this process of innovation is the market for credit derivatives. For a number of years, this market segment has seen very high growth rates. The first respective transaction took place around ten years ago in the U.S., but strong activity has only been observed over the last five years.

The growing use of credit derivatives has contributed to structural changes in the credit markets since credit derivatives facilitate the transfer of credit risk, which used to be very difficult and costly. Credit derivatives transfer the credit risk contained in a loan, interbank transaction or bond from the protection buyer to the protection seller without affecting the ownership of the underlying asset (the reference asset). Using financial/credit instruments to provide protection against default risk is not new. Letters of credit or bank guarantees have been applied for some time and also securitization is a commonly used tool. However, credit derivatives show a number of differences. First, their construction is similar to that of other financial derivatives. As it is the case with e.g. equity options, credit derivatives trading takes place separately from the underlying asset. Second, credit derivatives are regularly traded. This guarantees a regular marking to market of the relevant positions. Third, trading takes place via standardized contracts prepared by the International Swaps and Derivatives Association (ISDA), an association of market participants. Hence, there is no need to negotiate the terms on a case-by-case basis. Finally, the transaction has no impact on the legal relationship between debtor and protection buyer, as only the default risk is transferred. This characteristic of credit transfer instruments is of key importance because, in many countries, selling loans is difficult owing to the applicable tax regulations or the requirement for the borrower to agree to the sale. A transaction in the credit derivatives market has no impact in the relationship between debtor and creditor.

A key property of credit derivatives is that owing to their derivatives structure, they allow for the trading and diversification of credit risk. The

introduction of credit derivatives allows traders to package the risk inherent in a loan into two or three tradable components. The interest rate risk is thus isolated via interest rate swaps, the credit risk via credit derivatives, and if an exchange rate risk exists, it is taken out via foreign exchange derivatives. Given that risks that were formerly inseparable are now packaged into new components, they can be separately sold to those willing to bear them. According to microeconomic theory, this should result in an increase in allocational efficiency.

This nontechnical paper serves two purposes: First, we aim to provide a concise description of the credit derivatives market. Second, we attempt to analyze the aggregate effects of credit derivatives from a macroeconomic perspective. Given that credit derivatives are expected to have an impact on credit markets, we describe their implications for the financial system and the conduct of monetary policy.

The literature on credit derivatives can be separated into three groups, namely academic research, publications by market participants, and studies carried out at central banks. In the field of academe, most of the relevant publications have so far been published in mathematical finance or empirical finance. Overall, the literature mainly focuses on theoretical pricing models.[1]) Up to now, only two empirical studies have attempted to evaluate the information content of credit derivatives.[2]) So far, however, there are only a few papers that deal with the respective implications for the financial system.[3]) Given this early stage of academic research, publications by market participants are an important source of information. A number of surveys by market practitioners describe the various products that are available in the market as well as their pricing, accounting and risk management. Two extensive overviews have been published by Deutsche Bank (1998) and JP Morgan (1999).[4]) These publications will form the basis for section 2.1.

Last but not least, central banks have also investigated the market for credit derivatives. On the one hand, the BIS-based Committee on the Global Financial System (CGFS) has studied credit risk transfer in detail. The committee's exhaustive report first gives some background information on the market for credit risk transfers. It goes on to provide a detailed overview of the market, with particular emphasis on market concentrations and the valuation of the respective instruments. The report focuses on three critical areas, namely incentives, structural implications and policy issues. With a view to incentives, it studies potential changes in the relationship between borrower and lender. We will return to the policy issues raised by the CGFS in our conclusion. On the other hand, the Bank of England and the Federal Reserve have both published comprehensive studies on the subject.[5])

The remainder of this paper is organized as follows: In section 2, we

1 *For a recent example, see Jarrow and Yildirim (2002).*

2 *Cossin and Hricko (2002) investigate the determinants of credit risk in a unique sample of credit default swap transaction data; Houweling and Vorst (2002) perform an empirical evaluation of default swap pricing methods.*

3 *Some of the problems created by credit derivatives are studied in Morrison (2001).*

4 *See also Kasapi (1999) and Scott-Quinn and Walmsley (1998).*

5 *Federal Reserve System (Bomfim, 2002; Ferguson, 2002) and Bank of England (Rule, 2001a and 2001b; Marsh, 2002).*

describe the various instruments, the size of the market and the market participants. A key question from a central bank perspective is how the development of the credit derivatives market may affect monetary policy and financial stability. As the market is still at an early stage of development, any conclusions we draw can only be of a very tentative nature. These tentative implications are outlined in section 3. Since we focus on macroeconomic questions, regulatory issues are outside the scope of this paper.

Glossary

Bank liability curve	*Yield curve derived from interbank money market interest rates and interest rate swaps*
Bond yield	*Rate of return on bond investments (equates the market price to the present value of the expected future cash flows)*
Call option	*The right (but not the obligation) to buy a certain asset*
Counterparty risk	*Risk of loss occurring if a counterparty on the interbank market is unwilling/ unable to fulfill its contractual obligations*
Credit derivative	*Instrument which transfers the default risk from the protection buyer to the protection seller*
Credit spread	*Difference between the yield of a default-risky instrument and the yield on a government bond or interest rate swap*
Credit risk	*Risk of default and/or widening of credit spread*
Default risk	*Risk of loss owing to default*
Derivative instrument	*Instrument whose price depends on that of another instrument, e.g. forward contract, option or interest rate swap*
Hedging	*Transaction aimed to provide protection against a certain risk category*
Liquidity risk	*Risk of loss arising from failure to timely close a position in a trading portfolio*
Mark to market	*Valuation by means of the most recent price (as opposed to accounting valuation with a historical price or book value)*
Market risk	*Risk of loss arising in trading portfolios owing to large-scale price movements*
Option	*The right (but not the obligation) to buy or sell an asset within a given period of time at a price fixed today*
Over-the-counter market	*Trading of financial instruments outside organized exchanges*
Protection seller	*Market participant providing protection against credit risk*
Put option	*The right (but not the obligation) to sell a certain asset*
Reference asset	*Asset which serves as the underlying asset for a credit derivative*
Strike price	*The specified price of an option contract at which the contract may be exercised*
Swap	*Over-the-counter contract for the periodic exchange of payment flows between two counterparties*
Value at risk	*Potential portfolio loss caused by adverse price moves for a given holding period (typically one to ten days) and probability (e.g. 95%)*
Yield curve	*Relation between individual interest rates and their respective maturities*
Underlying asset	*Financial instrument on which a derivative is based, e.g. the interest rate, stock price or exchange rate*

2 Overview of the Credit Derivatives Market

2.1 Instruments

The continued market development makes it rather complicated to arrive at a common classification of all the available instruments. There is a considerable variety of instruments which are traded with varying frequencies. The following products are regularly used:

(1) credit default swap (CDS)
(2) total return swap (TRS)
(3) credit spread option (CSO)
(4) credit-linked note (CLN)
(5) collateralized debt obligation (CDO)

Other instruments of increasing complexity result from the combination of the above types.

2.1.1 Credit Default Swap (CDS)

CDSs are the most commonly traded credit derivatives with an overall market share of around 67% (FSA, 2002). A CDS serves to transfer the risk that a certain entity defaults from the protection buyer to the protection seller, who receives a fee. In the CGFS terminology, the former is termed risk shredder and the latter risk taker. In case of a default, the seller fully compensates the buyer for the losses, but other risks, e.g. the impact of changing interest rates on the asset value, are not transferred and therefore remain with the debt owner. The details of the transaction are recorded in the CDS contract, which is commonly based on the ISDA Master Agreement. In particular, the contract provides the legal definition of situations in which the protection seller must compensate the protection buyer, i.e. the credit events. Commonly, credit events comprise five possible cases:

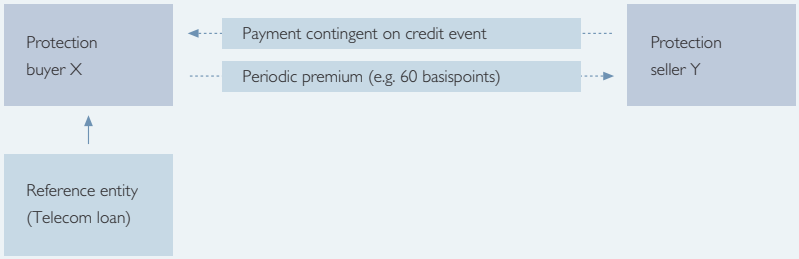
– the reference entity's failure to meet payment obligations when they are due;
– bankruptcy;
– repudiation;
– material adverse restructuring of debt;
– acceleration or default of obligation.

If any of the events described in the contract occurs, the compensation will be transferred. Here, we distinguish two mechanisms, namely credit risk transfer via cash settlement (i.e. the price difference between the current value and the nominal value of the reference asset) or physical settlement (i.e. the securities specified in the CDS contract are delivered from the protection buyer to the seller). Commonly, CDS transactions have a maturity of five years and average a nominal value of USD 25 million to USD 50 million. In the euro area, CDS for more than a hundred names are regularly traded.

A simple example can illustrate the way a CDS functions: A bank X has a considerable credit exposure to the telecom sector and intends to reduce its risks without selling the respective loans. Hence, via a broker, bank X starts a CDS with bank Y, which has so far focused its lending activities on Eastern Europe. Bank X transfers the default risk inherent in its telecom loans to bank Y, which is compensated with a fixed periodical fee for bearing the default risk. This periodical fee, or premium, is the price of default protection the broker quotes. It can be interpreted as a direct and regularly available indicator of the reference asset's credit quality. The details of the transaction are based on the ISDA Master Agreement which, among other essential details, also defines the credit event. As a

Chart 1

Credit Default Swap



Source: OeNB.

result of the transaction, the risk shredder X has reduced its credit risk without changing the material composition of its loan book, while the risk taker Y receives the premium and has improved the performance of its portfolio given the diversification benefits of the two sectors. Under the assumption of correlated risks, the basis for this transaction is the comparative advantage both parties realize by trading with each other. Bank X has mitigated its credit risk and bank Y has improved the risk/return performance of its portfolio.

Two methods are available for the pricing of a CDS. CDS valuation can be based on a theoretical model for the default risk. As an alternative, one may use a replication approach, separating the product into synthetic components for which market prices can be observed. Hence, the CDS payment structure of the protection buyer can be approximated by taking a long position in the corresponding default-risky asset and short-selling the risk-free asset, i.e. taking a loan at the going money market rate. For a large sample of CDS quotes, Houweling and Vorst (2002) show that pricing on the basis of a reduced form model is superior to a replication approach based on the prices of corporate bonds.

2.1.2 Total Return Swap (TRS)

Similar to CDSs, a TRS is also a contract between two market participants; it is based on a reference asset, but the risk transfer is different from a CDS. As the name says, a TRS exchanges the total return from e.g. a loan against a contractually fixed payment irrespective of the occurrence of a credit event. Hence, all payments from a credit asset are transferred to the protection seller, who receives a fixed payment in compensation. Therefore, in addition to the default risk, the protection seller also takes on all other risks, in particular the interest rate risk.

2.1.3 Credit Spread Option (CSO)

A CSO is a derivative on the spread between the default-risky asset and the bank liability curve. Therefore, this instrument is aimed at providing protection against both the credit event and also any other changes in the spreads. This makes the contract simpler to specify, as compensation must be paid for any widening of the spread above a certain strike price, irrespective of a credit event. The options are most commonly put options and can be of the European or the American type, depending on the exercise features included in the contract.

The value of the option is determined by the difference between the current spread of the underlying asset and the predetermined strike price. If this spread is negative, i.e. if the option is in the money, the put position's current payoff is positive. When valuing option contracts, market participants use forecasts of the probability of different spread levels for the period until the derivative expires. Market participants' perception of the spread movement, in particular of the volatility or the probability density until expiry, is thus incorporated into the market price of put and call options in the process of trading.

2.1.4 Credit-Linked Note (CLN)

The above instruments are off-balance-sheet derivatives. They can be repackaged to create new tradable securities. One example is the CLN, a synthetic security composed of individual instruments. In the simplest case, a CLN combines a bond of medium maturity with a CDS. The bank seeking default protection issues a note whose payoff depends on the financial health of the reference entity. As a CLN is based on a CDS, the only risk transferred is the default risk. The protection seller, who in this case buys the note, makes its payment at the beginning of the transaction. Hence, the bank basically receives additional capital it can put aside to cover losses arising from the loan. Moreover, the default risk is spread across a multitude of protection sellers. At the maturity of the CLN, the issuer repays the nominal value minus any losses caused by the potential impact of credit events. Hence, a CLN can be interpreted as the creation of a new bond without the involvement of the original debtor.

While these four instruments have been traded on the market for some time, other products for the transfer of credit risk are also gaining market share. One of these is the multi-name transfer of default risk. Such contracts do not serve as protection against the default of a single entity, but cover a portfolio or basket of debtors. The credit event is then triggered by the first default of a name contained in the basket. Another possibility is to use more complex, synthetic securities which repackage existing assets into new combinations in order to meet certain investor demands. Here, in particular, the degree of market and credit risk, the desired degree of leverage, maturity, tax characteristics and cash flow structure can be tailor-made. In the course of this development, the established instruments of securitization and the more recently introduced credit derivatives are applied simultaneously.

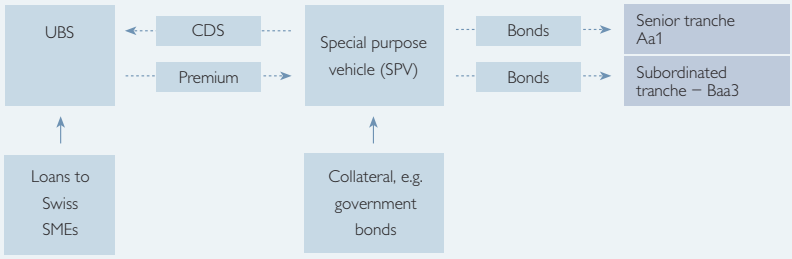
2.1.5 Collateralized Debt Obligation (CDO)

The use of CDOs has been observed to increase. A synthetic CDO resembles a securitized asset, i.e. a bond issue is covered by debt, e.g. high yield bonds, which remains on the balance sheet of the bank seeking protection. Depending on the form of the underlying asset, the CDO is applied in two forms, namely as a collateralized bond obligation or a collateralized loan obligation (CLO). The transfer of credit risk takes place via special purpose vehicles (SPVs) set up by the bank.

The pioneering transaction by UBS in 2000 can be seen as an example for the mechanisms behind a CLO (UBS, 2000). In June 2000, UBS performed a synthetic securitization of loans to Swiss small and medium-sized enterprises (SMEs), to the total notional amount of

Chart 2

Collateralized Loan Obligation



Source: OeNB.

CHF 2.5 billion, by means of a CLO. Within this structure, the respective loans remain under the legal ownership of UBS, while the default risk is transferred via a debt issue and a special entity. The transfer of credit risk takes place by means of an SPV that functions as the protection seller to the bank, which is why this type of security is classified as a synthetic asset. Hence, the SPV serves as the counterparty in the risk mitigation process. The bond issued by the SPV consists of two components (tranches) with investment grade credit quality. The two tranches differ in their exposure to default risks. From the debt issue, government bonds are bought which serve as collateral to offset losses in the underlying loan portfolio. This collateral portfolio is deposited with the SPV. The repayment to the investors at maturity (i.e. after five years) is contingent on the size and frequency of credit events in the underlying loan portfolio and on the respective component of the bond issue the investors bought. CLO constructions frequently contain an equity component which remains with the issuer and serves as the first level of protection against defaults in the underlying assets, while the subordinated and senior tranches provide the next levels of protection against defaults.

The valuation of CLOs is a complex task which has been given some attention in academic literature. In the risk analysis and market valuation, two factors are crucial: First, the value of the synthetic security is to a significant extent determined by the structure of the default time correlations. It is a considerable challenge for banks to precisely estimate the interdependence of defaults in their loan books. Second, the management and risk controlling of the collateral which the SPV acquires as a reserve for defaults has a considerable impact on the value of the CLO.

2.2 Comparison of the Size of Derivatives Markets

The size of a credit derivatives market can best be quantified using data provided by the Bank for International Settlements (BIS) in its Triennial Central Bank Survey of Foreign Exchange and Derivatives Market Activity. The latest data set describes the global over-the-counter derivatives markets at the end of June 2001, with data covering banks and dealers in 50 countries. In contrast to other data sources, the BIS sample is more

Table 1

The Size of Derivatives Markets

	Notional amount		
	June 1999	June 2001	Growth
	USD billion		%
Foreign exchange	22,055	20,434	– 7.35
Interest rate	48,124	75,890	+ 57.70
Equity	1,341	2,039	+ 52.05
Commodity	506	674	+ 33.20
Credit derivatives	108	694	+ 542.59
Other	10	23	+ 130.00

Source: BIS.

reliable because it eliminates a double-counting of positions.

Table 1 shows that the two largest segments of the derivatives markets by far are those based on interest rates and on exchange rates. The latter category is the only one for which the BIS statistics show a decline for the period from 1998 to 2001. This drop in the recorded notional amount is linked to the beginning of the Economic and Monetary Union (EMU), which has considerably reduced the trading activity by eliminating a number of active rates. Table 1 also shows that the credit derivatives market is still quite small. However, given its particularly pronounced growth of 542%, within the last three years, this market has already overtaken the commodity derivatives market. It has a long history and includes oil-related instruments, which show active trading.

Another view on the dynamic developments in the credit derivatives market is provided by the International Swaps and Derivatives Association's (ISDA) end-2002 market survey, which is based on data from 80 ISDA member institutions: From June to December 2002, the volume of credit default swaps increased by over 37%. According to this latest estimate, the total volume of CDS in the credit derivatives market now amounts to USD 2,150 billion.

2.3 Current Situation

Currently banks, investment funds, hedge funds, insurance companies and corporates are the main participants in the credit derivatives market. This shows that these instruments are also being used by nonfinancial firms, such as companies seeking to protect the default risk they have acquired in the course of vendor financing. Trading is concentrated in London and New York.

The incentives for trading credit derivatives are partly regulatory, but mostly economic in nature. Bearing this in mind, some current applications of credit derivatives are:

– *Management of economic capital:* Credit risk portfolio management for banks, e.g. to reduce portfolio concentration. As can be seen from the example pertaining to CDS, the use of credit derivatives allows banks to apply portfolio optimization techniques to their loan books.
– *Management of counterparty risk:* Reduction of the default risk of a counterparty in OTC markets. As the awareness of counterparty risk increased in the aftermath of the collapse of LTCM, demand has grown for insurance against the deteriorating credit quality of important counterparties.
– *Management of credit lines:* Applied by banks willing to continue providing credit to a client

without increasing their exposure (e.g. based on the business strategy of relationship banks).

– *Management of regulatory capital:* Banks aim to increase the efficiency of their use of scarce resource capital by means of risk mitigation. Here, the use of credit derivatives aims at utilizing the difference between a company's actual default risk and its capital requirement.[1])

– *Investment /diversification:* A common example in this category is an institutional investor who has had no access to the credit markets so far or who desires to short-sell default risk. Creating synthetic assets composed of credit derivatives and other instruments provides access to these markets. This type of transaction has attracted an increasing number of insurers who wish to enhance the returns on their investments. Another trading strategy is to perform arbitrage between different markets, such as between corporate bonds, the secondary market for loans and credit derivatives.

– *Portfolio hedging:* An investment bank with a limited amount of capital available wishes to hedge the spread risk in its corporate bond portfolio.

One difficulty in trading credit derivatives is the legal framework of the respective contracts. Frequently, the definition of the credit event is not sufficiently clear. This problem is also seen as a major obstacle by the CGFS (CGFS, 2003). To reduce the negative influence of transaction risk and to lower trading costs, the ISDA has made efforts to improve the definition of bankruptcy and to reduce the need for legal questions to be decided in court. Currently, a number of court cases are pending which are based on different interpretations of whether a credit event actually occurred or not. Two typical examples are conglomerates within which only a lower-level entity defaulted or the question of how the merger of two companies affects the contractual arrangements for default protection.

3 Potential Implications

The ongoing dynamics of the process in question makes it difficult to arrive at definite conclusions regarding the potential implications of the use of credit derivatives. Our discussion is organized in two segments, one dealing with issues related to financial stability and the other with monetary policy issues.

Above all, the general question[2]) is how the introduction of a derivatives market may affect the underlying credit markets. In the field of financial economics, many authors have studied the potential changes in the stability, liquidity and price formation process of securities markets after a corresponding derivatives market evolved. The comprehensive empirical literature, as surveyed e.g. by Mayhew (2000), has so far failed to prove that the introduction of derivatives trading has destabilized the corresponding underlying markets.

3.1 Financial Stability Issues

When analyzing the implications the credit derivatives market has on the banking system, the first contentious point is the degree of effectiveness of the risk transfer, which is based on

1 *For a discussion of risk mitigation, see BCBS (2001).*

2 *A discussion of the incentive issues is provided by the CGFS (2003).*

the reliability of the credit risk mitigation banks achieve through the transfer of credit risk. A number of recent large-scale defaults provide extensive material for analysis. According to market participants, the new instruments proved successful in the case of the defaults of Swissair and Railtrack (JP Morgan, 2001). With regard to Enron, the ISDA observed that while 800 contracts with an aggregate notional amount of USD 8 billion were outstanding, the settlement of open contracts proceeded without major difficulties (ISDA, 2002). Also, the Bank of England notes that for both Enron and the Argentine default, the CDS market did not experience large-scale disruptions (Bank of England, 2002). To judge the full effectiveness of risk transfer in more detail, it would be necessary to obtain data on the related consequences for risk takers. However, such information is currently not available. In addition, a number of questions about the exact implications of some contracts remain unsolved and will still have to be decided in courts. As legal disputes continue, the ISDA has a vital role as arbiter. Its task is to improve the master agreements and hence to reduce potential ambiguities, which should eliminate the need for arbitration. In some cases however, the legal framework has been found to be rather challenging, in particular regarding the differences between U.S. and European bankruptcy laws.

Taking a wider perspective, a key question is how credit derivatives affect the evolution of the banking sector. Credit derivatives have started to influence the methods banks use for the pricing, risk management, origination, distribution and accounting of credit risk. One remarkable result is the changed awareness and pricing of credit risk. Given the nature of derivatives and the ease of trading, liquidity in the CDS market has been growing quickly, triggering changes in the process of price formation. As a consequence, CDS spreads have become price-determining factors for loans or bonds. In some cases, credit default swaps are now traded even before the corresponding bond has been issued into the primary market, which shows the increasing importance of CDS as a benchmark for some credit market segments.

If the development described above continues, it may at first sight seem to produce a dichotomy among debtors. For major debtors (such as companies in the Euro STOXX 50 index) or major emerging market borrowers, there is a unified market where the pricing of all credit instruments (bonds, loans or CDS) is based on a common estimation of default probabilities and the losses given default. Any price differences are then based on different exposures to liquidity risk or taxation. This market would show diminishing friction between the individual segments and a steadily increasing degree of integration. The remaining segment of the private debt market consists of smaller loans, e.g. loans to SMEs, which mostly remain with the originating bank, as is the case in Austria or Germany. Here, however, some changes have also been observed, as can be seen from the use of collateralized loan obligations by UBS described in section 2. Hence, the credit derivatives market will become increasingly important also for smaller banks because CDOs allow banks to manage the default risk in their portfolios. If these developments continue, they will influence the structure and competitive situation of the banking system. A related question is whether

these instruments lead to a change in the risk appetite of financial institutions. Hence, one danger is that banks may choose riskier strategies and leverage in the banking system may rise. Here, the evidence so far is not conclusive.

The continued growth of the credit derivatives market not only affects the banking system, but also bears on other components of the financial system. The overall effects on financial stability are of crucial importance for evaluating the impact of the credit derivatives market. The principal question is how credit risk is transferred within the financial system.[1]) The current data situation with respect to the migration of risk is not satisfying as only relatively little reliable information is available on the dispersion of default risk outside the banking sector. Hence, credit derivatives may reduce the transparency within the financial system regarding the allocation of risks. Although banks still report loans in their balance sheets, they have separated ownership from bearing the corresponding default risk. Currently, insurers seem to be quite active as sellers of protection with a market share of around 25% (FSA, 2002).

Given the differences in the regulatory framework valid for banks and for the new class of market participants, the question arises as to whether the latter's methods of valuation and management of credit risk are sufficiently well developed. In many cases, the reporting of positions held by insurers is quite difficult given their location in offshore financial centers such as the Bermudas. The issue has even more weight in policy discussions because insurers are becoming more and more important as providers of investment opportunities. An example for the stronger role of insurers is the growth in savings instruments such as life insurance or pensions. The potential problems insurers have with credit derivatives are particularly relevant in the case of highly complex instruments such as CDOs. The increasing use of CDOs has caused quite some controversy in recent years. The U.K. Financial Services Authority (FSA) mentioned potential dangers arising from these instruments in the context of cross-sector risk transfers (FSA, 2002). Some regulators are concerned that CDO buyers lack sufficient knowledge for pricing and hedging these complex instruments. A number of investors were surprised by sudden large-scale losses from their CDO positions. The FSA concludes that some problems have been solved due to the fact that the entities of "naïve capacity" is no longer active as sellers of protection. Other problems that emerged with CDOs were related to Enron. In this case, the accounting and public reporting of transfer instruments were severely underdeveloped. This was particularly true for the use of SPVs to lower the degree of leverage in the balance sheet.

Another area of concern is partly related to the strong growth of the credit derivatives market. The rapid development, in parallel with continuing consolidation in the banking industry, has led to a very high concentration of market makers in the area of credit derivatives. In 2001, the top three banks had a market share of 94% in the U.S. credit derivatives market (BIS, 2002). This high degree of concentration considerably increases counterparty risk because, as

1 *This issue is frequently discussed, see e.g. Rule (2001a and b), FSA (2002), IMF (2002) or BIS (2002).*

a consequence, very few traders are responsible for the functioning of the market. Additionally, the provision of liquidity and risk-bearing capacity can become quite difficult in times of crises. In the event that one of the most active market participants suffers problems, the entire market may be shaken so that systemic risk seems a realistic concern. The high concentration also shows in the fact that the quotes for buying protection are volatile and hence the market is not yet deep enough to cope with sudden increases in demand.

Other potential consequences of the growth of credit derivatives relate to the management of bankruptcy. The key question here is whether banks tend to monitor credit quality less extensively if parts of the default risk are transferred.

3.2 Monetary Policy Issues

The credit market plays a central role in the transmission of monetary policy actions to the real economy. A key question is whether the transfer of credit risk within the financial system has changed the transmission mechanism of monetary policy. A detailed survey of the current state of research on the functioning of the transmission mechanism can be found in Kuttner and Mosser (2002).

A particularly important question for central banks is how the transmission mechanism is affected by the migration of credit risk from banks to other market participants. Currently, research does not provide a clear-cut answer from empirical literature on the consequences of credit derivatives.

However, we can draw on the more general discussion of the effects of financial innovation on the monetary transmission mechanism (Federal Reserve Bank of New York, 2002). The transfer of credit risk, which we have so far discussed from the perspective of credit derivatives, can also be achieved by securitization. In this case, the risk is transferred by selling the debt from a bank's balance sheet. Securitization has become an established technique in the capital markets of both the U.S.A. and the euro area. It involves the issuance of new securities which are backed by a pool of financial or nonfinancial assets. The most common application is for household or corporate mortgages. These assets are transferred under the legal control of the new investors via an SPV created especially for this transaction. In the euro area, the creation of securities from existing claims is an established feature in the pfandbrief segment.

Estrella (2001 and 2002) discusses the effects of the growing use of securitization in the U.S.A on the transmission mechanism. He identifies the credit channel and the interest rate channel as the two components most likely to be affected. In an empirical evaluation of a sample comprising macroeconomic variables and the volume of mortgages, he finds a significant negative change in the interest rate elasticity of the output gap. Estrella concludes that the growing use of the balance sheet-based transfer of credit risk has reduced the efficacy of monetary policy. His explanation is that this change is rather traceable to effects within the credit channel (i.e. liquidity and credit volume) than to the interest rate channel. This evidence from the U.S. indicates that the growing use of credit derivatives may strengthen the effects outlined above. Therefore, it seems conceivable that the ongoing increase in the transfer of credit risk, both on and off banks' balance sheets, may over

time reduce the impact of monetary policy actions.

Another issue arising in the course of the discussion is the effect of risk transfers on the data used in the analysis of monetary policy. Here, the increasing use of credit derivatives may lower the information content of monetary policy indicators. One example is the growth of loans to the private sector. If banks transfer part of the default risk on their balance sheets to other institutions outside the banking sector, figures indicating the total exposure of the banking sector lose their information content as a measure for financing conditions.

4 Summary

Given the early stage of developments, it is difficult to assess the implications of the introduction of credit derivatives in detail. In this paper, we have outlined several potential implications. Regarding financial stability, a key question is the degree of effectiveness of the risk transfer. Some preliminary evidence is positive, but an overall assessment is currently difficult given the lack of transparency. Other implications relate to the mechanism of risk transfer within the financial system and to the question of how the functioning of credit markets is affected by the new products. Particularly, the migration of risks outside the banking sector has raised substantial concerns about potential weaknesses in the risk management capacity of the new risk takers, e.g. insurers. In the context of monetary policy, the central question is how the transfer of credit risk within the financial system changes the transmission mechanism of monetary policy. Here, preliminary analysis on the impact of securitization in the U.S.A. indicates that the enhanced transfer of credit risk may reduce the impact of monetary policy actions.

With a view to providing an overall conclusion, the detailed analysis undertaken by the G 10 central banks within the CGFS finds that "(i)nnovation in financial markets, and within that the development of new financial instruments such as credit derivatives, is generally to be welcomed as increasing market efficiency, enabling better diversification of portfolios and providing a wider range of techniques for risk management. However, there are a number of aspects of credit risk transfer which raise policy issues and which, at least in some cases, might point to the need for a policy response."[1]) In this context, market transparency, the role of rating agencies, market concentration, contract design, risk management, accounting and regulation are key issues for discussion and analysis.

Among these key issues, two seem to be of particular importance. First, it is necessary to improve the regulatory framework and the accounting rules that apply when nonbank financial institutions hold credit risk transfer instruments. Second, the high concentration of active operators in the market for credit risk transfer may pose a sizeable problem in times of market turbulence.

1 *See CGFS (2003), p. 2.*

References

Bank of England. 2002. Financial Stability Review 12. London: Bank of England. June.

BCBS – Basel Committee on Banking Supervision. 2001. The New Basel Capital Accord. Consultative Paper. Basel: Bank for International Settlements. January.

BIS – Bank for International Settlements. 2001. The Changing Shape of Fixed Income Markets. BIS Working Paper 104.

BIS – Bank for International Settlements. 2002. 72nd Annual Report. Basel: Bank for International Settlements.

BIS – Bank for International Settlements. 2002. Triennial Central Bank Survey of Foreign Exchange and Derivatives Market Activity 2001 – Final Results. Basel: Bank for International Settlements.

Bomfim, A. N. 2002. Understanding Credit Derivatives and Their Potential to Synthesize Riskless Assets. Washington, D.C.: Federal Reserve Board. Mimeo.

Cossin, D. and T. Hricko. 2002. Exploring for the Determinants of Credit Risk in Credit Default Swap Transaction Data: Is Fixed-Income Markets Information Sufficient to Evaluate Credit Risk. Lausanne: University of Lausanne. Mimeo.

CGFS – Committee on the Global Financial System. 2003. Credit Risk Transfer. Working Group Report 20.

Deutsche Bank. 1999. Credit Derivatives and Structured Credit: A Survey of Products, Applications and Market Issues. Global Markets Research.

Duffie, D. and N. Gârleanu. 2001. Risk and Valuation of Collateralized Debt Obligations. Stanford: Stanford University. Mimeo.

Duffie, D. and K. J. Singleton 2003. Credit Risk: Pricing, Management, and Measurement. Princeton Series in Finance. Princeton: Princeton University Press.

Estrella, A. 2001. Financial Innovation and the Monetary Transmission Mechanism. In: Focus on Austria 3-4. Vienna: Oesterreichische Nationalbank. 155–172.

Estrella, A. 2002. Securitization and the Efficacy of Monetary Policy. Economic Policy Review 8(1). New York: Federal Reserve Bank of New York. May. 243–255.

Federal Reserve Bank of New York. 2002. Financial Innovation and Monetary Transmission. Proceedings of a Conference Sponsored by the Federal Reserve Bank of New York, April 5 and 6, 2001. Economic Policy Review 8(1). New York: Federal Reserve Bank of New York. May.

Ferguson, R. W. Jr. 2002. Financial Engineering and Financial Stability. Speech at the Annual Conference on the Securities Industry, American Institute of Certified Public Accountants and the Financial Management Division of the Securities Industry Association. November 20.

FSA – Financial Services Authority. 2002. Cross-Sector Risk Transfers. FSA Discussion Paper 11.

Houweling, P. and T. Vorst. 2002. An Empirical Comparison of Default Swap Pricing Models. Rotterdam: Erasmus University Rotterdam. Mimeo.

IMF – International Monetary Fund. 2002. Global Financial Stability Report: A Quarterly Report on Market Developments and Issues. Washington D.C.: IMF. March.

ISDA – International Swaps and Derivatives Association. 2002. Enron: Corporate Failure, Market Success. ISDA 17th Annual Meeting in Berlin. April 17.

ISDA – International Swaps and Derivatives Association. 2003. ISDA 2002 Year-End Market Survey. Press release. March 19.

JP Morgan. 1998. Credit Derivatives: A Primer.

JP Morgan. 2001. Credit Derivatives Research Alert.

Jarrow, R. A. and Y. Yildirim. 2002. Valuing Default Swaps Under Market and Credit Risk Correlation. In: Journal of Fixed Income 11(4). March. 7–19.

Kasapi, A. 1999. Mastering Credit Derivatives. London: FT Prentice Hall.

Kuttner, K. and P. Mosser 2002. The Monetary Transmission Mechanism: Some Answers and Further Questions. In: Economic Policy Review 8(1). New York: Federal Reserve Bank of New York. May. 15–26.

Marsh, I. W. 2002. What Central Banks Can Learn About Default Risk from Credit Markets. In: BIS Papers 12. August. 329–339.

Mayhew, S. 2000. The Impact of Derivatives on Cash Markets: What Have We Learned? Athens, GA: University of Georgia. Mimeo.

Morrison, A. D. 2001. Credit Derivatives, Disintermediation and Investment Decisions. Oxford Financial Research Centre Working Paper 2001-FE-01. Oxford: University of Oxford.

Rule, D. 2001a. The Credit Derivatives Market: Its Development and Possible Implications for Financial Stability. In: Financial Stability Review 10. London: Bank of England. June. 117–140.

Rule, D. 2001b. Risk Transfer Between Banks, Insurance Companies and Capital Markets: An Overview. In: Financial Stability Review 11. London: Bank of England. December. 137–159.

Scott-Quinn, B. and J. Walmsley. 1998. The Impact of Credit Derivatives on Securities Markets. Zurich: International Securities Market Association (ISMA).

UBS. 2000. UBS lanciert innovative synthetische Securitisation für den Schweizer Markt. Press release. Zurich/Basel: UBS. June 22.