An Introduction to Credit Derivatives

by
Gunter Dufey[1]
and
Florian Rehm[2]

Teaching Note
This version: 1st August 2000

Abstract: This paper provides the reader with introductory information about credit derivatives. It explains the most widely used products in a simple way, gives a broad overview over the applications of credit derivatives and provides estimates of the global market size.

[1] Prof. Gunter Dufey is Professor of CSIB and Finance at the University of Michigan Business School, Ann Arbor, MI, USA and is Head of the Chair of International Corporate Finance at WHU, Otto Beisheim Graduate School of Management, Burgplatz 2, 56179 Vallendar, Germany. Phone: +49-261-6509-400, Fax: +49-261-6509-409. Email: gdufey@whu.edu, URL: http://www.whu.edu/finance

[2] Dipl.-Kfm. Florian Rehm is Research Assistant at the Chair of International Corporate Finance at WHU, Otto Beisheim Graduate School of Management, Burgplatz 2, 56179 Vallendar, Germany. Phone: +49-261-6509-403, Fax: +49-261-6509-409. Email: frehm@whu.edu, URL: http://www.whu.edu/finance

1. Credit Derivatives – What is so special about them?

Credit Derivatives are contracts between two financial market participants. The essence of the contract is concerned with transferring credit risk from one party to another. Credit risk is the risk of the debtor's default on financial claims, regardless whether s/he is unable or unwilling to pay. The product "credit derivative" enables the transfer of this risk from the lender to someone else and thus, provides the lender the possibility to hedge against a debtor's default.

Historically, credit derivatives are part of the financial innovation taking place in the 1990's: banks were looking for a way to extend additional credit demanded by their most profitable and important clients, having however reached the limits of credit exposure to these entities. Selling the credit risk to another institution, banks or others, enabled them to continue extending the credit volume, simultaneously hedging the embedded credit risk away by selling it, typically without the knowledge of the client. Credit derivatives were at that time comparable to credit insurance.

Like all financial innovation, a credit derivative is a new form of financial instrument of "product" which is developed by unbundling various components from a traditional financial contract and "repackaging" them into a new contract. Possible features of these contracts are the underlying, the strike price, the currency denomination, interest rate, liquidity, maturity, default, the size of payment and the event of payment.

Comparing credit derivatives with other well-known derivatives like interest rate swaps or equity derivatives shows why many market participants have difficulties using them. An equity derivative bears market risk as its basic, underlying risk, measured in historic and implicit volatility of the stock or of a market index, an interest derivative bears interest rate risk, measured in terms of historic and implicit interest rate volatility of an underlying base rate like LIBOR. In contrast to those, a credit derivative bears credit risk.

The main problem is to measure and define "credit risk" per se. At this time, there is no common pricing model for credit risk, nor exists an index for credit risk as does LIBOR for interest rates. With credit risk derivatives, normally loans or bonds are used as the underlying. The problem with loans is that they are not traded. Thus, there is no market price for such an instrument that could be unbundled.

Nevertheless, the best indicator for credit risk is the credit spread between a default free interest rate – like that of Treasury bonds issued by major industrialized countries – and the interest rate of bonds the clearly are fraught with default risk, such as emerging market sovereign debt or corporate bonds. Using this market data enables one to calculate the "embedded" or "implied" pure credit risk and through pricing make it tradable.

2. The Products

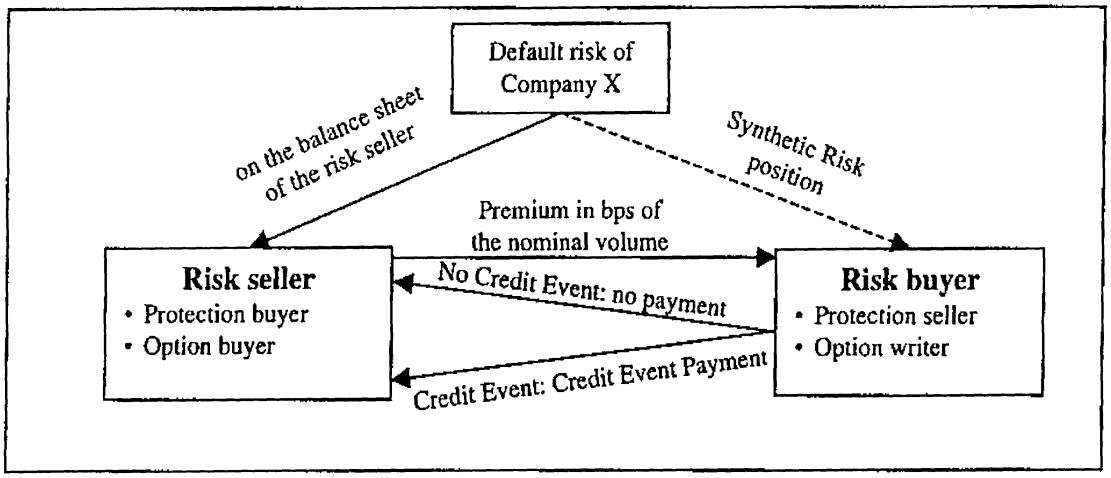
According to the BBA 1998 survey[3], the different types of credit derivatives being used in the global markets comprise the following:

Credit Default Swaps	40%
Total Return Swaps	10%
Credit Spread Products	23%
Credit Linked Notes	16%
Others[4]	11%

Table 1: Market shares of the leading types of Credit Derivatives

2.1 Credit Default Swap

The Credit Default Swap is closest to a credit insurance contract. It is basically an option where the risk seller pays a premium measured in basis points of the nominal amount. As this premium is paid on an annually revolving basis, a Credit Default Swap can also be expressed as a series of credit default options. In the case of a credit event, the risk buyer is paying a credit event payment. The most common credit events are those defined by the ISDA: failure to pay, bankruptcy, cross-default, restructuring, cross-acceleration, repudiation, merger, regulatory suspension, and downgrading.



Graph 1: The structure of a Credit Default Swap

In case of the Credit Event the value loss of the underlying is to be compensated by the Credit Event Payment.
There are three different methods of defining the Credit Event Payment:

[3] British Bankers' Association: Credit Derivatives Report 1998, London
[4] Other products are basket products or hybrids.

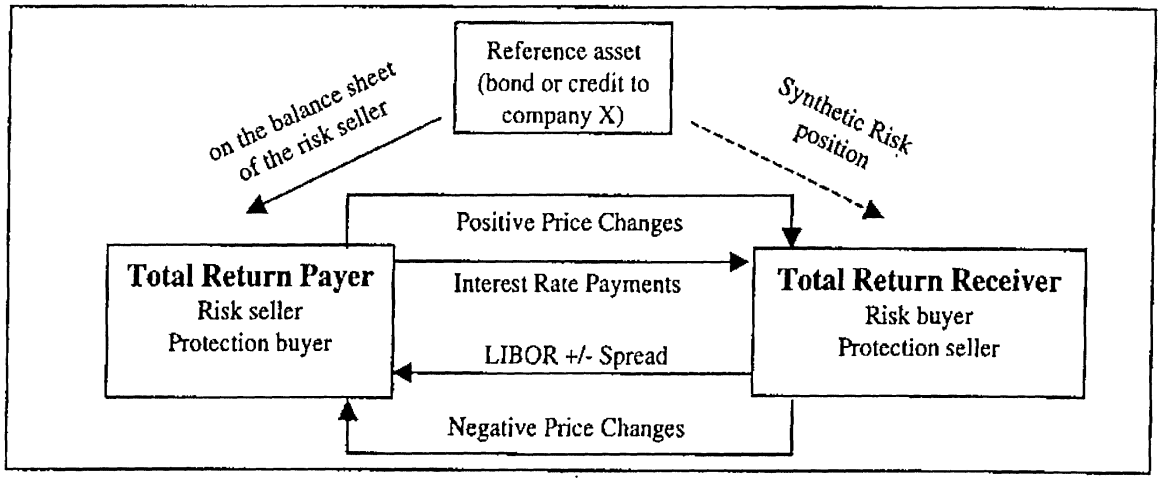
1. Cash Settlement: The risk buyer pays the difference between par and the recovery value of the underlying.
2. Physical Settlement: The risk buyer receives the underlying (and thus the remaining market value of the bond) and pays the nominal value to the risk seller.
3. Binary: The risk buyer pays a fixed amount stipulated in the contract.

2.2 Total Return Swap

In contrast to a Credit Default Swap, a Total Return Swap involves the sale of not only the credit risk involved in an underlying bond, but also the market risk, caused by interest rate changes.

In a Total Return Swap, the "total return payer" who normally physically owns a reference asset is paying all interest rate payments and possible positive market price changes of the underlying. The other party involved, the "total return receiver" is paying LIBOR plus or minus a spread, the possible negative market price changes of the underlying and the loss occurring in case of a default. To reimburse the counterparty for the credit risk taken, the LIBOR payment is applied to a lower notional amount than the coupon on the reference asset.

Similarly to interest rate swaps, a synthetic position in bonds which includes in addition an interest rate component as well as a default component can be build. Thus, the Total Return Receiver's position is equivalent to a long credit risk position and the Total Return Payer's position is equivalent to a short credit risk position which completely hedges the latter's real position in the reference asset.

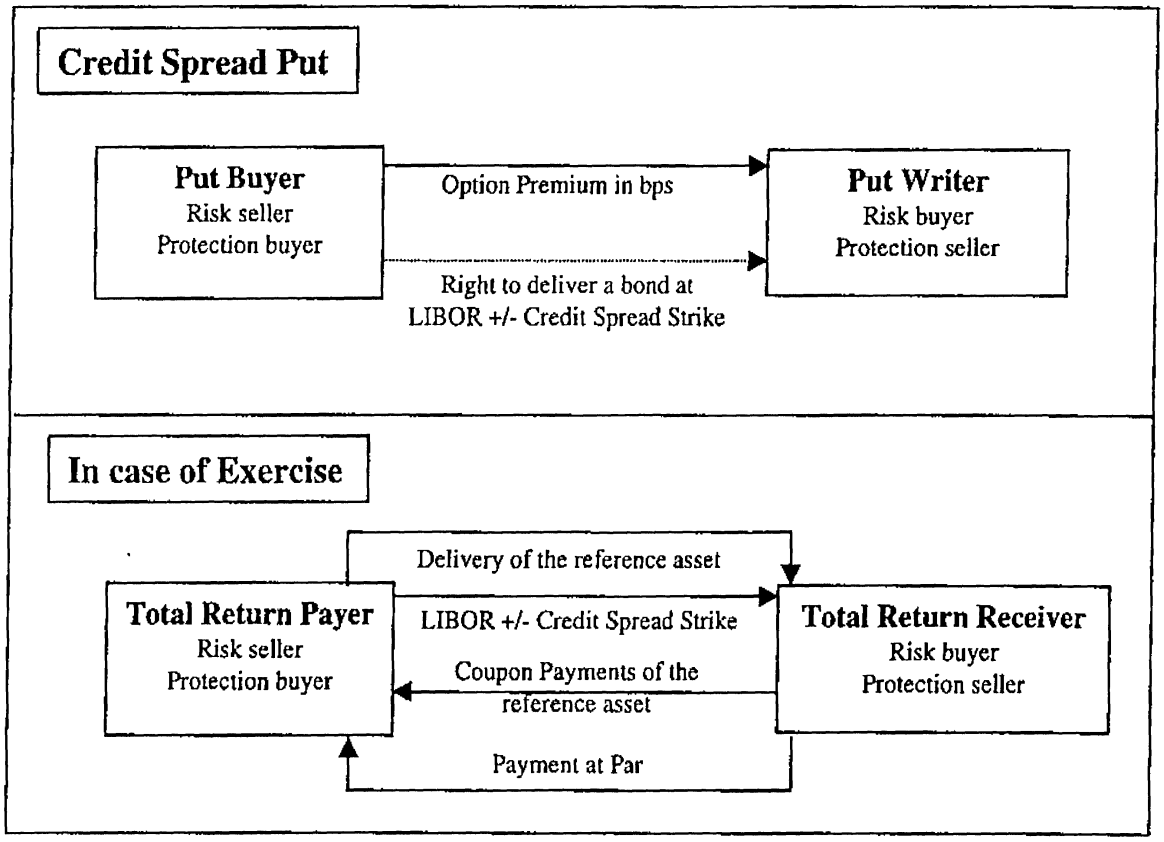


Graph 2: The structure of a Total Return Swap

2.3 Credit Spread Put

The Credit Spread Put is an instrument which enables to hedge away the credit spread risk, i.e. the risk of an increasing spread between the interest rate of a corporate bond and the reference interest rate which is LIBOR for floating rates and T-bond yield for fixed interest rates. If the spread increases above the negotiated strike spread, the option can be exercised and the reference asset will be delivered at strike.

For this protection against rising spreads, the put buyer is paying an option premium. Normally, the underlying reference asset is a bond or a basket of bonds. The Credit Spread Put on loans implies a synthetic pricing of these loans, whereby in case of exercise the value transfer is executed by cash settlements instead of physical delivery.



Graph 3: The structure of a Credit Spread Put[5]

[5] Graph taken from Heidorn (1999): Kreditderivate, Frankfurt, p. 7

2.4 Credit Linked Note

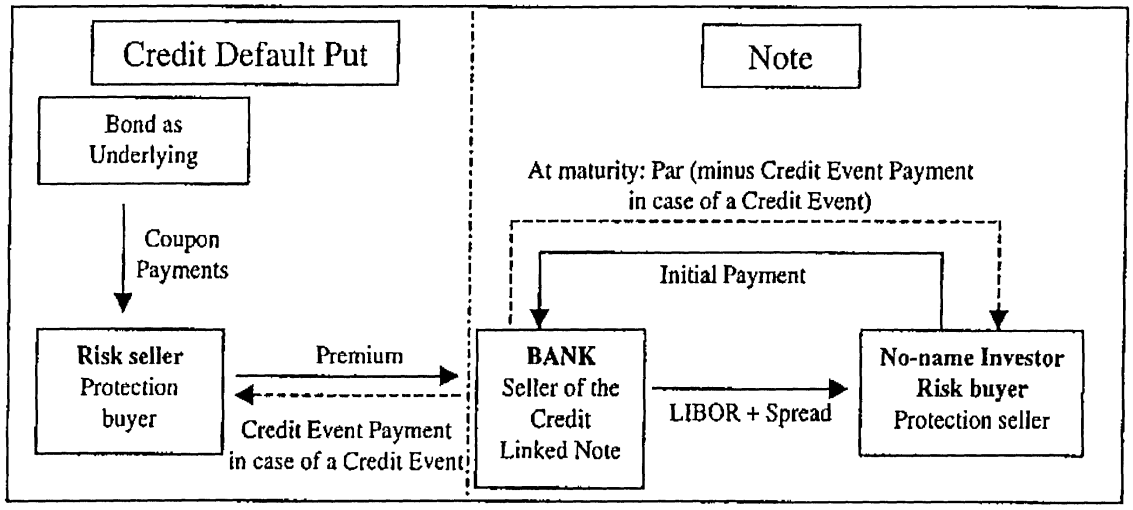
Looking at all the previously presented credit derivatives, it becomes obvious that, for the risk seller, the credit risk of the reference asset has been exchanged against the credit risk of the counterparty as there is now the chance of the protection seller's default. This risk is considered virtually negligible for large banks in countries that follow a credible policy of "too big to fail".

To enable the participation of a larger group of players in this market, "credit linked notes" were introduced. In these structures investors buy a bond whose interest payments and final payment are linked to the credit standing of an underlying reference asset. As compensation for taking this risk the coupon of such a note is increased by the embedded option premium.

The default risk of the investor can be neglected in this structure as the note functions as quasi-deposit for eventually needed payments in case of a default of the reference asset.

Indication	Embedded Credit Derivative
Credit Default Note	Credit Default Option
Basket Credit Default Note	Basket Credit Default Option
Credit Spread Note	Credit Spread Product
Total Rate of Return Linked Note	Total Rate of Return Swap

Table 2: Overview over Credit Linked Notes[6]



Graph 4: The structure of a Credit Default Note

[6] See Heidorn (1999): Kreditderivate, Frankfurt, p. 9.

3. Applications of Credit Derivatives

According to a survey from BBA[7] the most widespread application of credit derivatives is for the management of credit lines and, thus, a solution to the so-called "credit paradox". This means that banks originate more loans to certain sectors and certain names who they know better, which means that banks lend their money to those clients they know best. Thus, some risk limits are exhausted while others remain underutilized, and the overall capacity of the bank's loan portfolio is used inefficiently from the perspective of diversification.

Credit derivatives enable banks to originate loans according to their client relationships, but removing the credit risk from their balance sheets without the clients' knowledge while retaining ownership over the loans. This use of credit derivatives becomes obvious from the 1998 BBA Credit Derivatives Survey where market participants were asked the following question: "What will be the applications for credit derivatives in the London market in 2000?"

The answers mentioned the following in order of frequency

1. Management of credit lines
2. Diversification
3. Management of economic capital
4. Investment
5. Management of regulatory capital
6. Balance sheet optimization
7. Product structuring

Since the majority of the market participants are banks – and they are expected to remain dominant players – , it seem obvious that "management of credit lines" as the application is number one.

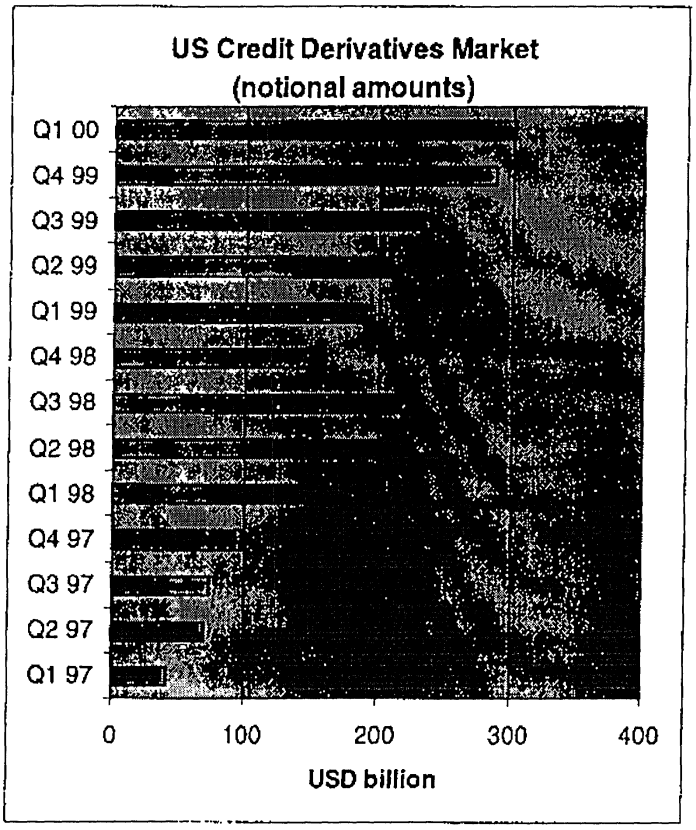
Nonetheless, different applications attract different users. Hedge -, mutual -, and pension funds are more likely to be interested in investment, while corporates are expected to use credit derivatives to manage their credit lines or for diversification.

[7] British Bankers' Association: Credit Derivatives Report 1998, London, p. 28.

4. The Global Market Size of Credit Derivatives

As the market for credit derivatives is mainly an OTC market and thus all contracts are negotiated on an individual basis, it is difficult to estimate the global market size of credit derivatives.

Estimates for the year 2000 are around USD 1 500 billion[8] worldwide, of which more than 50% is generated in London. Market growth is somewhere between 80% and 200% per year[9]. Growth rates like this show that the market itself is relatively young and small. Comparing the notional amount of credit derivatives held by commercial banks with the whole amount of derivatives, credit derivatives are only 0.4% of the notional amount outstanding.



Graph 5: Notional volumes of the US Credit Derivatives Market[10]

[8] Tavakoli (1998): Credit Derivatives, New York, p. 6.
[9] British Bankers' Association: Credit Derivatives Report 1998, London, p. 5
[10] Data: Office of the Comptroller of the Currency (2000), p. 1, and all previous quaterly reports since 01/97.