

## **Introduction to Credit Derivatives and Credit Default Swaps**

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Basics of credit derivatives and credit default swaps.  
Counterparty risk and language arbitrage explained.

**By Janet M. Tavakoli, President, Tavakoli Structured Finance, Inc.**

**Note from Janet Tavakoli:** In recent years there has been widespread manipulation, fraud, and abuse in the credit derivatives market. Many of these abuses are detailed in my 2003 book, *Collateralized Debt Obligations and Structured Finance*, and the fully updated 2008 second edition, *Structured Finance & Collateralized Debt Obligations*. For recent updates, please see the press section of [Tavakoli Structured Finance's](#) web site.

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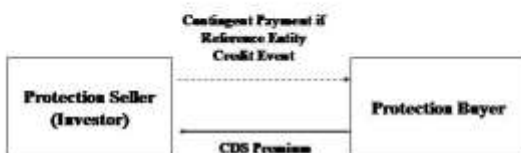
Astonishing rapid growth resulted in an estimated \$3 trillion in credit derivatives contracts outstanding at the end of Q1 2003, and the British Banker's Association estimates the credit derivatives market size will reach \$4.8 trillion by the end of 2004. If the current growth rate continues, this market will reach \$6.5 trillion by the end of 2005.

**Note on updates from Janet Tavakoli:** The credit derivatives market took off after 2005. In recent years there has been widespread manipulation, fraud, and abuse in the credit derivatives market. Many of these abuses are detailed in my 2003 book, *Collateralized Debt Obligations and Structured Finance*, and the fully updated 2008 second edition, *Structured Finance & Collateralized Debt Obligations*. For recent updates, please see the press section of Tavakoli Structured Finance's web site.

The most common type of credit derivative is the credit default swap. A credit default swap or option is simply an exchange of a fee in exchange for a payment if a "credit default event" occurs. Credit default swaps differ from Total Rate of Return Swaps in that the Investor does not take price risk of the Reference Asset, only the risk of default. The Investor receives a fee from the Seller of the default risk. The Investor makes no payment unless a Credit Default Event occurs.

The traditional or "Plain Vanilla" credit default swap is a payment by one party in exchange for a credit default protection payment if a credit default event on a reference asset occurs. The amount of the payment is the difference between the original price of the reference asset and the recovery value of the reference asset. The following schematic shows how the cash flow of this credit derivative transaction work:

### Generic Credit Default Swap (CDS)



The Protection Seller receives a periodic premium from the Protection Buyer in exchange for a contingent payment if there is a Credit Event of the Reference Entity. The contingent payment is determined based on pre-specified settlement terms.

Source: *Credit Derivatives & Synthetic Structures 2nd Edition*, John Wiley & Sons, 2001 by Janet Tavakoli

If the fee is paid upfront, which may be the case for very short dated structures, the agreement is likely to be called a credit default option. If the fee is paid over time, the agreement is more likely to be called a swap. Unless two counterparties are actually swapping and exchanging the credit default risk of two different credits, I prefer to call the former structure a credit default option. Cash flows paid over time are nothing more than an amortization of an option premium. Because the documentation references ISDA master agreements, however, swap terminology has crept into the market. Since the credit derivatives business at many commercial and investment banks is often run by former interest rate swap staff, the tendency to use swap terminology persists. Therefore, I will most often refer to these transactions as credit default “swaps”.

The credit default premium is usually paid over time. For some very short dated structures, the credit default premium may be paid upfront. In fact, professionals new to this market often ask if the premium should be paid upfront, instead of over time. After all, if the credit defaults, the default protection Seller will get no additional premiums.

The credit default option or swap is a contingent option, and not to be confused with an American option. A Termination Payment is only made if a Credit Event occurs. If the credit event does not occur, the default protection Seller has no obligation. The premium can be thought of as the credit spread an Investor demands to take the default risk of a given Reference Asset. If the Investor bought an asset swap, the Investor would earn a spread to his funding cost representing the compensation, the premium, the Investor would need to take the credit default risk of the Reference Asset in the asset swap.

For an American option, the premium is paid upfront (or over time, but with the proviso that the total premium is owed, even if exercise occurs before the expiration date). The American option can be exercised any time that it is in the money. The holder of the option does not have to exercise, however, and can wait and hope the option will go further in the money. If the market reverses direction, the American option can again become out-of-the money, and the holder who failed to exercise the option when it was in the money cannot exercise. With a credit default option, once the trigger event has occurred, the holder must exercise and the option stays exercisable.

Default Protection can be purchased on a loan, a bond, sovereign risk due to cross border commercial transactions, or even on credit exposure due to a derivative contract such as Counterparty credit exposure in a cross currency swap transaction. Credit protection can be linked to an individual credit or to a basket of credits.

At first glance, a credit default swap or option looks structurally simpler than a total return swap. We already know that a total return swap is simply a form of financing. In this chapter we will explore the complex, various, and interesting features of the credit default swap and the credit default option market. *Complex? Various?* Wait a minute. Didn't I mention that a total return swap already has a credit default swap imbedded in its structure? After all, if my Counterparty is taking the default risk of a bond or a loan, I have reduced my credit exposure to that reference asset. We understand everything there is to know about credit default swaps already. Don't we?

That is the question most practitioners ask themselves the first time they enter into a credit default contract. The first key difference is that although the price or premium of a credit default swap or option may increase, it is never actually in-the-money until a credit default event as defined by the confirm language has occurred. That seems like a knock-in option or a knock-in swap, which is a type of barrier option. Knock-in options have been

around since the 1960's. When a market price reaches a pre-determined strike price, the barrier, the knock-in option comes into existence. But *this* "knock-in" is not linked to traditional market factors, but rather to either credit default or a credit "event". If the option "knocks in" then, and only then, is the option in the money. The termination payment is usually not binary or pre-defined, although we will explore exceptions in this chapter. The termination payment is linked to a recovery value or recovery rate for the reference credit or reference credits involved.

The terminology is further complicated by the US market's use of the word swap to refer to an exchange of one bond for another (usually accompanied by a cash payment to make up for any discrepancy in relative values), and the UK market's use of the term "switch" for the same transaction. US market practitioners are often mystified when they first hear of "asset swap switches", an exchange of one asset swap package risk for another asset swap package risk. We will discuss this product later in this chapter.

As we will see in this chapter, a variety of structures have evolved in this market. The risk characteristics of these structures are different from the structures we have discussed so far and merit close scrutiny. One structure known by such names as: Digital, binary, all-or-nothing, and the zero-one structure has a substantial amount of risk. The Investor loses *the entire notional amount* – not merely coupon and some principal loss- if there is a default event.

Other structures such as the 'par value minus recovery value' structure can leave a position of premium bonds partially unhedged or can overhedge a position of bonds trading below par. Exposure management officers evaluating the suitability and appropriateness of such deals must be fully aware of the full exposures implied in these transactions.

The credit swap becomes even more interesting when one realizes that the term "default event" does not even apply to many credit agreements. The event, which triggers a termination payment under the terms of the credit default swap confirmation, is negotiable. The event may be defined as a spread widening, an event in a foreign country that may cause its sovereign debt to decline in price, or just about any event upon which the two parties can agree and define a price. Even the termination payment is negotiable. It may be pre-set at a fixed amount, or based on the recovery value of a reference asset, to mention only two structures.

Some credit "default" options, those linked to spread widening, for instance, sound suspiciously like put options which are struck out-of-the-money.

A German bank's emerging markets trader discovered he had exceeded his Russia position limit, an offence for which he could have been fired. He approached a large American bank and asked to buy credit protection on Russia for one month. To accomplish this, the German bank's trader paid a high premium for a one month, thirty-five point out-of-the money put on Russian Vanesh. The American bank happily pocketed the fat premium for an option the American bank considered virtually worthless. There was no pricing model, no calculation of recovery values, and no analysis of asset swap spreads. The price the German bank's trader was willing to pay was an obvious windfall for the American Bank. The need defined the price.

Was this transaction a credit derivative or was this merely a bond option?

The credit derivatives market has adopted over the counter versus exchange traded terminology, which makes it difficult to define the size of the credit derivatives market. Virtually any credit related over the counter option could be defined as a credit derivative. Generally, however, credit derivative contracts are further distinguished from other over the counter options on bonds by the fact that they are negotiated transactions.

Was the Morgan Grenfell trade a credit derivative? It certainly helped a bank free up credit lines. It was a negotiated transaction. I would say that yes, the transaction was a credit derivative, albeit the circumstances created an urgent and odd negotiation which suited both parties.

### **Importance of the Default Protection Seller**

If an Investor is purchasing credit default protection, what kind of credit default protection Seller is most desirable? If prices were the same, a default protection Seller with a triple A credit rating and a 0% correlation with the asset the Investor is trying to hedge would be the most desirable. But as we saw in the section on Total Rate of Return Swaps, a default protection Seller with these characteristics will probably sell very expensive protection. Therefore, it is beneficial to relax the criteria and find another provider. The Investor should be aware that there are unsuitable providers, however.

There are unsuitable applications, too. One must ask the right questions before trying to apply a solution. Credit derivatives are sometimes seen as the panacea, the answer to any finance problem, which cannot be solved by conventional market strategies.

### ***The whole point of using credit derivatives is to diversify credit risk.***

Asset swap spreads are independent of the credit quality of the Investor. A market asset is swapped to a LIBOR based floating coupon, for instance. The market is indifferent to the credit quality of the Investor, who pays cash upfront for the asset swap package. Unlike an asset swap, the premium paid to the "Investor", the credit default protection Seller, is sensitive to the credit quality of the Investor. The premium is further sensitive to the correlation between the "Investor" and the reference asset on which one is buying the credit default protection. Depending on the structure, the credit default swap contract may require an un-collateralized payment by the "Investor" if there is a credit default event.

An Investor has a choice of buying credit default protection from one of two counterparties to hedge a single A rated asset. One Counterparty is rated BBB with a 0% correlation with the A credit. The second Counterparty is rated single A, but is 90% correlated with the single A rated asset, which I'm trying to hedge. Which Counterparty is the better choice?

Counterintuitive as it may seem; ***it is better to buy credit default protection from an uncorrelated lower rated credit default protection Seller than from a credit protection Seller, which is highly correlated with the reference asset one is trying to hedge.*** Again, the benefits of diversification, as we saw in the S&P table earlier weigh in favor of the BBB Counterparty. The joint probability of default between the A rated asset and the BBB Counterparty might merit an implied credit rating of AA for the credit default protected asset. The combination of the 90% correlated A rated names would probably merit a rating no higher than A.

Determining correlation then, would seem key. The more information one has on correlation and credit risk, from whatever the source, the better. In the end, it is differences in interpretation of information, which make a market.

### **Credit Default Swaps are Negotiated Transactions**

Credit Default Swaps are negotiated transactions, and although there is some agreement on what is a plain vanilla structure, there is very little agreement on anything else. No standard practice exists in the credit derivatives market, so just about any contract imaginable can be created. The key issues in the credit default swap market revolve around the following parameters:

1. Defining the event
2. Determination of the Default Protection Fee
3. Determination of the reference asset
4. Determination of the default payment

When Enron declared bankruptcy on December 2, 2001, J.P. Morgan Chase Bank had \$965 million in losses from payments due on oil and gas contracts with Enron. J.P. Morgan Chase Bank thought the contracts were hedged with surety bonds. The surety bonds were advance payment bonds that guaranteed Enron's credit risk on pre-paid oil and gas forward delivery contracts.



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