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Credit Derivatives

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ABSTARCT

The objective of this paper is to introduce credit derivatives and their uses in financial markets by institutional investors and corporate financial managers. First, the purpose of credit derivatives and their relationship to different types of credit risk will be explained. Next, several basic terms related to credit derivatives will be introduced, which will be followed by a typology of credit derivatives. Throughout the paper, current and potential uses of credit derivatives will be suggested.

CREDIT DERIVATIVES

Credit derivatives are derivative instruments whose purpose is to control credit risk, i.e., transfer the risk from one party to another. The goal is mainly to decrease credit risk; however, some credit derivatives ("not pure" credit derivatives) actually increase the exposure to credit risk.

The use of credit derivatives has increased significantly in recent years (see exhibit 2) as portfolio managers and investors are trying to protect their portfolios more efficiently against various kinds of risk including credit risk.

There are several types of credit derivatives; the most frequently used ones are credit default products, i.e., credit default swaps and credit default options. Other types of credit derivatives are credit spread options and credit spread forwards. Asset swaps and total return swaps are not genuine credit derivatives because their main purpose is not to eliminate the credit risk. However, these two instruments will be briefly discussed since they are closely related to the subject.

CREDIT RISK

In general, credit risk is defined as "risk due to uncertainty in counterparty's ability to meet its obligations."[1] However, this definition is rather narrow since it only covers one type of credit risk – default risk. Besides default risk, there are two more types of credit risk – credit spread risk and downgrade risk.

Default risk refers to the obligations of the bond issuer in terms of timely payment of interest and repayment of the amount borrowed.[2] Credit spread risk refers to a risk that a bond will decline in value due to an increase in the credit spread. Last, creditworthiness (downgrade) risk is defined as a risk that the value of a bond will decline due to a change in the credit rating by a rating agency.

For financial institutions, credit derivatives applications have various uses including diversifying portfolios, hedging cash positions, managing concentration and correlation risks, and repackaging credit risk or creating a new exposure.[3] Strategies and example for corporations using credit derivatives include hedging the risk generated by the firm's operations[4]. An example is hedging the financial risks arising from vendor financing. Another might be hedging sovereign risks for companies that sell to governments.

Another example arises in the case of the indirect credit exposure that can arise in a project finance context. If a party joins a consortium of project sponsors, credit derivatives can be used to reduce the risk of the coalition incurring extra costs, both financial and managerial, because of financial distress of one or more participants. Similarly, if a firm has either business arrangements and sales, or accounts receivable that are very concentrated, credit derivatives can reduce this potential weakness.

Further situations in which credit derivatives would be motivated include forward hedging of an issuer's spread over a benchmark index and even outright bets on the credit-worthiness of "names." Given sufficient posted collateral or margin, the derivatives can be sold, thus bearing risk to garner income.

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[1] www.riskglossary.com/articles/credit_risk.htm
[2] Fabozzi, Frank J. *Bond Markets: Analysis and Strategies*. 6th ed., Upper Saddle River: Prentice Hall, 2006, p. 720.
[3] Credit derivatives and structured credit: a guide for investors by Richard Bruyère, etc. p. 65
[4] Credit derivatives and structured credit: a guide for investors by Richard Bruyère, etc. p. 76

BASIC TERMINOLOGY FOR CREDIT DERIVATIVES

Before particular credit derivatives are introduced, it is important to explain and define some basic terms that are used in this credit derivative field.

The reference obligation is the particular debt issue for which the credit protection is being sought.[5] The issuer of this debt is being referred to as reference entity or reference issuer. Another important term is the credit event. It is defined as "a financial event related to a legal entity which triggers specific protection provided by a credit derivative."[6] When a credit event occurs, the party providing protection becomes obliged to deliver this protection.

There are five types of credit events: bankruptcy, failure to pay, obligation acceleration, moratorium, and restructuring. Obligation acceleration means that the reference obligation becomes payable before the originally scheduled date. Moratorium refers to a situation when the reference entity challenges validity of the obligation issued. Last, restructuring is a credit event when the reference entity changes terms of the obligation, such as interest rate, so that the new terms are less favorable for the debt holder than the original terms.

CREDIT DEFAULT PRODUCTS

▪Credit Default Swaps

The most commonly used credit derivatives are credit default swaps. Credit default swaps work as an insurance against a credit event. The two parties participating in credit default swaps are a credit protection seller and a credit protection buyer. The seller is obliged to make a payment (of a notional amount) to the buyer in case a credit event occurs. In exchange, the buyer pays a fee, a premium, to the seller.

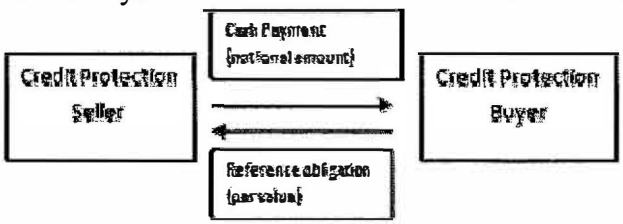
The conventional terms of credit default swaps cover a five-year period and a premium is paid quarterly. However, credit default swaps can be customized, e.g. the length of the period can be adjusted to the maturity of the reference obligation. The premium paid to the seller is expressed as a certain number of percentage points. To calculate the amount of a quarterly premium, the following formula is being used:

▪Notional amount * annual rate * (actual # of days in quarter/360)

It is important to mention that the notional amount (i.e. the "insured" amount) is not equal to the par value of the obligation, but to the market value of the obligation. Besides using a notional amount, which is a predetermined fixed amount, the parties can agree on using a flexible amount. In such a case, the amount will depend on the decline in value of the reference obligation.

The following graph depicts a physical settlement of a credit default swap after a credit event occurs. In this case, notional amount is being paid by the protection seller to the protection buyer in exchange for the par value of the reference obligation.

Exhibit 1: Physical Settlement of a Credit Default Swap

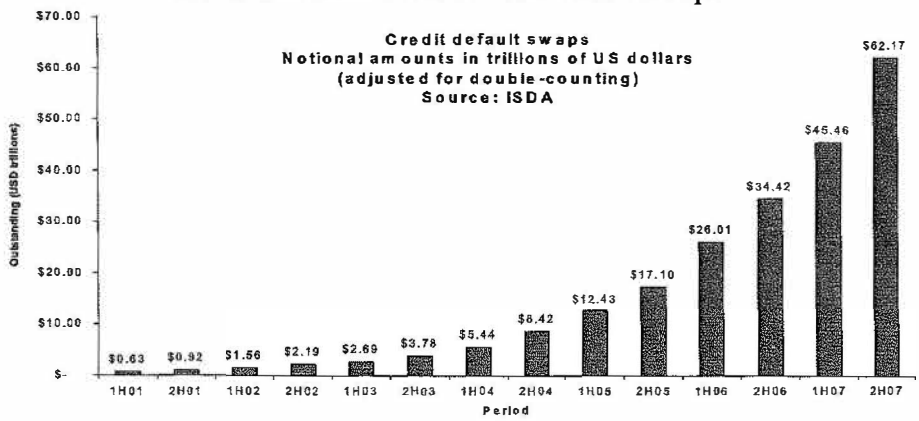


Credit default swaps can either cover only one reference obligation (single-name credit default swaps) or more than one reference obligations (basket credit default swaps). In case of the basket credit default swaps, conditions under which the payment is made to the buyer must be determined. For example, it can be agreed upon that default of only one reference obligation in the basket will lead to the payment (first-to-default basket swap).

Credit default swaps are a very popular credit default instrument because they enable the investor to transfer the credit risk completely. In addition, credit default swaps are relatively simple compared to other credit derivatives.

[5] Fabozzi, *op. cit.*,, p.721.
[6] http://en.wikipedia.org/wiki/Credit_event

Exhibit 2: Growth in Credit Default Swaps



▪Credit Default Options – CBOE Credit Event Binary Options (CEBOs)

Another variation of credit default options is CBOE Credit Event Binary Options (CEBOs), launched by the Chicago Board Options Exchange (CBOE). These relatively new derivative products are binary options that pay a fixed dollar amount when CBOE confirms a Credit Event in the debt securities issued or guaranteed by some entity, the Reference Entity. In other term, CEBOs provide a hedge against Credit Events. They are binary because they pay a specified amount if a Credit Event is confirmed, and nothing otherwise. With the increase use of credit derivative, CBOE offer investors a choice and advantages to trade credit using CEBOs. These advantages include "transparency, anonymity, standardized contract terms, central clearing and settlement, and the option of floor-based or electronic trading in a securities exchange regulated environment".[7]

Below are two descriptions of CEBOs listed by CBOE (as of May 2008):

1. Single-Name CEBOs – launched in June 19, 2007
   Single-Name CEBOs are security options that pay a fixed amount—$100,000 per contract—in the case where a credit event on an individual issuer or guarantor of debt securities is declared prior to the option's expiration. A list of Single-Name CEBOs available at CBOE is in Appendix 1.
2. Basket CEBOs– launched in August 28, 2007
   Basket CEBOs are call options based on a basket of reference entities (the basket components). The options automatically pay out a cash amount each time a credit event is confirmed in any of the basket components during the life of the contract. CBOE will determine when a triggering credit event has occurred, and resolution and payout is pre-determined and binding.
   There are two kinds of Basket CEBOs: (a) Multiple-Payout Basket CEBOs and (b) First-to-Default Basket CEBOs.
   a. Multiple-Payout Basket CEBOs
      Examples of multiple Reference Entities for this kind of CEBOs refers to the debt corporations in the same economic sector, or broad-based baskets referenced to the debt securities of corporations of the same credit quality. A list of what is available at CBOE is in Appendix 2. If CBOE confirms a Credit Event in a component of the basket, that particular component is then removed from the basket and is not replaced. The Credit Event payout is equal to the notional value of the basket times the weight of the component that has the Credit Event times one minus its recovery rate.
      As example, Home Builder Sector Multiple Payout Basket CEBOs (BBR, BBS) has a notional value of $100,000, 8 equally weighted components, each with a specified recovery rate of 40%. For each confirmed credit event, the option then would pay $7,500 (=$100,000 * .125 * (1-.4)). The total payment would range from $0 to $75,000—based over the life of the Multiple-Payout CEBO and on how many Credit Events confirmed by CBOE.
   b. First-to-Default Basket CEBO
      Also called "Single-Payout" CEBO basket. Although it is similar to a Multiple-Payout Basket CEBO, the only difference is that the option can only be automatically exercised once after the confirmation of the first Credit Event in any basket

[7] Introduction to CBOE Credit Option Complex, CBOE's website, accessed April 29, 2008. http://www.cboe.com/micro/credit/introduction.aspx/

component. After this exercise, the option expires. At this moment, CBOE does not list this CEBO.

■Asset Swaps

Another example of credit risk derivatives are asset swaps. Asset swaps are defined as exchanges of fixed and floating investment.

An example of an asset swap is an exchange of a fixed coupon bond for an index. The major consequence of asset swaps is a re-composition of a security's cash flow. The objective of an investor entering into an asset swap is to improve the character of his assets and to take advantage of an arbitrage opportunity in the market.

It is important to mention that asset swaps are not genuine credit risk derivatives because they do not enable the investor to shift the credit risk itself. However, asset swaps can be used to decrease the interest rate risk of the investor. For example, an investor who buys a risky bond can enter into an interest rate swap with a dealer. The gain from this swap equals to the difference between interest rate received from the bond and interest rate paid to dealer on swap. In addition, the investor receives a payment from the dealer, such as LIBOR.

A special type of asset swap is a par asset swap where the investor sells the credit risky bond to counterparty at par and with no interest accrued, with an interest-rate swap.[8] However, even in this case the credit risk for the investor is not eliminated; if the bonds default, the asset swap is terminated and the investor gets the defaulted bonds back. In addition to LIBOR, the investor receives also an asset swap spread as part of the par asset swap. The asset swap spread depends on the level of credit risk of the underlying bonds.

The following chart depicts the mechanism and realized transactions of a par asset swap from the investor's point of view:

■Total Return Swaps

An additional representative of credit derivatives are total return swaps. In the total return swaps, periodic floating-rate payments are exchanged for the return realized on a reference obligation[9]. There are two parties participating in the total return swaps; the first party involved, total return receiver, obtains the total return and makes the floating payments. The other party, total return payer, obtains the floating payments and pays the total return.

The total return which is being swapped includes both cash flow and appreciation of the reference obligation. Total return swaps shift all credit risk to the total return receiver, which is why these instruments are being used to increase exposure to the reference obligation. In addition, the total return receiver bears the interest rate risk. That is why total return swaps are not considered to be genuine credit derivatives because they don't protect against the credit risk, but they increase the risk instead.

On the other hand, the major advantage of total return swaps is that the total payment receiver does not need finance the reference obligation, but pays a fee instead to receive the total return from the obligation.

■Credit Spread Options

A credit Spread Options is an option whose value or payoff depends on the change in credit spread for a reference obligation. A credit spread option can have any Exercise Style:

- European (exercisable only at the expiration date)
- American (exercisable at any time prior to and including the expiration date)
- Bermuda (exercisable only on specified dates)

The critical factor for credit spread options is the underlying, which can be either:

1. A reference obligation, which is a credit-risky bond, with a fixed credit spread, or
2. The level of the credit spread for a reference obligation

■Credit Spread Forwards

A credit spread forward requires an exchange of payments at the settlement date based on a credit spread. Similar to credit spread options, the underlying for a credit spread forward is either the value of the reference obligation or the credit spread. The payoff is determined on the credit spread at the settlement date of the contract.

A portfolio manager who takes a position in a credit spread forward contract will receive a positive payoff if the credit spread moves in her favor by the settlement date. The payoff is = *(credit spread at settlement date – credit spread in contract) x notional amount x risk factor.*

However, the portfolio manager will get a negative payoff (i.e., makes a payment) if the credit spread moves the opposite way by the settlement date. In that event, the payoff is

[8] Fabozzi, *op. cit.*, p.724.
[9] Fabozzi, *op. cit.*, p.725.

=(credit spread in contract – credit spread at settlement date) x notional amount x risk factor.

- **Structured Credit Products**

Credit derivatives can be combined to create debt instruments with structures whose payoffs are linked to the credit characteristics of a basket of reference obligations. These types of financial products are called structured credit products. The two most commonly used are explored briefly: Collateralized Debt Obligations (CDO) and Credit-linked Notes (CLNs).

- **Collateralized Debt Obligations (CDO)**

A Collateralized Debt Obligation (CDO) is a security backed by a diversified pool of one or more types of debt obligations. The type of obligations include US domestic investment-grade corporate bonds, high yield corporate bonds, bank loans, emerging market bonds, asset-backed securities (ABS), residential and/or commercial mortgage-backed securities (MBS). In a CDO, the funds to purchase the collateral assets are obtained from the issuance of bonds. Therefore, a collateral manager is assigned for managing the collateral of assets. There are two types of CDO: cash CDO's and a synthetic CDO's. A cash CDO means the collateral manager purchases cash market instruments. A synthetic CDO is named such because the collateral manager does not own the pool of assets on which it has the credit exposure. In other words, a synthetic CDO absorbs the credit risk of the reference obligations, but not the legal ownership.

According to the Securities Industry and Financial Markets Association, aggregate global CDOs issuance totaled US$ 157 billion in 2004, US$ 272 billion in 2005, US$ 552 billion in 2006 and US$ 486 billion in 2007.[10]

- **Credit-Linked Notes (CLNs)**

Another common financial instrument that is derived from the use of credit derivatives is Credit-linked Notes (CLNs). A CLN is "a security issued by an investment banking firm or another issuer (typically a special-purpose vehicle—corporations or trusts) which has a credit risk to a second issuer (reference issuer), and the return is linked to the credit performance of the reference issuer."[11] Generally, CLNs have a maturity anywhere from three months to several years. The most likely terms of credit exposure are one to three years. When investors go into short term CLNs, it implies a credit view as reflected by the investors' desire to do so.

The structure of a CLN is similar to a standard bond. There is the issuer of a CLN which is the credit protection buyer. The investor in the CLN is the credit protection seller. A CLN has coupon rate (fixed or floating), maturity date, and a maturity value. However, the maturity value is adjusted based on the credit performance of the reference issuer. If the reference issuer experiences a credit event then the bonds is paid off and the maturity value is adjusted down—the calculation and method of adjustment is explained in the prospectus of the CLN.

CLNs offer borrowers a hedge against credit risk. The investor of CLNs is compensated with an enhanced coupon payment for accepting the credit risk of the reference issuer. It gives the investor a higher yield on the note for accepting exposure to a specified credit event.

SUMMARY AND CONCLUSIONS-CREDIT DERIVATIVES AS RISK MANAGEMENT TOOLS

Credit derivatives provide protection against credit risk. They separate specific aspects of credit risk from other risks. They allow even the most illiquid credit exposures to be transferred from portfolios that have but do not want the risk to those that want the risk but do not have that risk, even when the underlying asset itself could not have been transferred in the same way. Bottom line, credit derivatives serve as a means for leveraging an exposure in the credit market.

Credit derivatives facilitate the potential to achieve efficiency gains through a process of market completion, because it separates the management of credit risk from the asset with which that risk is associated. It is similar to an auction process in which an auctioneer sells a subset of a number of risks to the highest bidder rather than selling a whole 'package' with the same risks to the highest bidder.

The significance of credit derivatives has increased rapidly due to investors' motivation to manage portfolios efficiently and protect them against potential losses resulting from credit

[10] http://www.sifma.org/research/pdf/SIFMA_CDOIssuanceData2008.pdf
[11] Fabozzi, *op. cit.*,p. 737.

events. Ease of access to credit derivative instruments enables a larger number of investors to better hedge their investments. Even with new regulations, the use of credit derivatives will rise and evolve to meet the needs of investors and financial intermediaries.

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