Credit Derivative: Concept & Applications in the Investment Management of Insurance Companies

By

Parth N. Khandelwal

Assistant Manager – Actuarial
MetLife India Insurance Company Pvt. Ltd.
Brigade Seshamahal
5, Vani Vilas Road, Basavanagudi
Bangalore – 560 004

Introduction and Objective

This paper attempts to explain more closely the practical applications of credit derivatives in hedging of a life insurance company's bond portfolio as well as exploring the possibilities for product development depending upon the derivative strategies.

The world of insurance has become a risky one. Insurers are facing increasing intra-industry competition as well as more intensive competition from other financial institutions such as banks and mutual funds. In response, insurers have developed a number of increasingly complex products and at the same time have had to reduce the profit loadings in these products to compete in the marketplace. Add to this the historically high volatility in the prices of financial assets in the past quarter century, and it is not surprising that insurance company managers are worried about financial risk. Financial reporting and regulatory requirements also have made insurers more sensitive to the risks inherent in their asset and liability portfolios. The most prominent changes have been the adoption of risk-based-capital requirements, *Financial Accounting Standard (FAS) 115,* requiring mark-to-market accounting for fixed-income securities held in the "trading" or "available for sale" categories, and *FAS 119,* requiring disclosure of the purpose of derivative transactions.

This changing market and regulatory environment has led insurers to explore new techniques for managing their asset and liability risk, without sacrificing income. Many insurers have turned to financial derivatives to manage risk and enhance income. The market for financial derivatives has grown rapidly over the past two decades and now offers a wide variety of contracts to manage nearly all types of financial exposures. The contracts range from standardized derivatives that are traded on organized exchanges to individually tailored, over-the-counter (OTC) contracts created for a buyer by a derivatives dealer. [1]

---

[1] Some derivative transactions such as futures or forward contracts do not directly create assets or liabilities on insurer balance sheets, but rather generate, sometimes contingent, cash flows. Hence derivatives are often referred to as off balance-sheet [OBS] contracts

Need For Credit Derivatives

Insurers serve two primary functions in the economy—a risk-bearing and risk-pooling function and financial intermediation. In their risk-bearing and risk-pooling function, insurers provide a mechanism for individuals and businesses exposed to the risk of loss of life, health, or property to transfer these risks to an insurer in return for a premium payment. The insurer can diversify most of this risk (usually called underwriting risk) by writing insurance on large numbers of policyholders (the risk pooling function), whose risk of loss is more or less statistically independent. However, diversification does not fully eliminate underwriting risk, giving rise to the need for insurers to hedge this risk. [2]

The other important economic function performed by insurers is financial intermediation. Financial intermediation involves raising funds by issuing specialized types of debt contracts and investing the funds in financial assets. Intermediary gains from specialization in certain types of financial transactions give intermediaries economic value, Intermediaries typically are compensated for their services in the form of yield spreads; i.e. they pay less for the funds they borrow than they earn on the funds they lend or invest. Life insurers raise funds by issuing various types of products such as cash value life insurance, annuities, and

[2] Although reinsurance is still the predominant means of hedging underwriting risk, a derivatives market in underwriting risk has begun to emerge. The first exchange-traded insurance derivatives are the catastrophe insurance futures and options introduced by the Chicago Board of Trade (CBOT) in 1992–1993. These contracts have not traded very widely to date, although trading volume has been increasing steadily since a new sequence of contracts was introduced

guaranteed investment contracts (GICS). They invest in traded bonds and stocks, but globally life insurers are also major participants in the markets for privately placed bonds and mortgages. The intermediation function of insurers gives rise to the majority of their need for financial risk management.

One reason that this need arises is because the cash flows of the liabilities issued by insurers have different patterns and characteristics than the cash flows of the assets they invest in. Contracts with unusual cash flow patterns in life insurance include universal life, in which policyholders have a great deal of discretion over the premiums contributed; variable life insurance and annuities, which are linked to equity indices or portfolios; single-premium deferred annuities; and GICS. These contracts typically were created to meet the needs of a particular class of investor and exist precisely because (and only as long as) the insurer has a comparative advantage in creating an asset portfolio that delivers the promised policy cash flows without exposing policyholders to unacceptable levels of risk. Creating these types of asset portfolios requires financial risk management.

The most important of the more complex financial risk management is to manage relationship between the duration and convexity of assets and the duration and convexity of liabilities. This latter type of risk management is known as *asset-liability manage*ment, ALM.[3]. Financial derivatives often provide a cheaper and/or more flexible way to manage duration and convexity risk. This type of hedge

---

[3] Intuitively, duration is the sensitivity of the price of an asset to a change in interest rates, for example, the percentage decline in the value of a bond in response to a specified percentage change in interest rates. Convexity is the change in an asset's price sensitivity, that is, duration, when rates change. Duration gives a good indication of how much an asset's price will change in response to a small change in the level of interest rates; but because of the existence of convexity (convexity risk), duration does not give as good an approximation to the price change for relatively large changes in the level of interest rates

involves simultaneously buying and/or selling various combinations of derivative contracts, such as swaps, calls, and puts.

Only Hedging or Income Enhancement as well?

While insurers and other investors can use derivatives to hedge risk, they can also use derivatives for income enhancement. There is some concern in the regulatory community about the possibility that higher levels of derivatives activity may increase insurer insolvency risk. While it is certainly possible to construct derivatives positions such as covered call strategies, that are no more risky than more traditional investments such as stocks and bonds[4]. Increased reporting derivatives positions and making the resulting information more conveniently available to investors and policy holders would enhance the role of market discipline in controlling insolvency risk.

What is Credit Risk?

Credit risk is the possibility that a borrower will fail to service or repay a debt on time. The degree of risk is reflected in the borrower's credit rating, which defines the premium over the riskless borrowing rate it pays for funds and ultimately the market price of its debt. Credit risk has two variables: market risk and firm-specific risk. Credit derivatives allow users to isolate, price and trade

---

[4] A covered call strategy is one in which the holder of some underlying instrument (for example, share in a stock) writes a call option on that particular investment. This has the immediate effect of generating income for the insurer. If share prices stay the same or decrease, the call is not exercised. If prices rise, the shares are "called away" from the writer; however the insurer can easily deliver the shares since it already owns them. The primary motivation for an insurer to undertake this investment strategy is to enhance the income of the insurer by selling the possibility of the capital gain in the underlying asset

firm-specific credit risk by unbundling a debt instrument or a basket of instruments into its component parts and transferring each risk to those best suited or most interested in managing it. There are various traditional mechanisms to reduce credit risk including refusal to make investment in a debt instrument, but these mechanisms are less effective during periods of economic downturn. Credit derivatives will make credit risk pricing more efficient, and help segregate credit risk from market risk in bond and loan pricing.

With increased exposure to debt securities of various ratings and competition credit risk and investment performance risk are sensitive issues to insurance companies. By investing in credit derivatives both buyers and sellers of the credit risk can achieve various objectives, including reduction of risk concentrations in their portfolios, and access to a portfolio without actually making the loans.

Structure and Types of Credit Derivatives

A credit derivative is a financial instrument used to mitigate specific forms of credit risk by hedgers and speculators. These new products are particularly useful for insurance companies with widespread credit exposures they hold with heavy bond investment. There are three basic types of credit derivatives: total return swaps, credit default swaps, and credit spread options. They are almost all over the counter products.

Total Return Swaps

In this derivative the total return from one asset or a group of assets is traded for the total return of another group of assets. The way it usually works is one party will pay the total returns on a defined underlying asset and receive a stream of LIBOR payments or LIBOR-based payments. The principal amount of total return swap of the assets is not exchanged, and they're usually constructed so it's a zero-sum game at issue. The value of the swap would be zero at the inception. Total return swaps were developed to sell customized exposures to investors looking for a pick-up in yields on their portfolios. These structures enable investors to obtain exposure to portfolios which were not available to them previously and provide them with new diversification opportunities.

LIBOR + Spread + Loss on Security

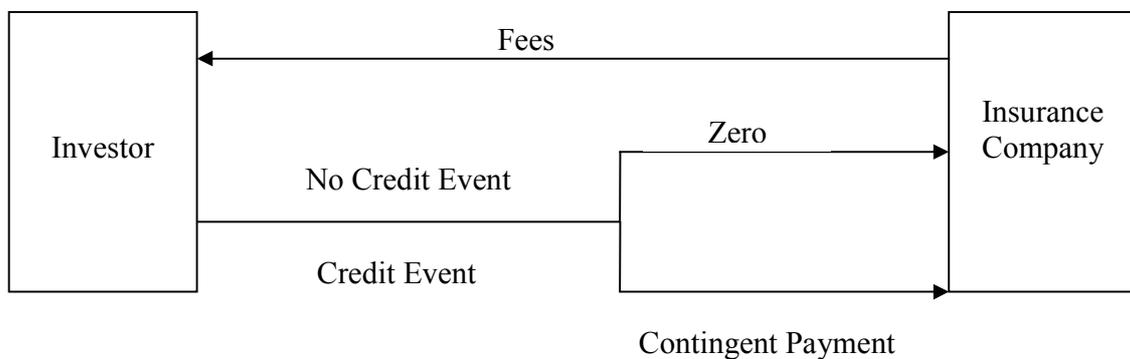| Insurance Company | → | Investor |
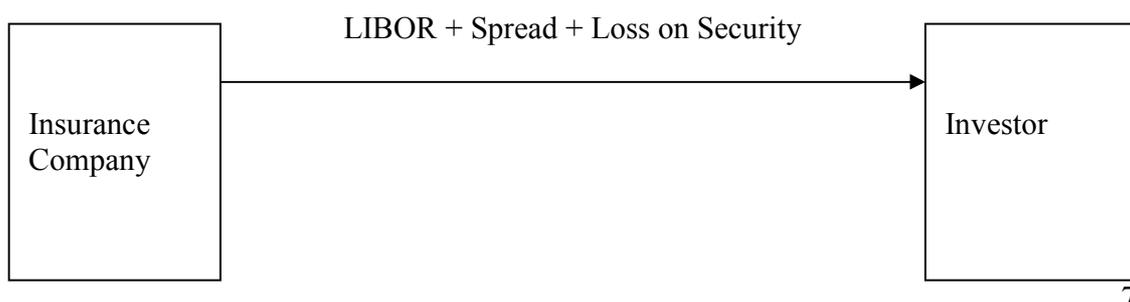
Total Positive returns on a Security

Credit Default Swaps

This derivative forms the building blocks of a lot of securitized transactions, and they have the largest volume among credit derivatives. This involves the protection seller and a protection buyer. The potential loss by the reference asset like a bond, due to specifically defined events, bankruptcy, default, or maybe even a downgrade, will become the responsibility of the protection seller. In return, the protection buyer has to pay a premium (CDS Spread). This is not a zero-cost transaction. There's a premium that is paid either up front or periodically. In a standard contract, payments are made semi-annually or quarterly in arrears. If a reference entity defaults, there is a final accrual (Prorated) payment covering the period from the previous payment to the default date and payments then stop. In return, the protection seller has responsibility for a contingent payment if a credit event occurs. It's really important that the payoff qualifying event be well defined in the swap agreement. One can think about what kind of problems might occur if it's not well defined. There are different ways that these contracts can be settled. One is the protection buyer can deliver the reference asset to the seller and then receive the full face amount of the reference asset or let's say bond. Alternatively, there can be a net settlement in which the face amount of the asset, minus the market value of the asset (say one month after the credit event has occurred). Both of these are used in practice.

Credit default swaps don't have to be based on a single reference entity; they can be based on a pool or basket of reference assets and the payoff can be specifically tailored for OTC transactions. The International Swaps and

Derivatives Association (ISDA) have standard definitions and documentation, and this is very important.

Now that the market for CDSs is well established in western world, a market is developing in forward CDSs and CDS options. A forward CDS contract is the obligation to buy or sell a CDS on a specified reference entity for a specified spread at a specified future time. The forward CDS ceases to exist if the reference entity defaults during the life of the forward contract. A CDS option is a European option that gives the holder the right to buy or sell protection on a specified reference entity for a specified future period of time for a certain spread. The option is knocked out if the reference entity defaults during the life of the option. For example, a call CDS option might allow the holder to buy protection on Citi Bank for five years starting in one year for 150bps per year. If Citi Bank defaults during the one year life of the option, the option is knocked out. If Citi bank does not default during this period, the option will be exercised if the market price of the five year protection on Citi bank is greater than 150bps (e.g. due to downgrading) at the end of the life of the option.

Investor	← Fees ←	Insurance Company
No Credit Event	→ Zero →	
Credit Event	→ Contingent Payment →	

Credit Spread Option

It involves a protection buyer and a protection seller. The protection buyer is protected against the spread widening on a reference asset compared to another asset. For example, let's say Company A have a ten year bond issued by ABC Corporation. The credit spread option would pay off if the yield on this asset exceeds the yield on recently issued ten-year Treasuries by say 400 basis points, and 400 basis points would be considered to be like the strike price. It is similar, in some ways, to a credit default swap in that there's a protection buyer in it and a protection seller; unlike a credit default swap, there doesn't have to be any specific event that occurs to trigger a payment of the option. All that has to happen is that the spread widens past a certain point.

Buying or selling an option on a borrower's credit spread provides an opportunity t gain exposure on the borrower's future credit risk. The yield spread represents the risk premium the market demands for holding the issuer's bonds relative to holding riskless assets like Gilts. This derivative structure allows investors to take a position in the underlying assets synthetically rather than buying assets in the cash market. Credit Spread Options also give end users protection in the event of large, unfavourable credit shift, which falls short of default. End users who purchased spread options will be able to cash in even though the reference credit has not defaulted.

Collateralised Debt Obligations

Globally this is a very applicable area for insurance companies. These are securities that are issued by a special purpose vehicle, and they're backed by collateral such as bank loans and high-yield debt. So a CDO is really going to appear as a bond on the books, and it's going to have a rating just like the other bonds in an insurance company portfolio. Insurance companies participate as investors and issuers[5]. They're similar to asset-backed securities, but the servicer or the portfolio manager play a much more critical role in the collateralised debt obligations. There are a variety of different structures. There are two main types of CDO structures. There are funded CDOs and unfunded CDOs. A funded CDO would mean there's a pool of assets and there is cash in the deal that is basically equal to pretty much the value of the assets. For unfounded CDOs, there might be a reference pool of £1 billion of assets, but there's only £100 million or so of cash in the deal that people have funded. Within funded CDOs, there are balance sheet CDOs and arbitrage CDOs. In arbitrage CDOs, there are cash-flow deals and market-value deals. Let's look at what these terms mean.

Balance sheet CDO

It is primarily issued by banks, and high grade bank loans are the collateral. The bank issues it because it wants to get its regulatory balance sheet and capital relief, and it wants to improve its capital adequacy ratios. The investor buys this type of deal to get exposure to asset classes that it can't otherwise get exposure to.

Arbitrage CDO

The collateral is usually high-yield corporate bonds or loans, and the issuer, which could be an insurance company or a bank, wants to just get assets under management. The investor can buy this to get into asset classes that it might not

---

[5] The financial activity of debt issuance is rarely allowed with respect to insurance companies due their nature of business and regulatory constraints.

otherwise be able to get into. There are some perceived arbitrage opportunities. Issuers are insurance companies, banks, mutual funds, and private equity funds.

I talked about perceived arbitrage opportunities in the arbitrage CDO. What are they? There is high-yield versus investment grade spreads. There is liquidity premium and high-yield investments that might not really mean additional risk. It just means that if you wanted to sell soon, you might not be able to do that. There are the implied default rates (risk neutral such as those that are in CDS pricing) versus the actual historical or expected default rates in the real world. There is also the advantage of diversification. There is the LIBOR curve versus the Treasury curve that sometimes might yield certain opportunities.

There are two kinds of arbitrage CDO: cash flow versus market value. In the cash-flow structure, the objective is to select credit that will pay coupons and will redeem the principal fully at maturity i.e. to minimize defaults. This is normal to all scenarios. The deals want sound credit quality, but they're willing to make some compromises on liquidity. Liquidity is not a high priority. These are usually buy-and-hold strategies, and the collateral is usually rated high-yield debt.

Within the cash-flow CDO structure, the portfolio manager is going to manage a high-yield portfolio of say £500 million, and the trustee is then going to take the proceeds that come in and distribute principal proceeds and interest proceeds. There are four classes in this deal. The first three classes, A through C, are debt tranches. They're now arranged so that the total adds up to £500 million.

The way this works is there is a waterfall approach to interest payments. Class A would get the interest it needs for that period. It's scheduled interest. Then interest would go to class B and class C, and then the equity. However, with principal it would work much differently. Typically, class A gets fully paid off

before class B gets any and so on. Class A is rated so high because it is supported by class B and C and the equity. Those others would have to get blown out before anything happened to class A.

The investment manager is expected to be very active in the market value CDO. He has to make decisions, and he is not going to have a buy/hold strategy; however, the objective is to select credits that will hopefully appreciate in value. The portfolio might include not only high-yield bonds, but also bonds that are already distressed. A common deal might have 70–75% high-yield rated debt, but it might have 25–30% in special classes like distress debt, foreign loans or certain equity in other special classes.

There are a variety of tests that the rating agencies and the investors will insist on that must be satisfied. First there is over collateralisation tests, primarily on the principal for each asset class. There are also interest coverage tests and diversity ratings tests. That means that the pool of assets has to be diverse enough so that there aren't contagion problems in a particular sector. If these tests are not met, then the manager must take immediate corrective action or start redeeming assets until the tests are met. The rating agencies, Moody's, Standard & Poor's, and Fitch all rate CDOs. What determines the rating is the collateral itself, the experience and expertise of both the manager and the issuer, and the deal structure. The CDO rating, ideally for a particular class, would be equivalent to a bond, a regular bond callable or non-callable bonds with that same rating. They should have the same risk profile. That's what the rating structure and the rating models are attempting to do.

In synthetic CDOs the actual amount of funding is very small in relation to the reference portfolio. These are what we call unfounded CDOs. They're partially funded. You might have a deal in which the reference portfolio is £1 billion but

the actual cash in the deal is only £100 million. It makes maximum use of credit default swaps. There's a leveraged tranche that may write £900 million of CDS protection in return for something like a six to ten basis points on that £900 million.

Collateralised Mortgage Obligation (CMO)

Instead of purchasing a CMO floater, company can employ the alternative i.e. investing in CMO trance: The Structured Note. Where there will be no risk of prepayment. However this benefit should be weighed against additional credit risk it will introduce to. This bond is going to be guaranteed by some industrial corporation, which could go bankrupt. So now company has taken on some additional credit risk. It tends also to be a little less liquid than the CMO, because of all the private placement documentation.

Pricing of Credit Default Swap Spread

There are many models out there. Hull & White have a good model that describes the process for valuing credit default swaps. In this paper I consider how a plain vanilla credit default swap can be valued assuming no counterparty default risk. Like most other approaches, ours assumes that default probabilities, interest rates, and recovery rates are independent. Unfortunately, it does not seem to be possible to relax these assumptions without a considerably more complex model.

If we assume that the only reason a corporate bond sells for less than a similar Treasury bond is the possibility of default, it follows that:

Value of Treasury Bond - Value of Corporate Bond = Present Value of Cost of Default

If the reference entity has issued relatively few actively traded bonds, we can use bonds issued by another corporation that is considered to have the same risk of default as the reference entity.

Default Probabilities: With no recovery rates:

We start with a simple example. Suppose that a five-year zero-coupon Treasury bond with a face value of 100 yields 6.4% and a similar five-year zero-coupon bond issued by corporation yields 7%. (Both rates are expressed with continuous compounding.) The value of the Treasury bond is $100\,e^{-0.064*5}$ or 72.6149 and the value of the corporate bond is $100\,e^{-0.07*5} = 70.4689$. The present value of the cost of defaults is, therefore

$$72.6149 - 70.4689 = 2.146$$

Define the risk-neutral probability of default during the five-year life of the bond as p. The expected loss from defaults in a risk-neutral world is, therefore, $100p$ and the present value of the expected loss is

$$100p\,e^{-0.064*5}$$

It follows that:

$$100p\,e^{-0.064*5} = 2.146$$

so that $p = 0.0296$ or 2.96%.

There are two reasons why the calculations for extracting default probabilities from bond prices are, in practice, usually more complicated than this. First, the recovery rate is usually non-zero. Second, most corporate bonds are not zero-coupon bonds. This may require calculating zero coupon rate of coupon bearing bond.

Default Probabilities: Generalised Approach – Discrete Time

The payoff from a CDS in the event of a default at time t is usually the face value of the reference obligation minus its market value just after time t. Using the best claim amount assumption just mentioned, the market value of the reference obligation just after default is the recovery rate times the sum of its face value and accrued interest. This means that the payoff from a typical CDS is

$$L - RL[1 + A(t)] = L[1-R-A(t)] \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{(1)}$$

Where **L** is the notional principal, **R** is the recovery rate, and **A(t)** is the accrued interest on the reference obligation at time t as a percent of its face value.

Let:

B_j : Price of the jth bond today
G_j : Price of a Treasury bond promising the same cash flows as the jth bond.
t_j : Maturity time of jth bond.
$F_j(t)$: Forward price of the jth bond for a forward contract maturing at time t assuming the bond is default-free $(t < t_j)$
$v(t)$: Present value discount factor at time t with certainty
$C_j(t)$: Claim made by holders of the jth bond if there is a default at time t $(t < t_j)$
$R_j(t)$: Recovery rate for holders of the jth bond in the event of a default at time t $(t < t_j)$
α_{ij} : Present value of the loss, relative to the value the bond would have if there were no possibility of default, from a default on the jth bond at time t_i
p_i: The risk-neutral probability of default at time t_i

From above definitions it follows that:

$$\alpha_{ij} = v(t_i)\left[F_i(t_i) - R_j(t_i)C_j(t_i)\right] \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\text{(2)}$$

The total present value of the losses on the jth bond is, therefore given by:

$$G_j - B_j = \sum_{i=1}^{j} p_i \alpha_{ij} \quad \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\text{(3)}$$

This allows us to determine probability of default on j^{th} bond.

$$p_j = \frac{G_j - B_j - \sum_{i=1}^{j-1} p_i \alpha_{ij}}{\alpha_{jj}}$$ ……………………………………………………………………..(4)

It is probably reasonable to assume that there is no systematic risk in recovery rates so that expected recovery rates observed in the real world are also expected recovery rates in the risk-neutral world. This allows the expected recovery rate to be estimated from historical data. The mean recovery rate is heavily dependent on the seniority of the bond.

We will assume, for ease of exposition, that all the bonds have the same seniority in the event of default and that the expected recovery rate is independent of time.

Default Probabilities: Generalised Approach – Continuous Time

Above analysis can be further modified for continuous time approach.

Let
$q(t)$: The probability of default between time t and $t+\Delta t$.
β_{ij} : Expected loss during time t and $t+\Delta t$

We can modify the equal 4 as follows:

$$q_j = \frac{G_j - B_j - \sum_{i=1}^{j-1} q_i \beta_{ij}}{\beta_{jj}}$$

Hull and White (1995) assume that, in the event of default, the bondholder claims the no default value of the bond. This is an attractive assumption. It implies that $C_j(t) = F_j(t)$. Other school of though assumes that the claim amount will be face amount plus the accrued interest rate. It should be noted that the default probability density under these two assumptions will give similar results. For the default probability densities to be markedly different, it would be necessary for the coupons on the bonds to be either very greater or very much less that the risk free rate.

Valuation of Credit Default Swap Spread

To value a plain vanilla credit default swap we assume that default events, treasury interest rates, and recovery rates are mutually independent. We also assume that the claim in the event of default is the face value plus accrued interest.

Let assume the payoffs are per unit of currency:

T: Life of credit default swap.
q(t): Risk-neutral default probability density at time t.
$\hat{R}$: Expected recovery rate on the reference obligation in a risk-neutral world.
u(t): Present value of payments on payment dates between time zero and time t.
e(t): Present value of an accrual payment at time t equal to t^* where t^* is the payment date immediately preceding time t i.e. default date in between two payment dates.
v(t): Present value discount factor at time t.
w: Total payments per year made by credit default swap buyer.
s: Value of w that causes the credit default swap to have a value of zero.
π: The risk-neutral probability of no credit event during the life of the swap.
A(t): Accrued interest on the reference obligation at time t as a percent of face value.

The value of π is one minus the probability that a credit event will occur by time T. It can be calculated from q(t):

$$\Pi = 1 - \int_0^T q(t)dt$$

If a default occurs at time t (t < T), the present value of the payments is $w[u(t) + e(t)]$. If there is no default prior to time T, the present value of the payments is wu(T). The expected present value of the payments is therefore:

$$w\int_0^T q(t)[u(t) + e(t)]dt + w\Pi u(T) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots..(5)$$

Given our assumption about the claim amount, we can write equation (1) as follows:

$$1 - [1 + A(t)]\hat{R} = 1 - \hat{R} - A(t)\hat{R}$$

The present value of the expected payoff from the CDS is

$$\int_0^T \left[1 - \hat{R} - A(t)\hat{R} \right] q(t)v(t)dt \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots.....(6)$$

The value of the CDS to buyer is

$$\int_0^T \left[1 - \hat{R} - A(t)\hat{R} \right] q(t)v(t)dt \ - \ w\int_0^T q(t)\left[u(t)+e(t)\right]dt + w\Pi u(T)$$

The CDS spread, *s* is the value of *w* that makes this expression zero.

$$s = \frac{\int_0^T \left[1 - \hat{R} - A(t)\hat{R} \right] q(t)v(t)dt}{\int_0^T q(t)\left[u(t)+e(t)\right]dt + \Pi u(T)}$$

Let's say if the credit default swap premium is much higher than the actual yield spread. What an investor could do? He should short the corporate bond, sell the credit default swap, and buy the Treasury bond. If we work that out we can see that there's basically a risk-free profit that would be gained by that. On the other hand, if the credit default swap premium is much lower than the bond-yield spread, then the investor would buy the bond, buy the credit default swap, and short the Treasury again locking in a risk-free profit.

Credit Derivatives: Regulatory & Accounting Issues to Insurer

Regulatory Issues:

The main regulatory hurdle, which is affecting the growth of the credit derivatives market, concerns the allocation of capital on a financial institution's balance sheet against outstanding credit derivatives contracts. Regulators set rules which define the capital necessary for a given position is usually dependent on its relative risk. The firm needs more capital if the position is highly risky and less for higher quality assets. The capital adequacy directive (CAD) of the European Union has defined various risk categories. Capital charges are made according to the risk categories of the position, including market risk, counterparty risk, large single party exposure and foreign exchange risk.

Credit derivatives offer in many instances the possibility of offsetting counterparty risk against the market risk but may not achieve a reduction in risk capital requirements from the regulators. For example, a TRS may allow a credit exposure to be transformed into a market exposure plus some other counterparty exposure. The institution will be required under existing regulation to hold capital against both the loan and the offsetting credit swap.

Various issues need to be sorted out, among them: Do default puts attract position risk charges? If yes, what are the appropriate risk weightings? What offsetting, if any, should be allowed for credit derivatives? What percentage of notional amounts must be held against different credit derivatives transactions?

Another question is when, if regulators will recognize firms' internal models for credit derivative valuation. This problem is aggravated by the absence of widely accepted valuation techniques for credit derivatives. Perhaps the best

summary of the state of regulatory affairs in the credit derivatives market is that it remains in work in progress.

Accounting Issues:

There are GAAP accounting issues that company has to worry about. There is *FAS 133* and, of course, getting hedge accounting treatment. It's very difficult to get a macro hedge. Company will have to basically assign the hedge to specific homogeneous assets. Or, if they are trying to do something with liabilities, it has to be a very homogeneous pool of liabilities. What governs these types of securities is International Accounting Standards 39. There's an issue about whether credit default swaps are derivatives. Credit default swaps are, in some ways, similar to financial guarantees; however, there are some differences.

FAS 133 makes a dramatic departure from past accounting practice by requiring derivative contracts to be marked-to-market and recorded as assets or liabilities on the balance sheet.

Definition of a derivative under FAS 133

A qualifying derivative must satisfy three criteria:

1. It has (1) one or more underlyings and (2) one or more notional amounts or payment provisions or both. These contractual terms determine the amount of the settlement or settlements, and, in some cases, whether or not a settlement is required.
2. It requires no initial net investment or an initial net investment that is smaller than would be required for other types of contracts that would be expected to have a similar response to changes in market factors.

3. Its terms require or permit net settlement, it can readily be settled net by a means outside the contract, or it provides for delivery of an asset that puts the recipient in a position not substantially different from net settlement.

Fair Value Accounting Treatment

When hedging exposures associated with the price of an asset, liability, or a firm commitment, the total gain or loss on the derivative is recorded in earnings. In addition, the underlying exposure due to the risk being hedged must also be marked-to-market to the extent of the change due to the risk being hedged; and these results flow through current income, as well. This treatment is called a "fair value hedge." Hedgers may elect to hedge all or a specific identified portion of any potential hedged item.

Fair value hedge accounting is not automatic. Specific criteria must be satisfied both at the inception of the hedge and on an ongoing basis. If, after initially qualifying for fair value accounting, the criteria for hedge accounting stop being satisfied, hedge accounting is no longer appropriate. With the discontinuation of hedge accounting, gains or losses of the derivative will continue to be recorded in earnings, but no further basis adjustments to the original hedged item would be made.

Reporting entities have complete discretion to de-designate fair value hedge relationships at will and later re-designate them, assuming all hedge criteria remain the same.

Examples of exposures that qualify for fair value hedge accounting

- Interest exposures associated with the opportunity cost of fixed rate debt
- Price exposures for fixed rate assets
- Price exposures for firm commitments associated with prospective purchases or sales
- Price exposures associated with the market value of inventory items
- Price exposures on available-for-sale securities

Eligible risks

- The risk of the change in the overall fair value
- The risk of changes in fair value due to changes in the benchmark interest rates (i.e., the risk-free rate of interest or the rate associated with LIBOR-based swaps), foreign exchange rates, credit worthiness, or the spread over the benchmark interest rate relevant to the hedged item's credit risk.
- Currency risk associated with (a) an unrecognized firm commitment, (b) a recognized foreign-currency-denominated debt instrument, or (c) an available-for-sale security

Prerequisite requirements to qualify for fair value accounting treatment

- Hedges must be documented at the inception of the hedge, with the objective and strategy stated, along with an explicit description of the methodology used to assess hedge effectiveness.
- The hedge must be expected to be "highly effective," both at the inception of the hedge and on an ongoing basis. Effectiveness measures must relate the gains or losses of the derivative to those changes in the fair value of the hedged item that are due to the risk being hedged.

- If the hedged item is a portfolio of similar assets or liabilities, each component must share the risk exposure, and each item is expected to respond to the risk factor in comparable proportions.

- Portions of a portfolio may be hedged if they are (a) a percentage of the portfolio; (b) one or more selected cash flows; (c) an embedded option (provided it is not accounted for as a stand-alone option); (d) the residual value in a lessor's net investment in a direct financing or sale-type lease.

- A change in the fair value of the hedged item must present an exposure to the earnings of the reporting entity.

- Fair value hedge accounting is permitted when cross currency interest rate swaps result in the entity being exposed to a variable rate of interest in the functional currency

Dis-allowed situations (i.e., when fair value accounting may not be applied)

- In general, written options may not serve as hedging instruments. An exception to this prohibition (i.e., when a written option may qualify for cash flow accounting treatment) is when the hedged item is a long option. FAS 133 also defines any combinations that include a written option and involves the net receipt of premium -- either at the inception or over the life of the hedge -- as a written option position.

- Assets or liabilities that are re-measured with changes in value attributable to the hedged risk reported in earnings -- e.g., non-financial assets or liabilities that are denominated in a currency other than the functional currency -- do not qualify for hedge accounting. The prohibition does not apply to foreign-currency-denominated debt instruments that require re-measurement of the carrying value at spot exchange rates.

- Investments accounted for by the equity method do not qualify for hedge accounting.

- Equity investments in consolidated subsidiaries are not eligible for hedge accounting.
- Firm commitments to enter into business combinations or to acquire or dispose of a subsidiary, a minority interest or an equity method investee are not eligible for hedge accounting.
- A reporting entity's own equity is not eligible for hedge accounting.
- For held-to-maturity debt securities the risk of a change in fair value due to interest rate changes is not eligible for hedge accounting. Fair value hedge accounting may be applied to a prepayment option that is embedded in a held-to-maturity security, however, if the entire fair value of the option is designated as the exposure.
- Prepayment risk may not be designated as the risk being hedged for a financial asset.
- Except for currency derivatives, derivatives between members of a consolidated group cannot be considered to be hedging instruments in the consolidated statement, unless offsetting contracts have been arranged with unrelated third parties on a one-off basis.

Disclosure Requirements

The following must be disclosed by all reporting entities that use derivative instruments

- Objectives for using each derivative, whether for hedging or for speculation.
- The context needed to understand objectives.
- Qualitative disclosures are encouraged.

The following must be disclosed if derivatives are used in hedging relationships

- Risk management policies must be specified, identifying exposures to be hedged and hedging strategies for managing the associated risks.
- Identification of the type of hedging relationship (i.e., fair value, cash flow, net investment in foreign operation), if applicable.
- The hedged item must be explicitly identified.
- Ineffective hedge results must be disclosed.
- Any component of the derivatives' results that is excluded from the hedge effectiveness assessment must be disclosed.

Specific requirements for fair value hedges

- The place on the income statement where derivative gains or losses are reported must be disclosed.
- When a firm commitment no longer qualifies as a hedged item, the net gain or loss recognized in earnings must be disclosed.

Specific requirements for cash flow hedges

- A description of the conditions that will result in the reclassification of accumulated other comprehensive income into earnings, and a schedule of the estimated reclassification expected in the coming 12 months must be disclosed.
- The maximum length of time over which hedging is anticipated (except for variable interest rate exposures) must be disclosed.
- Entities must disclose the amount reclassified into earnings as a result of discontinued cash flow hedges because the forecasted transaction is no longer probable.
- Specific requirements for hedges of net investments in foreign operations.

- Entities must disclose the amount of the derivatives' results that is included in the cumulative translation adjustment during the reporting period.

Recent experience with credit derivatives:

The Enron and WorldCom credit default swaps paid off without any problems. There was a controversy with Rail Track. Rail Track is a rail services provider in the UK, and it went into receivership. Nomura delivered convertible bonds, and Credit Swiss First Boston said it didn't want convertible bonds; it wanted regular bonds. The International Swaps and Derivatives Association (ISDA) clarified that prospectively in November of 2001, but this had happened before that time. It is very important to know what is deliverable and what is not so you can get the definitions.

To summarize, there's going to be continued focus on credit. CDOs, both funded and synthetic, offer yield enhancement opportunities. We really need to understand the risks better in some of these investment areas. Many companies just bought these saying that this is A rated and satisfied their investment guideline without really understanding what could happen if something like 2001 and 2002 hypothetically occurred again. We can't just do cash-flow testing based on interest rate risk. We need to start building models that will take into account the different contingencies for these deal structures.

Conclusion

Getting into derivatives shouldn't be done lightly. It requires quite a bit of investment flair. The standard settlement procedures of company probably are not going to be adequate. Many of these contracts, for instance, futures contracts, are marked to market and settled in cash daily. Companies are going to have to designate people in their organisation to monitor, not only the mark to market and make sure that this cash settles back and forth every day, but companies are also going to have to put somebody on the analytical side to make sure they can monitor the risk. Company doesn't want to be caught owning an exposure or selling an exposure that you didn't really want to sell or buy.

From regulatory perspective specifically with respect to India I would like to make following recommendations regarding limits on trading these instruments. For example

- Transactions which have nothing to do with hedging preliminary purchases or obtaining additional returns should be restricted through stringent reporting process.

- Writing naked call should not be permitted i.e. Call options may be sold only if the assets involved in the option deal are in the portfolio at the time of the sale. These assets may not be sold during the period of the call option.

- Not buying naked put i.e. Put options may be purchased only if the assets involved in the option deal arc in the portfolio at the time of purchase.

- Arbitrage transactions are also need to be ruled out as long as market doesn't develop enough.

- The purchase of a derivative option which is out of the money is not to be permitted either.

- There should be restrictions on the volume of financial derivative involvement.

- Hedging transactions must be limited to the portfolio of directly held securities and borrower's notes.
- Preliminary purchase transactions should be limited to certain maximum limit as proportion of total securities and borrowers' notes to be acquired. It needs to be lower than projected future premium income to avoid any mismatch and to get exposure to actual capital appreciation.
- Transactions to obtain additional returns should be limited to a lower limit depending upon the off and on balance sheet nature of the derivative and solvency margin requirement.

The regulator should take account that the main motive for taking out an insurance has changed from retirement insurance to a new awareness for profitable invests, consequently using retirement insurance as assets. Another reason for increasing investments in insurance policies is the fact that consumers are better educated and informed nowadays, enabling them to "make their money work" by investing it. Their knowledge makes it possible to demand better services from the insurance companies. But not only the insurance's performance has to be improved; the products themselves have to be adapted to the new standards set by the market and by the customers. Where as products-innovation will largely depend upon the type of investment instruments available in market. Please refer to Appendix 3 showing a comprehensive list of derivative products available in India. From capital market perspective both insurance regulator and securities (Banks) regulator should take active role in promoting more and more trades in these products to develop an efficient liquid market in India. There will be serious impact on Indian financial system if financial institutions are not allowed to trade in various instruments when compared to their counterparts in other developed countries. I hope this will not another story of missed opportunities. A controlled investment climate with plethora of investment instruments will lead to globalisation of Indian insurance industry.

Bibliography

- Fixed income derivatives – Uses and Implications, Jeff F Mulholland and Timothy L. Patria .
- Credit Derivatives Move Beyond Plain Vanilla, by Sunil K. Aggrawal
- Derivatives and dynamic assets allocation in with profit funds, Derivatives working party, Martin Muir, Andrew Chase, Paul Coleman, Paul Cooper, Gary Finkelstein, Paul Fulcher and Tim Wilkins
- Derivative solutions for Insurance company, A note by Morgan Stanley
- The credit derivatives market: its development and possible implication on financial stability, By David Rule, FSD , Bank of England
- Corporate Hedging in the Insurance Industry: the use of Financial Derivatives by U.S. Insurers, by J. David Cummins, Richard D. Phillips, and Stephen D. Smith
- Society of Actuaries, Professional Actuarial Speciality Guide – Asset Liability Management.
- Valuing Credit Default Swaps: John Hull and Alan White (2000)
- Risk Management Solutions for Insurance Company in India, by Deutsche Bank
- Strategic application of financial derivatives in the investment policy of insurance companies. By Esther Nass,
- Pricing Insurance Derivatives by Paul Embrechts and Steffen Meister.
- Securitisation of Insurance Company Assets and Liabilities, by Mark G. Retik