Financial Derivatives – Weapon to Mass Destruction

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Abstract

The past decade has witnessed a high growth in the volume of international trade like changes in the interest rates, exchange rates and stock market prices in the different financial markets and this increased the financial risk to the corporate world. But derivatives are there to hedge this financial risk. Most important is credit risk (in case of banks especially). In order to cope up with this risk credit derivatives are there. But there are some perils of credit derivatives even when they are there to provide a cushion to bankers especially. These credit derivatives became the main reason of the sub-prime crisis in the USA. Other areas are also there where investors and companies suffered heavy losses due to the credit derivatives. So, credit derivatives have two aspects like a coin and this article presents these two aspects.

1. Introduction

The past decade has witnessed the high growth in the volume of international trade and business due to the wave of globalization and liberalization all over the world. Changes in the interest rates, exchange rates and stock market prices at the different financial markets have increased the financial risk to the corporate world. It is, therefore to manage such risks, the new financial instruments have been developed, which are popularly known as *financial derivatives*. The very purpose of these instruments is to provide commitments to prices for future dates for giving protection against movements in future prices. And these instruments also provide opportunities to earn profits if one can assume higher risk.

Although derivatives are used to cope up with the risk or future losses but if not traded carefully they may proved to be a lethal weapon. In this regard the statement given by Warren Buffet is worth considering—"*Derivatives are financial weapons of mass destruction. Derivatives generate reported earnings that are often wildly overstated and based on estimates whose inaccuracy may not be exposed for many years. Large amounts of risk have become concentrated in the hands of relatively few derivatives dealers ... which can trigger serious systemic problems*" (BBC NEWS Tuesday, March 4th, 2003).

Are derivatives really a weapon of mass destruction? Let understand the meaning of derivatives first of all.

2. What are Financial Derivatives?

Literally derivate means something which derives its value from the underlying asset. Underlying asset can be securities, commodities, bullion, currency, livestock, or anything else. The underlying asset paves the way for the classification of derivatives.

> "*A derivative can be defined as a financial instrument whose value depends on (or derives from) the values of other, more basic, underlying variables*"—(Hull, 2009)

> "*Derivative includes: 1. Security derived from a debt instrument, share, loan whether secured or unsecured, risk instrument or contract for difference or any other form of security; 2. A contract which derives its value from the prices, or index of prices of underlying securities*".—The Securities Contracts (Regulation) Act, 1956

From the aforementioned it is clear that derivatives are either securities or contracts that derive value from another. As derivatives' value is depend upon the value of underlying asset so whenever there is change in the value of underlying asset the value of derivative changes automatically.

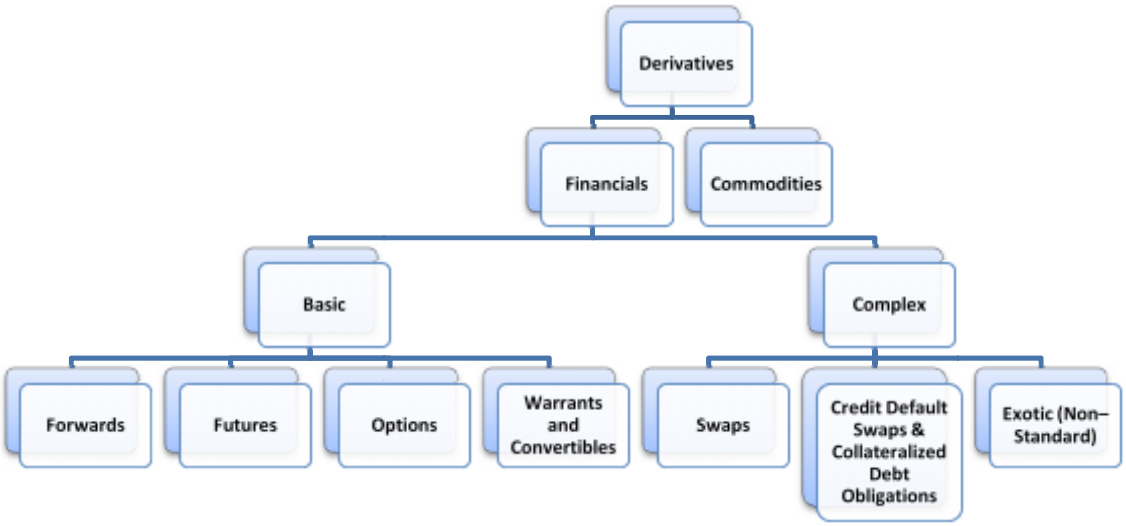
2.0. Features of Financial Derivatives

Following are the general features of a simple financial derivative instrument:

1. It is a contract;
2. Derives value from the underlying asset;
3. Specified obligation;
4. Direct or exchange traded;
5. Related to national amount;
6. Delivery of underlying asset is not involved;
7. May be used as deferred delivery;
8. Secondary market instrument;
9. Exposure to risk;
10. Off balance–sheet item;
11. A financial instrument based on another financial instrument.

2.1. Types of Financial Derivatives

Figure 1: Types of Financial Derivatives



2.2. Basic Financial Derivatives

2.2.0. Forward

A forward contract is a simple but customized contract between two parties to buy or sell a financial asset at a certain time in the future for a certain price. These are not exchange traded but traded in over the counter (OTC) market.

Certain features of forward contracts are—bilateral contracts, exposed to counter party risk, delivery price, customized, delivery of the asset on the expiry date, synthetic assets, popular in foreign exchange markets, etc.

2.2.1. Future Contracts

It is an agreement between two parties to buy or sell a specified quantity of a financial asset at a specified price and at a specified time and place. Future contracts are always exchange traded that's why these are standardize in nature and governed by a set of rules laid down by the exchange in this behalf.

Certain features of future contracts are—regulated by the exchange, obligation of the parties, standardization, settlement price, clearing house, cash settlement, delivery of underlying asset does not take place, daily settlement and margin, exposed to higher risk, etc.

2.2.2. Options

These are the most popular type of derivatives. It is defined as—"*a contract between two parties whereby one party obtains the right but not the obligation, to buy or sell a specified quantity of asset at a specified price, on or before a specified date*".

From the above definition it's clear that options are different from forwards and futures in some senses—firstly in options, there is right but not the obligation to perform the contract and secondly it can be performed on or before a specified date.

Person who acquires the right is known as option holder or option buyer and the other person is known as option writer or option seller. The writer of the option charges some amount from the holder for giving such right and it is known as option premium. Further specified price is also known as exercise price. Further, if the option can be exercised at any time before the maturity date then it is called *American Option* and when it can be exercised only at the maturity then it is called *European Option*[*].

2.2.3. Warrants and Convertibles

Warrant is just like an option contract where the holder has the right to buy shares of a specified company at a specified price during the given time period. Generally these are attached with either equity shares or bonds/debentures and used by a company make the shares or bonds/debentures more appealing to public so that they can buy them.

[*] This is just a convention to use these names and there is nothing to do with the geographical locations.

Warrants can be detached from the instrument with which they have been issued and can be traded separately. Because warrants are more speculative and leveraged documents, so while trading them, one should be careful.

2.2.4. Swap Contracts

A swap contract is an agreement between two counter parties to exchange two different streams of cash flows in future. Two types of popular swap contracts are—interest rate swaps and currency swaps. In interest rate swap one party agrees to pay to the other party interest at a fixed rate on a notional principal amount and in return, it receives interest at a floating rate for a specified time period. In case of currency swap, there is exchange if interest flows in one currency for interest flows in other currency.

2.2.5. Credit Derivatives

Credit derivatives can be divided in to two categories(Partnoy & Skeel, The Promise and Perils of Credit Derivatives, 2006) *i.e.* credit default swaps and collateralized debt obligations. These are explained as follows:

2.2.5.1. Credit Default Swap

The most popular credit derivative is a *credit default swap* (CDS). This is a contract that provides insurance against the risk of a default by particular company or we can say that a credit default swap is a private contract in which private parties bet on a debt issuer's bankruptcy, default, or restructuring. The company is known as the *reference entity* and a default by the company is known as a *credit event*. The buyer of the insurance obtains the right to sell bonds issued by the company for their face value when a credit event occurs and the seller of the insurance agrees to buy the bonds for their face value when a credit event occurs. The total face value of the bonds that can be sold is known as the credit default swap's *notional principal*.

Example: Suppose a Lena–Dena Bank that has lent `10 million to a Ram Bharose Company and then might enter into a `10 million credit default swap with a third party (Derivative Trading Limited) in order to protect itself against the possible default by the Ram Bharose Company. If the Ram Bharose Company defaults on its debt, the Lena–Dena Bank will lose money on the loan but simultaneously makes money on the Swap. And, if the Ram Bharose Company does not default, the Lena–Dena Bank will make some payment to the Derivative Trading Limited in the form of credit default swap charges, reducing its profits on the loan. And this charge is far less than the profit made on the loan given to the Ram Bharose Company.

2.2.6.2. Collateralized Debt Obligations

A collateralized debt obligation (CDO) is a pool of debt contracts housed within a special purpose entity (SPE) whose capital structure is sliced and resold based on differences in credit quality.

In a "cash flow" CDO, the SPE purchases a portfolio of outstanding debt issued by a range of companies (banks), and finances its purchase by issuing its own financial instruments, including primarily debt but also equity.

In a "synthetic" CDO, the SPE does not purchase actual bonds, but instead enters into several credit default swaps with a third party, to create synthetic exposure to the outstanding debt issued by a range of companies.

The SPE finances its purchase by issuing financial instruments to investors, but these instruments are backed by credit default swaps rather than any actual bonds.

2.3. History of Derivatives Market in India

2.3.0. Why there was Need of Derivatives?

Before liberalization the prices of many commodities were controlled but after 1991 the process of de–regulation started. This increased the volatility of prices of different goods and services. Further, due to the entry of MNCs in India the market determined exchange rates and interest rates also created volatility and instability in portfolio values and security prices. In order to hedge these various types of risks different types of derivatives came in to the picture.

2.3.1. A Snap–shot of Recommendations L. C. Gupta Committee

On 18th of November 1996 the Securities and Exchange Board of India (SEBI) appointed a committee headed by Dr. L. C. Gupta so that an appropriate framework could be developed for the trading of derivatives in India. On 11th of May 1998, SEBI accepted the recommendations of Dr. L. C. Gupta Committee and paved the way for the derivative trading in India. Following are the major recommendation of L. C. Gupta's committee:

1. There is an urgent need of introducing of financial derivatives;
2. There is need for equity, interest and currency derivatives;
3. Future trading through derivatives should be introduced in a phased manner starting with stock index futures, which will be followed by options on index and later options on stocks.
4. There should be two level regulation *i.e.* exchange level and SEBI level;
5. Derivative trading should be on a separate segment of existing stock exchanges;
6. There will be an independent clearing corporation;
7. The derivative exchange will have online trading and adequate surveillance system;
8. Stringent conditions for trading and clearing member;
9. Cash market on which derivatives are based needed improvements;
10. Declaration of derivatives as 'securities' under Section 2(*h*) of the SCRA.

2.3.2. Years of introduction of Various Derivatives in India

Table 1: Years of introduction of Various Derivatives in India

Over the Counter (OTC)	Exchange Traded
• 1980s—Currency forwards	• June, 2000—Equity index futures
• 1997—Long-term foreign currency-rupee swaps	• June, 2001—Equity index options
• July, 1999—Interest rate swaps and FRAs	• July, 2001—Stock option
• July, 2003—FC- rupee options	• June, 2003—Interest rate futures

Source: (http://www.derivativesportal.com)

2.3.3. Financial Derivatives in India: A Chronological Review

Table 2: Financial Derivatives in India: A Chronological Review

Date	Progress
14th of December, 1995	NSE asked SEBI for permission to trade futures
18th of November, 1996	SEBI setup Dr. L. C. Gupta Committee to draft a policy framework for index futures
11th of May, 1998	Dr. L. C. Gupta Committee submitted the report
7th of July, 1999	RBI give permission for OTC forward rate agreements (FRAs) and interest rate swaps
24th of May, 2000	SIMES chose NIFTY for trading futures and options on an Indian index
25th of May, 2000	SEBI gave permission to NSE and BSE to do index future trading
9th of June, 2000	Trading on BSE SENSEX futures commenced at BSE
12th of June, 2000	Trading of NIFTY futures commenced at NSE
31st of August, 2000	Trading of futures and options on NIFTY to commence at SIMES
July, 2001	Trading on equity futures commenced at NSE on 31st securities
June, 2003	Trading on interest rate futures commenced at NSE
July, 2003	Trading on FC-rupee options started

Source: (Gupta, 2005)

2.4. Some Positive Aspects of Derivatives?

Derivatives are there for the following reasons:

1. Risk aversion tools;
2. Prediction of future prices;
3. Enhance liquidity;
4. Assist investors;
5. Integration of price structure;
6. Catalyze growth of financial markets;
7. Brings perfection in market;

3. Derivatives–Weapon to Mass Destruction

As we discussed, in year 2003 Warren Buffet said that—"*Derivatives are financial weapon of mass destruction. Derivatives generate … which can trigger serious systematic problems*". Since Buffet referred to derivatives as *financial weapons of mass destruction*, now whether or not these are weapons but the market of so called weapons in U.S. grown up to $516 trillion opposed to an estimate of $100 trillion (by Bank of International Settlements) in 2008. Increase by volume by the end of 2010 was:

Table 3: Global Listed Derivatives Volume by Region

Region	Jan-Dec 2009	Jan-Dec 2010	% Change
Asia Pacific	6,206,896,074	8,865,036,759	42.8%
North America	6,353,460,256	7,169,690,209	12.8%

Europe	3,838,022,268	4,418,537,986	15.1%
Latin America	1,020,820,724	1,526,946,057	49.6%
Other	325,404,696	315,036,438	-3.2%
Total	**17,744,604,018**	**22,295,247,449**	**25.6%**

Source:(www.futuresindustry.com)

Buffett's perspective may well have been driven by his own experience with some derivative positions he inherited as a result of Berkshire's $22 billion purchase of General Reinsurance Corporation in 1998 (the largest U.S. property and casualty reinsurer at the time). In Buffett's 2002 letter to shareholders, he describes derivatives as "time bombs" for all parties involved. He goes on to temper this statement by saying that this generalization might not be judicious because the range of derivatives is so great. Buffett also claims that it is very difficult to track the values of derivatives and their liabilities even for their holders.

In 2008, Jérôme Kerviellost over $7 billion (a £3.6 billion loss) trading equity index futures for Société Générale. And it was one of the largest bank frauds in world history via derivatives trading. This makes previous rogue trader incidences pale in comparison of the following losses:

- Nick Leeson at Barings Bank in 1995 (a £791 million loss and bankruptcy for his employer);
- National Westminster Bank PLC in 1997 (a $125 million loss);
- John Rusnak at Allied Irish Bank in 2002 (a $691 million loss);
- David Bullen and three other traders at National Australia Bank in 2004 (a $360 million loss).

So up to some extent the statement given by the Buffett was correct. Let us further discuss the impact of these weapons which were responsible for the sub-prime crisis of 2008 in USA.

3.0. What complicated the matter?

Unfortunately, this problem was not as easy as it appears. Let us understand what complicated the problem.

In America banks gave many sub-prime loans and these sub-prime loans were very lucrative part of their investment portfolio as they were expected to yield a very high return in view of the increasing home prices.

For original lenders since, the interest rate charged on sub-prime loans was about 2% higher than the interest on prime loans (owing to their risky nature); lenders were confident that they would get a handsome return on their investment. In case a sub-prime borrower continued to pay his loans installment, the lender would get higher interest on the loans. And in case a sub-prime borrower could not pay his loan and defaulted, the lender would have the option to sell his home (on a high market price) and recovered his loan amount. In both the situations the Sub-prime loans were excellent investment options as long as the housing market was booming. Just at this point, the things started complicating.

With stock markets booming and the system flush with liquidity, many big fund investors like hedge funds and mutual funds saw sub-prime loan portfolios as attractive investment opportunities. Hence, they bought such portfolios from the original lenders. This in turn meant the lenders had fresh funds to lend. The sub-prime loan

market thus became a fast growing segment. Major (American and European) investment banks and institutions heavily bought these loans (known as Mortgage Backed Securities, MBS) to diversify their investment portfolios. Most of these loans were brought as parts of CDOs (Collateralized Debt Obligations).

Owing to heavy buying of Mortgage Backed Securities (MBS) of sub-prime loans by major American and European Banks, the problem, which was to remain within the confines of U.S. propagated into the world's financial markets. Ideally, the MBS were a very attractive option as long as home prices were soaring in U.S. However, when the home prices started declining, the attractive investments in sub-prime loans became risky and unprofitable.

As the home prices started declining in the US, sub-prime borrowers found themselves in a messy situation. Their house prices were decreasing and the loan interest on these houses was soaring. As they could not manage a second mortgage on their home, it became very difficult for them to pay the higher interest rate. As a result many of them opted to default on their home loans and vacated the house. However, as the home prices were falling rapidly, the lending companies, which were hoping to sell them and recover the loan amount, found them in a situation where loan amount exceeded the total cost of the house. Eventually, there remained no option but to write off losses on these loans.

The problem got worsened as the Mortgage Backed Securities (MBS), which by that time had become parts of CDOs of giant investments banks of U.S. & Europe, lost their value. Falling prices of CDOs dented banks' investment portfolios and these losses destroyed banks' capital. The complexity of these instruments and their wide spread to major International banks created a situation where no one was too sure either about how big these losses were or which banks had been hit the hardest.

3.1. Perils of Other Forms Derivatives

Even in other derivatives, the stakes appear to be increasing at an equally alarming rate. For example, Orange County (a municipality in California) lost $1.7 billion in 1994 from debt and derivatives used to expand its investment fund and Long Term Capital Management lost $5 billion in 1998. In addition, the sub-prime credit meltdown of 2007 is estimated in the hundreds of billions of dollars.

From the above it is clear that what Buffet said in 2003 became true in 2008. The power of derivative bubble burst was so strong that it shook the whole world's economy after some time and referred to as Global Recession.

Insurance giant American International Group (AIG)[†], by nature of its business, provides extensive disclosure in its annual report. At the end of 2002, AIG's Financial Products unit had $14.9 billion in risk related to *credit derivatives* and a notional amount in its credit-derivative portfolio of $126 billion.

Citigroup said it holds $37.5 billion worth of derivatives in assets on its trading account, or 24% of that account, and $41 billion in liabilities, 45% of its trading-account liabilities. Bank of America had an average of $25.3 billion in derivative assets and $17.3 billion in derivative liabilities in 2002.

[†] AIG entered in to a venture with TATA in India in insurance business and called TATA–AIG Insurance.

3.2. Other Big Losses by Financial (F) and Non Financial (NF) Institutions

3.2.0. Amaranth (F)

This hedge fund lost $6 billion in 2006 betting on the future direction of natural gas prices.

3.2.1. Daiwa Bank (F)

A trader working in New York for this Japanese bank lost more than $1 billion in the 1990s.

3.2.2. Kidder Peabody (F)

The activities of a single trader, Joseph Jett, led to this New York investment dealer losing $350 million trading U.S. government securities. The loss arose because of a mistake in the way the company's computer system calculated profits.

3.2.3. Midland Bank (F)

This British bank lost $500 million in the early 1990s largely because of a wrong bet on the direction of interest rates. It was later taken over by Hong Kong and Shanghai bank.

3.2.4. National Westminster Bank (F)

This British bank lost about $130 million from using an inappropriate model to value swap options in 1997.

3.2.5. Sub-prime Mortgage Losses (F)

In 2007 investors lost confidence in the structures products created from U.S. sub-prime mortgages. This led to a "credit crunch" and losses of tens of billions of dollars by financial institutions.

3.2.6. Allied Lyons (NF)

The treasury department of this drinks and food company lost $150 million in 1991 selling call options on the U.S. dollar–sterling exchange rate.

3.2.7. Gibson Greetings (NF)

The treasury department of this greeting card manufacturer in Cincinnati lost about $20 million in 1994 trading highly exotic interest rate derivatives contracts with Bankers Trust. They later sued Bankers Trust and settled out of court.

3.2.8. Hammersmith and Fulham (NF)

This British Local Authority lost about $600 million on sterling interest rate swaps and options in 1988. All its contracts were later declared null and void by the British courts, much to the annoyance of the banks on the other side of the transactions.

3.2.9. Metallgeselschaft (NF)

This German company entered into long-term contracts to supply oil and gasoline and hedged them by rolling over short-term futures contracts. It lost $1.8 billion when it was forced to discontinue this activity.

3.2.10. Procter and Gamble (NF)

The treasure department of this large U.S. Company lost about $90 million in 1994 trading highly exotic interest rate derivatives contracts with Bankers Trust. It later sued Bankers Trust and settled out of court.

3.2.11. Shell (NF)

A single employee working in the Japanese subsidiary of this company lost $1 billion dollars in unauthorized trading of currency futures.

3.2.12. Sumitomo (NF)

A single trader working for this Japanese company lost about $2 billion in the copper spot, futures, and options market in the 1990s.

3.3. Negative Aspect of Credit Derivatives Especially

3.3.0. Non–Monitoring by Banks

Whenever there is problem in the company then banks come before to save the company. And in case when a company files for the bankruptcy then banks can intervene in the process of liquidation as their loan is secured most of the times and they have preferential right to get back their money. But, does it mean that banks have no reason to monitor a company.

In case of the Enron, JP Morgan Chase, Citigroup and some other banks had lent money to it. These banks used more than 800 *credit default swaps* to set off $8 billion of Enron risk. Banks did not monitor the Enron at all and kept giving loans to the Enron and the result was–the Enron was tottering on the brink of closure and so the banks. So the question is, whether credit derivatives provide enough hedging to the banks that they have no time to monitor the company?

3.3.1. Disagreement between the Lenders and Hedge Fund

Sometimes there is disagreement between a bank and the hedge fund. For example, a bank has given loan to a B–company and immediately bank entered in to a hedge agreement with a hedge fund. Suppose there is some problem with the B–company and it wants new terms and conditions including concession on the interest on loan. Now in this case bank has to take permission of hedge fund and hedge fund will not permit bank since it's interested in its profits only. Now in this case due to the attitude of the hedge bank B–company has to suffer. In 2004 Tower Automotive (Tower) filed a bankruptcy petition due to this divergence of views.

3.3.2. Non–Transparency in the Credit Default Market

All swaps are structured as over-the-counter (OTC) derivatives, and at the most of the times they are not regulated. What does it mean? The detail of a swap contract is un–disclosed. Sometimes the original party sells

the stake to someone else without notifying to other party. These types of actions make the information more asymmetrical. “Recordkeeping, documentation and other practices have been so sloppy,” as a recent article put it, “that no firm could be sure how much risk it was taking or with whom it had a deal” (David Wessel, 2006).

There are no means available to the creditors, market, and investors using which they can know that whether or not a lender has hedged its position with the help of credit derivatives this means there is uncertainty for these stakeholders. This uncertainty is the biggest challenge for these stakeholders and sometimes it proves to be a big loss.

3.3.3. Self Protection Leads to Violations of Laws

If derivatives are standardized then there is no problem and one can assume that company is adhering to the laws. Further the conduct of the company also, one can assume is good. But there are some costs associated with standardize derivatives and the terms and conditions cannot be modified. Sometimes in order to avoid these costs company go for OTC derivatives where they are lesser costs and further terms and conditions are tailor made. Thus companies are controlling themselves. But the question arises that whether or not this is justified?

3.3.4. Systemic Risk in the Credit Default Swaps Market

Credit default swaps also raise systemic concerns. Because many investors-particularly hedge fund investors-place highly leveraged bets on credit default swaps, even a relatively small market change could trigger a crisis of the sort that . Long Tenn Capital Management threatened to unleash when it collapsed in 1998 (Partnoy, 2003).

4. Conclusion

No doubt, that derivatives are there to protect from risks but sometimes they pose threats also. But we think that these losses are due to the self regulation. We also think that a public regulator can do much better in this regard. Further the task of hedging is not the domain of banks only but other participants should also come under this domain with expertise in hedging. In the last we just want to say that handling derivatives is not an easy task. So “*Handle With Care*”.

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