Introduction to Financial Derivatives
Preface

This book is intended for all students of MBA (Finance) of various universities and management institutes and the same can be used for CA, ICWA and ACS courses. The objectives of the book are to provide the student with a conceptual framework of financial decisions taken with regard to investment decisions in Derivative Market. This Derivative Market covers Equity, Foreign Exchange and Commodity products. The purpose is to make students familiar with the unique economic fundamentals and financial factors, which challenge the financial manager in the international context. The book covers the entire syllabus as approved by UGC on the subject of Financial Derivatives. With increasing prospects on capital market and earnings through hedging, Derivative instruments assume significance. This book could be the perfect guide for the beginners who wish to invest in F&O (Futures and Options) segment. Besides, this book is presented in simple mathematical terms, easily understandable to the average students.

This has the advantage of harmonising the finance function with the investment function of the financial manager on the one hand and integrating the domestic finance with international finance on the other. At the cost of repetition, each chapter is made self-contained and related to other chapters. But this is an added advantage to students who get a recap of some of the points of significance.

The material is kept as brief as possible, yet with a comprehensive coverage of all the modules as approved by various universities and autonomous institutions and in accordance with their syllabus.

This text book could be the perfect guide to the new beginners who want to know about Derivative Market in three classifications namely Equity Derivatives, Currency Derivatives and Commodity Derivatives.

Author
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R. Amuthan
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Introduction to Financial Derivatives

Derivatives are instruments in respect of which trading is carried out as a right on an underlying asset. In normal trading, an asset is acquired or sold. When we deal with derivatives, the asset itself is not traded, but the right to buy or sell the asset is traded. Thus, a derivative instrument does not directly result in a trade but gives a right to a person which may ultimately result in trade. A buyer of a derivative gets a right over the asset which, after or during a particular period of time, might result in the buyer buying or selling the asset.

A derivative instrument is based on an underlying asset. The asset may be a commodity, a stock or a foreign currency. A right is bought either to buy or sell the underlying asset after or during a specified time. The price at which the transaction is to be carried out is also spelt out in the beginning itself.

The emergence of the market for derivative products, most notably forwardss, futures and options, can be traced back to the willingness of risk-averse economic agents to guard themselves against uncertainties arising out of fluctuations in asset price. By their very nature, the financial markets are marked by a very high degree of volatility. Through the use of derivative products, it is possible to transfer partially or fully price risks by locking-in asset prices. As instruments of risk management, these generally do not influence the underlying asset prices. However, by locking-in asset prices, derivative products minimise the impact of fluctuations in asset prices on the profitability and cash flow situation of risk-averse investors.

DERIVATIVES DEFINED

Derivative is a product whose value is derived from the value of one or more basic variables, called bases (underlying asset, index, or reference rate), in a contractual manner. The underlying asset can be equity, forex, commodity or any other asset. For example, wheat farmers may wish to sell their harvest at a future date to eliminate the risk of a change in prices by that date. Such a transaction is an example of a derivative. The price of this derivative is driven by the spot price of wheat which is the “underlying”.

(1)
In the Indian context the securities contracts (Regulation) Act, 1956 (SC(R)A) defines "derivative" to include-

1. A security derived from a debt instrument, share, loan whether secured or under secured, risk instrument or contract for differences or any other form of security.
2. A contract, which derives its value from the prices or underlying securities.

Derivatives are securities under the SC(R)A and, hence, the trading of derivatives is governed by the regulatory framework under the SC(R)A.

**Products, Participants and Functions**

Derivative contracts have several variants. The most common variants are forwards, futures, options and swaps. The following three broad categories of participants - hedger, speculators and arbitrageurs trade in the derivative market. Hedgers face risk associated with the price of an asset. They use futures or options markets to reduce or eliminate this risk. Speculators wish to bet on future movements in the price of an asset. Futures and options contract can give them an extra leverage; that is, they can increase both the potential gains and potential losses in a speculative venture.

Arbitrageurs are in business to take advantage of a discrepancy between prices in two different markets. If, for example, they see the futures price of an asset getting out of line with the cash price, they will take offsetting positions in the two markets to lock in profit.

**Origin of Derivatives Markets**

It is difficult to trace the main origin of futures trading since it is not clearly established as to where and when the first forwards market came into existence. Historically, it is evident that the development of futures markets followed the development of forwards markets. It is believed that the forwards trading has been in existence since 12th century in England and France. Forwards trading in rice was started in 17th century in Japan, known as Cho-at-Mai a kind (rice trade-on-book) concentrated around Dojima in Osaka, later on the trade in rice grew with a high degree of standardisation. In 1730, this market got official recognition from the Tokugawa Shogurate. As such, the Dojima rice market became the first futures market in the sense that it was registered on organised exchange with the standardised trading norms.

The butter and eggs dealers of Chicago Produce Exchange joined hands in 1898 to form the Chicago Mercantile Exchange for futures trading. The exchange provided a futures market for many commodities including pork bellies (1961), live cattle (1964), live hogs (1966), and feeder cattle (1971). The International Monetary Market was formed as a division of the Chicago Mercantile Exchange in 1972 for futures trading in foreign currencies. In 1982, it introduced a futures contract on the S&P 500 Stock Index. Many other exchanges throughout the world now trade futures contracts. Among them are the Chicago Rice and Cotton Exchange, the New York Futures Exchange, the London International Financial Futures Exchange, the Toronto Futures Exchange and the Singapore International Monetary Exchange. They grew so rapidly that the number of shares underlying the option contracts sold each day exceeded the daily volume of shares traded on the New York Stock Exchange.

The S&P 500 stock indices while the American Stock Exchange trades options on the Major Market Stock Index, and the New York Stock Exchange trades options on the NYSE Index. Most exchanges offering futures contracts now also offer options on these futures contracts. Thus, the
Chicago Board of Trades offers options on corn futures, the Chicago Mercantile Exchange offers options on live cattle futures, the International Monetary Market offers options on foreign currency futures, and so on.

The basic cause of forwards trading was to cover the price risk. In earlier years, transporting goods from one market to other markets took many months. For example, in the 1800s, food grains produced in England were sent through ships to the United States which normally took few months. Sometimes, during this time, the price crashed due to unfavourable events before the goods reached the destination. In such cases, the producers had to sell their goods at loss. Therefore, the producers sought to avoid such price-risk by selling their goods forwards, or on a "to arrive" basis. The basic idea behind this move at that time was simply to cover future price risk. On the opposite side, the speculator or other commercial firms seeking to offset their price-risk came forwards to go for such trading. In this way, the forwards trading in commodities came into existence.

In the beginning, these forwards trading agreements were formed to buy and sell food grains in the future for actual delivery at the pre-determined price. Later on, these agreements became transferable, and during the American Civil War period, i.e., 1860 to 1865, it became commonplace to sell and resell such agreements where actual delivery of produce was not necessary. Gradually, the traders realised that the agreements were easier to buy and sell if the same were standardised in terms of quantity, quality and place of delivery relating to food grains. In the nineteenth century this activity was centred in Chicago which was the main food grains marketing centre in the United States. In this way, the modern futures contracts first came into existence with the establishment of the Chicago Board of Trade (CBOT) in the year 1848, and today, it is the largest futures market of the world. In 1865, the CBOT framed the general rules for such trading which later on became a trendsetter for so many other markets.

In 1874, the Chicago Produce Exchange was established which provided the market for butter, eggs, poultry, and other perishable agricultural products. In the year 1877, the London Metal Exchange came into existence, and today, it is the leading market in metal trading both in spot as well as forwards. In the year 1895, the butter and egg dealers withdrew from the Chicago Produce Exchange to form separately the Chicago Butter and Egg Board, and thus, in 1919 this exchange was renamed as the Chicago Mercantile Exchange (CME) and was reorganised for futures trading. Since then, so many other exchanges came into existence throughout the world, which trade in futures contracts.

Although financial derivatives have been in operation since long, they have become a major force in financial markets in the early 1970s. The basic reason behind this development was the failure of Brettonwood System and the break-down of the fixed exchange rate regime. As a result, a new exchange rate regime, i.e., floating rate (flexible) system, based upon market forces, came into existence. But due to pressure of demand and supply on different currencies, the exchange rates were constantly changing, and often, substantially. As a result, the business firms faced a new risk, known as currency or foreign exchange risk. Accordingly, a new financial instrument was developed to overcome this risk in the new financial environment.

Another important reason for the instability in the financial market was fluctuation in the short-term interests. This was mainly due to the fact that one of the government of that time tried to manage foreign exchange fluctuations through short-term interest rates and by maintaining money supply targets, but which were contrary to each other. Further, the increased instability of short-term interest rates created adverse impact on long-term interest rates and hence, the instability in bond prices
because they are largely determined by long-term interest rates. The result is that it created another risk, named interest rate risk, for both the issuers and the investors of debt instruments.

Interest rate fluctuations had not only created instability in bond prices, but also in other long-term assets such as, company stocks and shares. Share prices are determined on the basis of expected present values of future dividends payments discounted at the appropriate discount rate. Discount rates are usually based on long-term interest rates in the market. So increased instability in the long-term interest rates resulted in enhanced fluctuations in the share prices in the stock markets. Further, volatility in stock prices is reflected in the volatility in stock market indices which causes systematic risk or market risk.

In the early 1970s, it was witnessed that the financial markets were highly unstable. As a result, many financial derivatives have emerged as the means to manage the different types of risks stated above, and also of taking advantage of it. Hence, the first financial futures market was the International Monetary Market, established in 1972 by the Chicago Mercantile Exchange, which was followed by the London International Financial Futures Exchange in 1982. For further details see the ‘Growth of Futures Market’ in the forthcoming chapter.

**BENEFITS OF DERIVATIVE MARKET**

1. First, prices in an organised derivatives market reflect the perception of market participants about the future and lead the prices of underlying to the perceived future level. The prices of derivatives converge with the price of the underlying at the expiration of the derivative contract. Thus, derivatives help in discovery of future as well as current prices.

2. Second, the derivatives market helps to transfer risks from those who have them but may not like them, to those who have an appetite for them.

3. Third, derivatives, due to their inherent nature, are linked to the underlying cash markets. With the introduction of derivatives, the underlying market witnesses higher trade volumes because of participation by more players who would not otherwise participate for lack of an arrangement to transfer risk.

4. Fourth, speculative trades shift to a more controlled environment of derivatives market. In the absence of an organised derivatives market, speculators trade in the underlying cash markets. Margining, monitoring and surveillance of the activities of various participants become extremely difficult in these kind of mixed markets.

5. Fifth, an important incidental benefit that flows from derivatives trading is that it acts as a catalyst for new entrepreneurial activity. The derivatives have a history of attracting many bright, creative, well-educated people with an entrepreneurial attitude. They often energise others to create new businesses, new products and new employment opportunities, the benefit of which are immense.

6. Finally, derivatives markets help increase savings and investment in the long run. Transfer of risk enables market participants to expand their volume of activity.

7. The most important services provided by the derivatives is to control, avoid, shift and manage efficiently different types of risks, through various strategies like hedging, arbitraging. Spreading etc. Derivatives assist the holders to shift or suitably modify the risk
Introduction to Financial Derivatives

characteristics of their portfolios. These are specifically useful in highly volatile financial market conditions like erratic trading, highly flexible interest rates, volatile exchange rates and monetary chaos.

8. Derivatives serve as barometers of the future trends in prices which result in the discovery of new prices both on the spot and futures markets. Further, they help in disseminating information regarding the futures markets trading of various commodities and securities etc., to the society, which enable to discover or form suitable or correct or true equilibrium prices in the markets. As a result, they assist in appropriate and superior allocation of resource in the society.

9. As we see that, in derivatives trading, no immediate full amount of the transaction is required, because most of them are based on margin trading. As a result, large number of traders, speculator arbitrageurs operates in such markets. So, derivatives trading enhance liquidity and reduce transaction costs in the markets for underlying assets.

10. The derivatives assist the investors, traders and managers of large pools of funds to devise strategies so that they may make proper asset allocation, increase their yields and achieve other investment goals.

11. It has been observed from the derivatives trading in the market that the derivatives smoothen out price fluctuations, squeeze the price spread, integrate price structure at different point of time and remove gluts and shortages in the markets.

12. The derivatives trading encourage the competitive trading in the markets, different risk taking preference of the market operators like speculators, hedgers, traders, arbitrageurs, etc. resulting in increase in trading volume in the country. They also attract young investors, professionals an other experts who will act as catalysts to the growth of financial markets.

13. Lastly, it is observed that derivatives trading develop the market towards “complete markets”. Complete market concept refers to that situation where no particular investors are better off than others, or patterns of returns of all additional securities are spanned by the already existing securities in it, or there is no further scope of additional security.

14. All said and done, we can say it is the speculators-friendly market.

Uses of Financial Derivative

1. Spot price is getting converted in to Future prices. It helps in discovering future as well as current prices.

2. Derivatives help to transfer risks from those who dislike to take risk to those who like to take risks.

3. Assured returns attract many investors.

4. Investors can ensure normal or speculative or arbitrage profit, whichever they like.

5. In futures, the long-buying investors cannot go for putting down stock market price movements as it is due to MTM arrangement. So many long contracts in futures and many call contracts in option will create more open interest for the underlying counter. This open interest is healthy sign for the stock price appreciation as if it shows many people are willing to buy the stock.
6. Investors can resort to limit their profit or losses by preferring to option contracts.

7. Market prices will not be affected by market sentiments.

8. Because of margining system, both buying and selling transactions are guaranteed. In NSE, there is a nodal agency called NSCCL (National Securities Clearing Corporation Limited), which takes care delivery of shares and settling payment for both buyers and sellers in cash market as well as F&O Market.

**TYPES OF FINANCIAL DERIVATIVES**

The most commonly used derivatives contracts are forwards, futures and options which we shall discuss in detail later. Here, we take a brief look at various derivatives contracts that have come to be used.

**Forwards**

A forwards contract is a customised contract between two entities, where settlement takes place on a specific date in the future at today's pre-agreed price.

**Futures**

A futures contract is an agreement between two parties to buy or sell an asset at a certain time in the future asset at a certain price. Futures contracts are special types of forwards contracts in the sense that the former are standardised exchange-traded contracts.

**Options**

Options are of two types—calls and puts. Calls give the buyer the right but not the obligation to buy a given quantity of the underlying asset, at a given price on or before a given future date. Puts give the buyer the right, but not the obligation to sell a given quantity of the underlying asset at a given price on or before a given date.

**Warrants**

Options generally have lives of up to one year; the majority of options traded on options exchanges having a maximum maturity of nine months. Longer-dated options are called warrants and are generally traded over-the-counter.

**LEAPS**

The acronym LEAPS means Long-term Equity Anticipation Securities. These are options having a maturity of up to three years.

**Baskets**

Basket options are options on portfolios of underlying assets. The underlying asset is usually a moving average of a basket of assets. Equity index options are a form of basket options.

**Swaps**

Swaps are private agreements between two parties to exchange cash-flows in the future according to a prearranged formula. They can be regarded as portfolios of forwards contract. The two commonly used swaps are:
Introduction to Financial Derivatives

- **Interest Rate Swaps**: These entail swapping only the interest related cash flows between the parties in the same currency.
- **Currency Swaps**: These entail swapping both principal and interest between the parties, with the cash-flows in one direction being in a different currency than those in the opposite direction.

**Swaptions**

Swaptions are options to buy or sell a swap that will become operative at the expiry of the options. Thus a Swaption is an option on a forwards swap. Rather than have calls and puts, the Swaptions market has receiver Swaptions and payer Swaptions. A receiver Swaption is an option to receive fixed and pay floating. A payer Swaption is an option to pay fixed and receive floating.

**DEVELOPMENT OF EXCHANGE-TRADED DERIVATIVES**

Derivatives have probably been around for as long as people have been trading with one another. Forwards contracting dates back at least to the 12th century, and may well have been around before then. Merchants entered into contracts with one another for future delivery of specified amount of commodities at specified price. A primary motivation for pre-arranging a buyer or seller for a stock of commodities in early forwards contracts was to lessen the possibility that large swings would inhibit marketing the commodity after a harvest.

The following factors have been during the growth of financial derivatives:

1. Increased volatility in asset price in financial market,
2. Increased integration of national financial markets with the international markets,
3. Marked improvement in communication facilities and sharp decline in their costs,
4. Development of more sophisticated risk-management tools, providing economic agents a wider choice of risk-management strategies, and
5. Innovation in the derivatives markets, which optimally combine the risks and returns over a large number of financial assets leading to higher returns, reduced risks as well as transactions cost as compared to individual financial assets.

**Table 1.1 The Global Derivatives Industry: Outstanding Contracts (in $ billions)**

<table>
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<td>Exchange-traded instruments</td>
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<td>12403</td>
<td>13932</td>
<td>13522</td>
<td>14302</td>
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<td>11221</td>
<td>12643</td>
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<td>12626</td>
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<tr>
<td>Currency futures and options</td>
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<td>171</td>
<td>161</td>
<td>81</td>
<td>59</td>
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<tr>
<td>Stock index futures and options</td>
<td>511</td>
<td>591</td>
<td>1021</td>
<td>1208</td>
<td>1793</td>
<td>1580</td>
</tr>
<tr>
<td>Some OTC instruments</td>
<td>17713</td>
<td>25453</td>
<td>27211</td>
<td>44259</td>
<td>53316</td>
<td>58244</td>
</tr>
<tr>
<td>Interest rate swaps and options</td>
<td>16515</td>
<td>23894</td>
<td>27211</td>
<td>44259</td>
<td>53316</td>
<td>58244</td>
</tr>
<tr>
<td>Currency swaps and options</td>
<td>1197</td>
<td>1560</td>
<td>1824</td>
<td>5948</td>
<td>4751</td>
<td>5532</td>
</tr>
<tr>
<td>Other instruments</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>30110</td>
<td>30134</td>
<td>31423</td>
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<tr>
<td>Total</td>
<td>26996</td>
<td>35471</td>
<td>41438</td>
<td>94249</td>
<td>101723</td>
<td>109501</td>
</tr>
</tbody>
</table>

**Source**: Bank for International Settlements.
How to Trade in Derivatives?

Trading in derivatives is as simple as trading in cash markets. The same buy and sell concept is used here, too. However, an investor can only be long in a cash market. In other words, he can only buy a particular stock and then sell it later. On the other hand, derivatives provide a distinct advantage of selling a security at a higher price and then buying the same at a lower price. This concept is known as short selling. In other words, derivative products provide an opportunity to make money in a rising market as well as falling market by going long (buy low, sell high) and going short (sell high, buy low).

In a long or short futures position, there are three settlement contracts at any point in time – near-month mid-month and far-month contracts. For instance, in April 2011, the April, May and June contracts will be the near-month, mid-month and far-month series respectively. Each of these contracts expires on the last Thursday of that particular month. Typically, the near-month contracts are the most liquid, accounting for more than 90 per cent of the volumes for most part of that month.

Regardless of whether you are a hedger or speculator, you can keep your position open until the expiry of the contract. On the day of the expiry, you must square-off (or close) your positions by reversing the transactions. In other words, sell if you have bought and vice versa. You can also roll over (carry forwards) your positions in to the next month series by first closing your position int the current series and then taking a similar position on inception the next series, after adjusting for margin and broker commissions.

Global Derivative Markets

The derivatives markets have grown manifold in the last two decades. Table 1.1 presents growth of the derivatives industry. According to the Bank for International Settlements (BIS), the approximate size of global derivatives market was US$ 109.5 trillion at end-December 2000. The total estimated notional amount of outstanding over-the-counter (OTC) contracts stood at US$ 95.2 trillion at end-December 2000, an increase of 7.9 per cent over end-December 1999. Growth in OTC derivatives market is mainly attributable to the continued rapid expansion of interest rate contracts, which reflected growing corporate bond markets and increased interest rate uncertainty at the end of 2000. The amount outstanding is organised exchange markets increased by 5.8 per cent from US$ 13.5 trillion at end-December 1999 to US$ 14.3 trillion at end-December 2000.

The turnover data are available only for exchange-traded derivatives contracts. The turnover in derivatives contracts traded on exchange has increased by 9.8 per cent during 2000 to US$ 384 trillion as compared to US$ 350 trillion in 1999 (Table 1.2). While interest rate futures and options accounted for nearly 90 per cent of total turnover during 2000, the popularity of stock market index future and options grew modestly during the year. According to BIS, the turnover in exchange-traded derivative markets rose by a record amount in the first quarter of 2001, while there was some moderation in the OTC volumes.

Exchange-traded vs. OTC Derivatives Markets

The OTC derivatives markets have witnessed rather sharp growth over the last few years, which has accompanied the modernisation of commercial and investment banking and globalisation of financial activities. The recent developments in information technology have contributed to a great extent to these developments. While both exchange-traded and OTC derivative contracts offer many benefits, the former have rigid structures compared to the latter. It has been widely discussed that
the highly institutions and their OTC derivative positions were the main cause of turbulence in financial markets in 1998. These episodes of turbulence revealed the risks posed to market stability originating in features of OTC derivative instruments and markets.

Table 1.2 Turnover in Derivatives Contracts Traded on Exchanges (in US$ trillion)

<table>
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</thead>
<tbody>
<tr>
<td>Interest rate futures</td>
<td>177.3</td>
<td>271.9</td>
<td>266.4</td>
<td>253.6</td>
<td>247.8</td>
<td>296.6</td>
<td>263.8</td>
<td>292.3</td>
</tr>
<tr>
<td>Interest rate options</td>
<td>32.8</td>
<td>46.7</td>
<td>43.3</td>
<td>41.0</td>
<td>48.6</td>
<td>55.8</td>
<td>45.6</td>
<td>47.5</td>
</tr>
<tr>
<td>Currency futures</td>
<td>2.8</td>
<td>3.3</td>
<td>3.2</td>
<td>2.6</td>
<td>2.7</td>
<td>2.5</td>
<td>2.6</td>
<td>2.4</td>
</tr>
<tr>
<td>Currency options</td>
<td>1.4</td>
<td>1.4</td>
<td>1.3</td>
<td>1.3</td>
<td>0.9</td>
<td>0.5</td>
<td>0.3</td>
<td>0.2</td>
</tr>
<tr>
<td>Stock market index futures</td>
<td>7.1</td>
<td>9.4</td>
<td>10.6</td>
<td>12.9</td>
<td>16.4</td>
<td>19.6</td>
<td>21.7</td>
<td>22.7</td>
</tr>
<tr>
<td>Stock market index options</td>
<td>6.3</td>
<td>8.0</td>
<td>9.3</td>
<td>10.2</td>
<td>13.1</td>
<td>14.7</td>
<td>15.7</td>
<td>18.7</td>
</tr>
<tr>
<td>Total</td>
<td>227.7</td>
<td>340.7</td>
<td>334.1</td>
<td>321.6</td>
<td>356.5</td>
<td>389.7</td>
<td>349.7</td>
<td>383.8</td>
</tr>
</tbody>
</table>

Source: Bank for International Settlements

The OTC derivatives markets have the following features compared to exchange-traded derivatives:

1. The management of counter-party (credit) risk is decentralised and located within individual institutions,
2. There are no formal centralised limits on individual positions, leverage, or margining,
3. There are no formal rules for risk and burden-sharing,
4. There are no formal rules or mechanisms for ensuring market stability and integrity, and for safeguarding the collective interests of market participants, and
5. The OTC contracts are generally not regulated by a regulatory authority and the exchange's self regulatory organisation, although they are affected indirectly by national legal systems, banking supervision and market surveillance.

Some of the features of OTC derivatives markets embody risks to financial market stability. The following features of OTC derivatives markets can give rise to instability in institutions, markets, and the international financial system: (i) the dynamic nature of gross credit exposures, (ii) information asymmetries, (iii) the effects of OTC derivative activities on available aggregate credit, (iv) the high concentration of OTC derivative activities in major institutions, and (v) the central role of OTC derivatives markets in the global financial system. Instability arises when shocks, such as counter-party credit events and sharp movements in asset prices that underlie derivative contracts occur, which significantly alter the perceptions of current and potential future credit exposures. When asset prices change-rapidly, the size and configuration of counter-party exposures can become unsustainably large and provoke a rapid unwinding of positions.

There has been some progress in addressing these risks and perceptions. However, the progress has been limited in implementing reforms in risk management, including counter-party, liquidity and operational risks, and OTC derivatives markets continue to pose a threat to international financial stability. The problem is more acute as heavy reliance on OTC derivatives creates the possibility of systemic financial events, which fall outside the more formal clearing-house structures.
Moreover, those who provide OTC derivative products, hedge their risks through the use of exchange-traded derivatives. In view of the inherent risks associated with OTC derivatives, and their dependence on exchange-traded derivatives, Indian law considers them illegal.

DERIVATIVES MARKET IN INDIA

Approval for Derivatives Trading

The first step towards introduction of derivatives trading in India was the promulgation of the securities laws (Amendment) Ordinance, 1995, which withdrew the prohibition on options in securities. The market for derivatives, however, did not take off, as there was no regulatory framework to govern trading of derivatives. SEBI set up a 24-member committee under the chairmanship of Dr. L.C. Gupta on November 18, 1996 to develop appropriate regulatory framework for derivatives trading in India. The committee submitted its report on March 17, 1998 prescribing necessary pre-condition for introduction of derivatives trading in India.

The committee recommended that derivatives should be declared as 'securities' so that regulatory framework applicable to trading of 'securities' could also govern trading of securities. SEBI also set up a group in June 1998 under the chairmanship of Prof. J.R. Varma, recommend measures for risk containment in derivatives market in India. The report, which was submitted in October 1998, worked out the operational details of margining system, methodology for charging initial margins, broker net-worth, deposit requirement and real-time monitoring requirements.

The SCRA was amended in December 1999 to include derivatives within the ambit of 'securities' and the regulatory framework was developed for governing derivatives trading. The act also made it clear that derivatives shall be legal and valid only if such contracts are traded on a recognised stock exchange, thus, precluding OTC derivatives. The government also rescinded in March 2000, the three-decade old notification, which prohibited forwards trading in securities.

Derivatives trading commenced in India in June 2000 after SEBI granted the final approval to this effect in May 2000. SEBI permitted the derivative segments of two stock exchanges, NSE and BSE, and their clearing house/corporation to commence trading and settlement in approved derivatives contracts. To begin with, SEBI approved trading in index futures contracts based on S&P CNX Nifty and BSE-30 (sensex) index. This was followed by approval for trading in options based on these two indexes and options on individual securities. The trading in index options commenced in June 2001 and the trading in options on individual securities commenced in July 2001. Futures contract on individual stocks were launched in November 2001. Trading and settlement in derivative contracts is done in accordance with the rules, byelaws, and regulations of the respective exchanges and their clearing house/corporation duly approved by SEBI and notified in the official gazette.

Derivatives Market at NSE

The derivatives trading on the exchange commenced with S&P CNX Nifty futures on June 12, 2000. The trading in index option commenced on June 4, 2001and trading in options on individual securities commenced on July 2, 2001. Single stock futures were launched on November 9, 2001. The index futures and options contract on NSE are based on S&P CNX Nifty index. Currently, the futures contracts have a maximum of 3-months expiration cycles. Three contracts are available for trading, with 1 month, 2 months and 3 months expiry. A new contract is introduced on the next trading day following the expiry of the near-month contract.
Trading Mechanism

The futures and options trading system on NSE, called NEAT-F&O trading system, provides a fully automated screen-based trading for Nifty futures & options and stock futures & options on a nation-wide basis and an online monitoring and surveillance mechanism. It supports an anonymous order driven market which provides complete transparency of trading operations and operates on strict price-time priority. It is similar to that of trading of equities in the Cash Market (CM) segment. The NEAT-F&O trading system is accessed by two types of users. The Trading Members (TM) have access to functions such as order entry, order matching, order and trade management.

It provides tremendous flexibility to users in terms of kinds of orders that can be placed on the system. Various conditions like Good-till-Day, Good-till-cancelled, Good-till-date, immediate or cancel, Limit/market price, Stop loss, etc. Can be built into an order. The Clearing Members(CM) use the trader workstation for the purpose of monitoring the trading member(s) for whom they clear the trades. Additionally, they can enter and set limits to positions, which a trading member can take.

Following are Clearing and Settlement Process of National Stock Exchange, Clearing and Settlement Procedure for Purchasing/Selling Shares:

- If the client would like to buy the stock, he has to place a buy order with his nearby trading member.
- He will get in touch with depository services for checking his clients demat account. Only through depository service provider, namely CDSL (Central Depository Services Limited) or NSDL (National Securities Depository Limited), the order message will reach the NSE mainframe.
- In turn NSE mainframe will flash message to the concerned company through online, the required number of shares will be purchased by means of NSE's net work, after finishing this process, the information will be passed to the trading member terminal.
- This process after is finished the contract note issue will start. Contract note is the document which is served as the proof of the fact that shares have been purchased by the client. It contains the purchase price, broker commission, turn-over tax, securities transaction tax and service tax. All these details will be mentioned in the document itself. It is usually generated at the trading member terminal and this will be issued to the client.
- By the time when the contract note is generated, Depository service provider (CDSL or NSDL), will give signal to credit the Demat account.

Fig. 1.1: Clearing and Settlement Process of Stock Trading in Issue

If it is Market trading, this process duration is T + 3. It is future and Open Market Trading Process duration is T + 1.
In case the seller, goes for giving sale order, the same procedure will be started. NSCCL is the nodal agency of NSE which is functioning to guarantee payment to the seller and guarantee delivery of shares to the buyer. This agency (NSCCL) will receive payment from the buyer as soon as the buy order is made and through NSE network it is passed to the seller of shares.

This process will be completed in T+2 DAYS in case the client is in Equity market, whereas in Futures and option Market, it is completed in T+1 DAYS.

FEATURES OF DERIVATIVES

1. A derivative instrument relates to the future contract between two parties. It means there must be a contract-binding on the underlying parties and the same to be fulfilled in future. The future period may be short or long depending upon the nature of contract, for example, short term interest rate futures and long term interest rate futures contract.

2. Normally the derivative instruments have the value which derived from the values of other underlying assets.

3. In general, the counter parties have specified obligation under the derivative contract. Obviously, the nature of the obligation will be different as per the type of the instrument of a derivative.

4. In general, the financial derivatives are carried off balance sheet. The size of the derivative contract depends upon its notional amount. The notional amount is the amount used to calculate the pay off. For instance, in the option contract, the potential loss and potential pay-off both may be different from the underlying shares, because the pay-off of derivative products differs from the pay-off that their notional amount might suggest.

5. Usually, in derivatives trading, the taking or making of delivery of underlying assets is not involved, instead underlying transactions are mostly settled by taking offsetting positions in the derivatives themselves. It is hence, there is no effective limit on the quantity of claims, which can be traded in respect of underlying assets.

6. Derivatives are also known as deferred delivery or deferred payment instrument. It means that it is easier to take short or long position in derivatives in comparison to other assets or securities.

7. Even though, derivatives are exchange-traded instrument by and large, there are instruments still available on Over the Counter Derivative (OTC) basis. For example, forwards and future contracts in foreign exchange market are available on OTC basis. Indian banks are offering this product only to their customers. The transaction does not come under ambit of either RBI or SEBI rules and regulations.

TYPES OF FINANCIAL DERIVATIVES

In the preceding sections, it is observed that financial derivatives are those assets whose values are determined by the value of some other assets, called the underlying. Presently, there are bewilderingly complex varieties of derivatives already in existence, and the markets are innovating newer and newer ones continuously. For example, various types of financial derivatives based on
their different properties like, plain, simple or straightforwards, composite, joint or hybrid, synthetic, leveraged, mildly leveraged, customised or OTC-traded, standardised or organised exchange-traded, etc. are available in the market.

Due to complexity in nature, it is very difficult to classify the financial derivatives. So in the present context, the basic financial derivatives which are popular in the market have been described in brief. The details of their operations, mechanism and trading, will be discussed in the forthcoming respective chapters. In simple form, the derivatives can be classified into different categories which are shown in the Fig. 1.2.

One form of classification of derivative instruments is between commodity derivatives and financial derivatives. The basic difference between these is the nature of the underlying instrument or asset. In a commodities derivative, the underlying instrument is a commodity which may be wheat, cotton, pepper, sugar, jute, turmeric, corn, soyabean, crude oil, natural gas, gold, silver, copper and so on. In a financial derivative, the underlying instrument may be treasury bills, stocks, bonds, foreign exchange, stock index, gilt-edged securities, cost of living index, etc. It is to be noted that financials derivative is fairly standard and there are no quality issues, whereas in commodities derivative, the quality may be the underlying matters. However, the distinction between these two from structure and functioning point of view, both are almost similar in nature.

Another way of classifying the financial derivatives is classifying them into basic and complex derivatives. In this, forwards contracts, futures contracts and options, contracts have been included in the basic derivatives, whereas swaps and other complex derivatives are taken into complex category because they are built up from either forwards/futures or options contracts, or both. In fact, such derivatives are effectively derivatives of derivatives.
Basic Financial Derivatives

Forwards Contracts

A forwards contract is a simple customised contract between two parties to buy or sell an asset at a certain time in the future for a certain price. Unlike futures contracts, they are not traded on an exchange, rather they are traded in the over-the-counter market, usually between two financial institutions or between a financial institution and one of its clients.

Example: An Indian company buys Automobile parts from USA with payment of one million dollars due in 90 days. The importer, thus, is short of dollars that is, it owes dollars for future delivery. Suppose the present price of a dollar is ₹ 48. Over the next 90-days, however, dollar might rise against ₹ 48. The importer can hedge this exchange risk by negotiating a 90-day forwards contract with a bank at a price ₹ 50. According to forwards contract, in 90-days the bank will give importer one million dollar and importer will give the bank 50 million rupees hedging a future payment with forwards contract. On the due date the importer will make a payment of ₹ 50 million to the bank and the bank will pay one million dollar to importer, whatever rate of the dollar is after 90-days. This is a typical example of forwards contract on currency. The basic features of a forwards contract are given below:

1. Forwards contracts are bilateral contracts, and hence, they are exposed to counter-party risk. There is risk of non-performance of obligation either of the parties. So, these are riskier than to futures contracts.

2. Each contract is custom-designed, and hence, is unique in terms of contract size, expiration date, the asset type, quality, etc.

3. In forwards contract, one of the parties takes a long position by agreeing to buy the asset at a certain specified future date. The other party assumes a short position by agreeing to sell the same asset at the same date for the same specified price. A party with no obligation offsetting the forwards contract is said to have an open position. A party with a closed position is, sometimes, called a hedger.

4. The specified price in a forwards contract is referred to as the delivery price. The forwards price for a particular forward contract at a particular time is the delivery price that would apply if the contract were entered into at that time. It is important to differentiate between the forwards price and the delivery price. Both are equal at the time the contract is entered into. However, as time passes, the forwards price is likely to change whereas the delivery price remains the same.

5. In the forwards contract, derivative assets can often be contracted from the combination of under lying assets, such assets are oftenly known as synthetic assets in the forwards market.

6. In the forwards market, the contract has to be settled by delivery of the asset on expiration date. In case the party wishes to reverse the contract, it has to go to the same counterparty compulsorily which may dominate and command the price it wants as being in a monopoly situation.
7. In the forwards contract, covered parity or cost-of-carry relations are relation between the prices of forwardss and underlying assets. Such relations further assist in determining the arbitrage-based forwards asset prices.

8. Forwards contracts are very popular in foreign exchange market as well as interest rate bearing instruments. Most of the large and international banks quote the forwards rate through their ‘forwards desk’ lying within their foreign exchange trading room. Forwards foreign exchange quotes by these banks are displayed with the spot rates.

9. As per the Indian Forwards Contract Act 1952, different kinds of forwards contracts can be done like hedge contracts, transferable specific delivery (TSD) contracts and non-transferable specific delivery (NTSD) contracts. Hedge contracts are freely transferable and do not specify, any particular lot, consignment or variety for delivery. Transferable specific delivery contracts are though freely transferable from one party to another, but are concerned with a specific and pre-determined consignment. Delivery is mandatory. Non-transferable specific delivery contracts, as the name indicates, are not transferable at all, and as such, they are highly specific.

In brief, a forwards contract is an agreement between the counter parties to buy or sell a specified quantity of an asset at a specified price, with delivery at a specified time (future) and place. These contracts are not standardised, each one is usually being customised to its owner's specifications.

**Futures Contracts**

Like a forwards contract, a futures contract is an agreement between two parties to buy or sell a specified quantity of an asset at a specified price and at a specified time and place. Futures contracts are normally traded on exchange, which sets the certain standardised norms for trading in the futures contracts.

**Example:** A silver manufacturer is concerned about the price of silver, since he will not be able to plan for profitability. Given the current level of production, he expects to have about 20,000 ounces of silver ready in next two months. The current price of silver on May 10 is ₹ 1052.5 per ounce, and July futures price at FMC is ₹ 1068 per ounce, which he believes to be satisfied price. But he fears that prices in future may go down. So he will enter into a futures contract. He will sell four contracts at MCX where each contract is of 5000 ounces at ₹ 1068 for delivery in July.

<table>
<thead>
<tr>
<th>Date</th>
<th>Spot Market</th>
<th>Futures Market</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 10</td>
<td>Anticipate the sale of 20,000 ounce in two months and expect to receive ₹ 1068 per ounce or a total ₹ 21,36,00,00.</td>
<td>Sell four contracts, 5000 ounce each July futures contracts at ₹ 1068 per ounce.</td>
</tr>
<tr>
<td>July 5</td>
<td>The spot price of silver is ₹ 1071 per ounce, Miner sells 20,000 ounces and receives ₹ 21,42,00,000.</td>
<td>Buy four contracts at ₹ 1071, total cost of 20,000 ounce will be ₹ 21,42,00,000.</td>
</tr>
<tr>
<td>Profit/Loss</td>
<td>Profit = ₹ 60,000</td>
<td>Futures loss = ₹ 60,000</td>
</tr>
</tbody>
</table>
In the above example trader has hedged his risk of price-fall and the trading is done through standardised exchange which has standardised contract of 5000 ounce silver. The futures contracts have following features in brief:

**Standardisation:** One of the most important features of futures contract is that the contract has certain standardised specification, i.e., quantity of the asset, quality of the asset, the date and month of delivery, the units of price quotation, location of settlement, etc. For example, the largest exchange on which futures contracts are traded are the Chicago Board of Trade (CBOT) and the Chicago Mercantile Exchange (CME). They specify about each term of the futures contract.

**Clearing House:** In the futures contract, the exchange clearing house is an adjunct of the exchange and acts as an intermediary or middleman in futures. It gives the guarantee for the performance of the parties to each transaction. The clearing house has a number of members all of whom have offices near to the clearing house. Thus, the clearing house is the counter party to every contract.

**Settlement Price:** Since the futures contracts are performed through a particular exchange, at the close of the day of trading, each contract is mark-to-market. For this the exchange establishes a settlement price. This settlement price is used to compute the profit or loss on each contract for that day. Accordingly, the members’ accounts are credited or debited.

**Daily Settlement and Margin:** Another feature of a futures contract is that when a person enters into a contract, he is required to deposit funds with the broker, which is called the margin. The exchange usually sets the minimum margin required for different assets, but the broker can set higher margin limits for his clients, which depend upon the credit-worthiness of the clients. The basic objective of the margin account is to act as collateral security in order to minimise the risk of failure by either party in the futures contract.

**Tick Size:** The futures prices are expressed in currency units, with a minimum price movement called a tick size. This means that the futures prices must be rounded to the nearest tick. The difference between a futures price and the cash price of that asset is known as the basis. The details of this mechanism will be discussed in the forthcoming chapters.

**Cash Settlement:** Most of the futures contracts are seeded in cash by having the short or long to make a cash payment on the difference between the futures price at which the contract was entered and the cash price at expiration date. This is done because it is inconvenient or impossible to deliver sometimes, the underlying asset. This type of settlement is very much popular in stock indices futures contracts.

**Delivery:** The futures contracts are executed on the expiry date. The counter parties with a short position are obligated ro make delivery to the exchange, whereas the exchange is obligated to make delivery to the longs. The period during which the delivery of the contract varies from contract to contract,

**Regulation:** The important difference between futures and forwards markets is that the futures contracts are regulated through an exchange, but the forwards contracts are self-regulated by the counterparties themselves. Commission have been established in various countries to regulate futures markets, both in stocks and commodities. Any such new futures contracts and changes to existing contracts must by approved by the respective Commissions. Further, details on different issues of futures market trading will be discussed in forthcoming chapters.
Introduction to Financial Derivatives

Options Contracts

Options are the most important group of derivative securities. Options may be defined as a contract between two parties whereby one party obtains the right, but not the obligation, to buy or sell a particular asset, at a specified price, on or before a specified date. The person who acquires the right is known as the options buyer or options holder, while the other person (who confers the right) is known as options seller or options writer. For giving such options to the buyer, the seller charges an amount, which is known as the option premium.

Options can be divided into two types: calls and puts. A calls option gives the holder the right to buy an asset at a specified price whereas input option, the holder gets the right to sell an asset at the specified price and time.

The specified price in such contract is known as the exercise price or the strike price and the date in the contract is known as the expiration date or the exercise date or the maturity date. The asset or security instrument or commodity covered under the contract is called the underlying asset. They include shares, stocks, stock indices, foreign currencies, bonds, commodities, futures contracts, etc. Further options can be American or European. A European option can only be exercised on the expiration date, whereas an American option can be exercised at any time before the maturity date.

Example: Suppose the current price of CIPLA share is ₹ 750 per share. X owns 1000 shares of CIPLA Ltd. and apprehends the decline in price of the share. The option (puts) contract available at BSE is of ₹ 800, in next two-month delivery. Premium cost is ₹ 10 per share. X will buy a puts option at ₹ 0 per share at a strike price of ₹ 800. In this way X has hedged his risk of price fall of stock. X will exercise the puts option if the price of stock goes down below ₹ 790 and will not exercise the option if price is more than ₹ 800, on the exercise date. In case of options, buyer has a limited loss and unlimited profit potential unlike in case of forwards and futures.

In April 1973, the options on stocks were first traded on an organised exchange, i.e., Chicago Board Options Exchange. Since then, there has been a dramatic growth in options markets. Options are now traded on various exchanges in various countries all over the world. Options are now traded both on organised exchanges and over-the-counter (OTC). The option-trading mechanism on both are quite different, which leads to important differences in market conventions. Recently, options contracts on OTC are getting popular because they are more liquid. Further, most of the banks and other financial institutions now prefer the OTC options market because of the ease and customised nature of contract. It should be emphasised that the option contract gives the holder the right to do something. The holder may exercise his option or may not. The holder can make a reassessment of the situation and seek either the execution of the contracts or its non-execution as be profitable to him. He is not under obligation to exercise the option. So, this fact distinguishes options from forwards contracts and futures contracts, where the holder is under obligation to buy or sell the underlying asset. Recently in India, the banks are allowed to write cross-currency options after obtaining the permission from the Reserve Bank of India.

Warrants and Convertibles

Warrants and convertibles are other important categories of financial derivatives, which are frequently traded in the market. Warrant is just like an option contract where the holder has the right to buy shares, shares of a specified company at a certain price during the given time period. In other words, the holder of a warrant instrument has the right to purchase a specific number of shares at a fixed price in a fixed period from a issuing company.
If the holder exercised the right, it increases the number of shares of the issuing company, and thus, dilutes the equities of its shareholders. Warrants are usually issued as sweeteners attached to senior securities like bonds and debentures so that they are successful in their equity issues in terms of volume and price. Warrants can be detached and traded separately. Warrants are highly speculative and leverage instruments. So trading in them must be done cautiously.

Convertibles are hybrid securities which combine the basic attributes of fixed interest and variable return securities. Most popular among these are convertible bonds, convertible debentures and convertible preference shares. These are also called equity derivative securities. They can be fully or partially converted into the equity shares of the issuing company at the predetermined specified terms with regard to the conversion period, conversion ratio and conversion price. These terms may be different from company to company, as per nature of the instrument and particular equity issue of the company. Further details of these instruments will be discussed in forthcoming chapters.

**Swap Contracts**

Swaps have become popular derivative instruments in recent years all over the world. A swap is an agreement between two counter parties to exchange cash-flows in the future. Under the swap agreement, various terms like the dates when the cash-flows are to be paid, the currency in which to be paid and the mode of payment are determined and finalised by the parties. Usually, the calculation of cash-flows involves the future values of one or more market variables.

There are two most popular forms of swap contracts, i.e., interest-rate swaps and currency swaps. In the interest-rate swap, one party agrees to pay the other party interest at a fixed rate on a notional principal amount, and in return, it receives interest at a floating rate on the same principal notional amount for a specified period. The currencies of the two sets of cash-flows are the same. In case of currency swap, it involves exchange of interest-flows in one currency for interest-flows in other currency. In other words, it requires the exchange of cash-flows in two currencies. There are various forms of swaps based upon these two, but having different features in general.

**Other Derivatives**

As discussed earlier, forwards, futures, options, swaps, etc. are described usually as standard or 'plain vanilla' derivatives. In the early 1980s, some banks and other financial institutions were very imaginative and designed some new derivatives to meet the specific needs of their clients. These derivatives were described as “non-standard” derivatives. The basis of the structure of these derivatives was not unique, for example, some non-standard derivatives were formed by combining two or more ‘plain vanilla’ call and put options whereas some others were far more complex.

In fact, there is no boundary for designing the non-standard financial derivatives, and hence, they are sometimes termed as ‘exotic options’ or just ‘exotics’. There are various examples of the non-standard derivatives such as packages, forwards start option, compound options, choose options, barrier options, binary options, look back options, shout options, Asian options, basket options. Standard Oil’s Bond Issue, Index Currency Option Notes (ICON), range forwards contracts or flexible forwards and so on.

Traditionally, it is evident that important variables underlying the financial derivatives have been interest rates, exchange rates, commodity prices, stock prices, stock indices, etc.
Introduction to Financial Derivatives

However, recently some other underlying variables are also getting popular in the financial derivative markets such as credit-worthiness, weather, insurance, electricity and so on. In fact, there is no limit to the innovations in the field of derivatives. Let us assume that two companies A and B wish to borrow 1 million rupees for five-years and the rate of interest is:

<table>
<thead>
<tr>
<th>Company</th>
<th>Fixed</th>
<th>Floating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company A</td>
<td>10.00% per annum</td>
<td>6 month LIBOR + 0.30%</td>
</tr>
<tr>
<td>Company B</td>
<td>11.20% per annum</td>
<td>6 month LIBOR + 1.00%</td>
</tr>
</tbody>
</table>

A wants to borrow at floating funds and B wants to borrow at fixed interest rate. B has low credit rating than company A since it pays higher rate of interest than company A in both fixed and floating markets. They will contract to financial Institution for swapping their assets and liabilities and make a swap contract with bank.

Both companies will initially raise loans A in fixed and B in floating interest rate and then contract to bank, which, in return, pays fixed interest rate to A and receive floating interest rate to A and from B. Bank will pay floating interest rate and receive. Fixed interest rates and also changes commission from both A and B have the liability in which both were interested.

RISK MANAGEMENT SYSTEM

The salient features of risk containment measures on the F&O segment are:

- Anybody interested in obtaining membership of F&O segment is required to take membership of “CM and F&O”. An existing member of CM segment can also obtain membership of F&O segment.
- NSCCL charges an upfront initial margin for all the open positions of a CM up to client level. It follows the VaR based margining system through SPAN system. NSCCL computes the initial margin percentage for each Nifty index futures contract on a daily basis and informs the CMs. The CM, in turn, collects the initial margin from the TMs and their respective clients.
- NSCCL’s online position monitoring system monitors a CM’s open positions on a real-time basis. Limits are set for each CM base capital and additional capital deposited with NSCCL. The online position monitoring system generates alerts whenever a CM reaches a position limit set up by NSCCL. NSCCL monitors the CMs and TMs for mark-to-market value violation and for contract-wise position limit violation.
- CMs are provided with a trading terminal for the purpose of monitoring the open positions of all the TMs clearing and settling through them. A CN may exposure limits for a TM clearing and settling through him. NSCCL assists the CM to monitor the intra-day exposure limits set up by a CM and whenever a TM exceeds the limits, it withdraws the trading facility provided to such TM.
- Separate Settlement Guarantee Fund for this segment has been created out of the capital deposited by the members with NSCCL.
ACCOUNTING TREATMENT FOR DERIVATIVES

Notwithstanding the applicability of AS-30, it is very important to understand the impact and effect of this announcement. The announcement on accounting for derivatives issued by ICAI on March 29, 2008, clarifies the best practice treatment to be followed for all derivatives as follows:

1. All derivatives except forwards contracts covered by AS-11, can be accounted for on the basis of the requirements prescribed in AS-30, Financial instruments: recognition and Measurement.

2. In case an entity does not follow AS-30, keeping in view the principle of prudence as enunciated in AS-1, 'Disclosure of Accounting Policies', the entity is required to provide for losses in respect of all outstanding derivative contracts at the date of balance sheet by marking them to market.

Issues Involved in the Implementation of AS-30

The effect of the implementation of AS-30 announcement is as follows:

(a) In case an entity does not follow AS-30, the losses in respect of derivative contracts at the balance sheet date have to be provided for and disclosed. Profits or losses cannot be on balance sheet item.

(b) In case an entity follows AS-30, then the effect will be broadly as follows:

In case the derivatives do not meet the hedge accounting criteria as laid down in AS-30, the gains or losses in respect thereof will have to be recognised in the statement of profit or loss. The derivatives will have to be shown as financial assets or financial liabilities on the balance sheet, as the case may be, as per the requirements of the accounting standard.

In case the hedge accounting criteria, e.g., hedge effectiveness, qualifying hedges, documentation etc, as laid down in AS-30 are met, the entity will have to consider, keeping in view the requirements of AS-30, whether the hedge is fair value hedge or cash-flow hedge.

THE ROLE OF THE CLEARING HOUSE

In the derivatives industry we find different terminology being used around the world. This is true with the description used to identify the organisation appointed by or incorporated into the exchange to manage the clearing, settlement and risk of the exchange and its members.

Clearing house is commonly used but equally we might come across clearing corporation, clearing organisation as well as 'clearer', clearing firm or clearing member but the latter three refer to members rather than the exchange-clearing entity. For simplicity we will use the term 'clearing house'.

In general terms, the role of the clearing house is to act as counter party to both sides of the trade, thereby breaking the direct counter party relationship between the two trading counterparties. It is fundamental to the integrity and credibility of the market for which it operates, as its purpose is to guarantee the performance of each and every transaction.

By assuming the legal responsibility for the trade, the clearing house removes any risk on each other that the two original counterparties might have had.
In addition, the clearing house also acts as risk manager and provides the settlement routing and data to members, and statistical and other data to the exchange and external parties often including regulators.

There are two main types of clearing house; those that are a division of the exchange itself and indistinguishable from the exchange who owns them, and those that are independent of the exchange with their own financial backing. In most cases, for these independent clearing houses, shareholders, the members of the markets and the clearing house, or a combination of these three provide the necessary financial backing.

Amongst clearing houses the London Clearing House (now LCH.Clearnet) and the Options Clearing Corporation (OCC) in Chicago are examples of ones that clear business for more than one exchange.

This can be advantageous for the broker as clearing members of, for instance, Euronext.liffe, London Metal Exchange (LME) and 1PE because it means only one point of settlement for all of their trading in these markets as LCH.Clearnet is the clearing house for these exchanges.

Clearing houses must be financially robust in order to sustain a default in the market(s) for which they operate. The financial standing of the clearing house is a very important consideration for brokers when they are contemplating becoming clearing members of an exchange. It is also an important issue for companies researching the potential of trading in the market, as they need to know that their trades will be efficiently settled and that their positions will be secure in the event of another unrelated party causing a default in the market.

In the United Kingdom the FSA have designated LCH.Clearnet as a Recognised Clearing House and regulate it. This gives the members and users of the market comfort that it is a properly organised and approved clearing house. Of course the members of LCH.Clearnet must also adhere to the rules and regulations laid down by the clearing house. Any failure to do so would almost certainly be deemed to put a firm in breach of these rules and regulations and in turn it would constitute a default. That would result in the firm concerned being banned from acting as a clearing house member not only in the market concerned but in all probability would result in curtailment or suspension of the status in relation to other markets.

The LCH.Clearnet also has registration as a Designated Clearing Organisation (DCO) granted by the US regulator The Commodity Futures Trading Commission (CFTC).

**When Did the First Clearing House Come into Existence?**

One of the oldest clearing houses is that established by the Chicago Board of Trade as the following statement illustrates:

The Chicago Board adopted a motion suggesting that it establish a modern clearing house. Probably no more progressive and far-reaching step was ever taken to insure prices accurately reflecting supply and demand. I believe it will be effective. Secretary of Agriculture William Jardine in a Report to President Calvin Coolidge, In 1925, it is Originally formed as the 'Board of Trade Clearing Corporation' it is today called The Clearing Corporation (CCorp) and provides services to the Eurex US electronic derivatives market. Its importance in the history and development of the clearing of derivatives exchanges can be seen by the following extract taken from their website:
In the history of the world's financial markets, perhaps no single entity has had a greater impact on the safety and soundness of the clearing process than the Clearing Corporation (CCorp). Based on a tradition of independence, integrity, and innovation, the Clearing Corporation has established itself as the model for the majority of the world's clearing houses.

September 3, 1925 is among the most important dates in the history of the futures industry. It was on that day, more than 75 years ago, that the Board of Trade Clearing Corporation, now named The Clearing Corporation, was founded by the Chicago Board of Trade (CBOT®) membership.

The Clearing Corporation is one of the oldest independent clearing houses in the world. It has not only survived, but flourished, through the Great Depression and periods of recession, war, and rapid technological and economic change. Its world-class standing has been and will continue to be built upon three fundamental concepts: Independence, Integrity, and Innovation.

The importance of its independence as a corporate entity cannot be overestimated. This quality has allowed The Clearing Corporation to make objective decisions during periods of substantial stress with one goal in mind-financial integrity for the clearing and settlement process.

Integrity goes hand-in-hand with independence. Clearing members know that The Clearing Corporation makes decisions based on safety and soundness for the marketplace and nothing else.

The financial integrity of the marketplace also has been aided through The Clearing Corporation's commitment to innovation since its founding. This commitment is evidenced by its history as an industry leader-from its first use of computers in 1963 to the development of on-line trade entry and risk analysis systems. The Clearing Corporation continues to make every effort to enhance the clearing and settlement process for its members.

The statement above sums up many of the attributes of a clearing house in general and today the many clearing houses that operate do so with efficiency, cost-effectiveness and security of the markets and members as their primary objectives. We can look at some of the clearing houses and in doing so, build up a picture of the role of these important organisations in the market infrastructure. We can start with a clearing house closely linked to the CCorp through the Eurex exchange.

**Eurex AG**

To be eligible for clearing membership of Eurex, an organisation must be a financial institution located within the European Union or Switzerland, authorised to operate custody business, credit operations and receipt of margin by customers in the form of securities and cash. Applicants must have a prescribed level of proven equity capital as well as contribute a specific amount to the Eurex Clearing AG clearing fund.

Clearing Members can be either General Clearing Members (GCM) or Direct Clearing Members (DCM). General Clearing Members are authorised to clear their own transactions as well as those of their customers and those of Non-Clearing Members clearing through them. Direct Clearing Members are entitled to carry out the clearing for their own transactions, those of their customers and of affiliated NCMs. Although the clearing member is responsible for settlement, there is the possibility to stipulate a separate settlement institution for the settlement of transactions.

There are prerequisites for settlement, which include an account at the Bundes bank (of the Federal Republic of Germany) and a securities account at one central depository recognised by Eurex Clearing AG. These accounts are to be held either by the settlement institution or by the clearing
member with the necessary power of attorney. Importantly one of the requirements is that the Settlement Institution shall use appropriate technical equipment including back-office systems in order to guarantee the correct recording, accounting and supervision of all transactions. A combination of the functions of trading, clearing and settlement are possible within a financial institution.

The structure and relationships possible with Eurex AG are shown below in Figures 1.3 and 1.4.

As we can see, the GCM and DCM have a direct relationship with the clearing house. The DCM can only clear business of an affiliated company who is a NCM of Eurex whereas the GCM can clear business for any NCM.
Customers can have a relationship with the GCM, DCM, an affiliated NCM of the DCM or any NCM of the exchange.

**The Options Clearing Corporation (OCC)**

Options Clearing Corporation is the largest clearing organisation in the world for options and was the first clearing house to receive an AAA rating from Standard & Poor's Corporation. Operating under the jurisdiction of the Securities and Exchange Commission (SEC) and the CFTC, OCC clears US-listed options, futures and options on futures on a number of underlying financial assets including stocks, currencies, stock indexes and interest rate products. The OCC’s Clearing Membership consists of approximately 130 of the largest US broker/dealers, US futures commission merchants and non-US securities firms representing both professional traders and public customers. The American Stock Exchange, the Chicago Board Options Exchange, the International Securities Exchange, the Pacific Exchange and the Philadelphia Stock Exchange share equal ownership of OCC.

It has, in recent years, developed and introduced a completely new clearing system called ENCORE. The ENCORE has enabled real-time processing capabilities, increased flexibility by accommodating growth in options volume and new products, and provided secure Internet access to OCC’s customers.

**LCH.Clearnet**

There are several key stages in the ‘clearing process’ much of which is generic across clearing houses. A key stage is when and how the counterparty relationship between the two parties to the trade on the exchange converts to a relationship between the clearing house and each of the trade participants. That stage is often referred to as novation.

**Novation**

The process of creating the trade in the name of the clearing house as the process clearing house becomes buyer to every seller of the each transaction and seller to every buyer of each transaction. At this point, the clearing member has no counter party risk in the market for their trade other than with the clearing house. All open positions are only held with the clearing house and it becomes irrelevant which market member the trader dealt with originally. Once this process is completed, the clearing house is in a position to effect settlement of the two transactions (Figures 1.5 and 1.6).

Settlement takes place between the members and the clearing house, not with each other. Counter party risk between the members has been removed.

The settlement process on LCH.Clearnet is secured by the use of a direct debit system, known as the Protected Payment System (PPS).

**Protected Payments System**

LCH.Clearnet Limited operates PPS for the transfer of funds to and from clearing members. A clearing member is required to maintain PPS bank account(s) in London in Great Britain Pounds (GBP) and for each currency in which it incurs settlements at one of the participating PPS banks. Different banks can be used for different currencies. Clearing members are also required to maintain a USD account at one of the specified banks for PPS in the United States. Any bank charges arising from the operation of a PPS account are for the account of the clearing member. A PPS mandate must be completed, the original of which is held at the PPS bank and a copy lodged with LCH.Clearnet Limited.
Clearing Process System (CPS)

First, we can look at the CPS for Euronext.liffe and IPE. The CPS is an extension of the Trade Registration System (TRS), using the same computer terminals and the data processed by TRS.

**TRS Functions**

The following functions are performed within TRS:
- Trade matching
- Presentation of particulars to LCH for registration
- Allocation and designation of trades to a position-keeping account, for example house/principal account, client account, NCM account.

Recorded trades flow into CPS throughout the trading day. Any correction to trade data is performed within TRS and results in the automatic amendment of the trade in CPS. Trade details can be disseminated to Members via the Trade Status Change Stream (TSCS).

**CPS Functions**

The following functions are performed within CPS:
- Settlement
- Position keeping
- Account transfers
- Calculation of margin
- Option exercise
- Tender notification and delivery/option allocation.

Trade Registration System provides members with the facility to print reports which include TRS, CPS and LCH.Clearnet banking reports.

Now let us look at the situation regarding the LME.
The LME Clearing System is an extension of the LME Matching System, using the same computer terminals and the data processed by the Matching System.

**Matching System Functions**

The following functions are performed within the Matching System:

- Trade matching and designation of trades to a position-keeping account
- Trade suspension and acceptance outside a lots or price range limit
- Trade confirmation and presentation of trades to LCH for registration.

**Clearing System Functions**

The following functions are performed within the Clearing System:

- Settlement
- Position maintenance
- Margin calculation
- Deliveries (values, batch allocations) and option exercise allocation processing.

The TRS and CPS facilities allow a clearing member to reconcile and monitor the transactions being created and placed into their account at the clearing house and for which they will be liable for settlement the next day.

**Risk Management**

A very significant role of the clearing house is managing the risk created by the transactions on the exchange. From setting the criteria for membership of the clearing house to establishing default rules, using margin systems and requiring daily settlement of resulting obligations of all members, the clearing house controls the risk that the exchange, the members and the users of the market face.

We will look at margin in more detail in another chapter, but it is as much about the risk management tools like margin as it is about the technology and risk management skills of the clearing house itself.

Globally, clearing houses daily manage trillions of dollars of derivatives transactions and it is a testament to their skills and professionalism that, when a member does default, it is managed in such a way that the exchange and its members are not usually affected.

**Case Studies on Derivative Misfortunes**

- Case Studies on Derivative Mishaps
- Lessons to be Learnt from Derivative Mishaps

No book on derivatives will ever be complete without a mention of some of the case studies or mishaps in the financial world. Although many books title this topic somewhat on the lines of derivative debacles, we refrain from using such harsh words since many things in this world give adverse results when they are misused and derivatives are no exception. In each of such unfortunate incidents involving derivatives, the protagonist had been dealing with derivatives and it led some commentators and critics to call derivatives as “weapons of mass destruction”. But as we maintained
in Chapter 1, indiscriminate and unscrupulous use of derivatives is a sure-shot recipe for disaster. Moreover, the top managements should completely understand the nature of risks involved in these products before they embrace derivatives and there should be proper systems for monitoring and controlling the line functions so that their misuse will be prevented. In this chapter we will discuss three of the mishaps that occurred with different organisations—a manufacturing firm, a bank and a hedge fund. Table 1.4 presents some of the derivative losses reported so far.

<table>
<thead>
<tr>
<th>Year</th>
<th>Organisation</th>
<th>Losses</th>
<th>Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>1993</td>
<td>Metallgesellschaft</td>
<td>$1.3 billion</td>
<td>Energy futures</td>
</tr>
<tr>
<td>1994</td>
<td>Gibson Greetings</td>
<td>$20 million</td>
<td>Leveraged interest rate swaps</td>
</tr>
<tr>
<td>1994</td>
<td>Kashima Oil</td>
<td>$1.5 billion</td>
<td>Currency derivatives</td>
</tr>
<tr>
<td>1994</td>
<td>Procter &amp; Gamble</td>
<td>$157 million</td>
<td>Leveraged interest rate and currency swaps</td>
</tr>
<tr>
<td>1994</td>
<td>Askin Capital Management</td>
<td>$600 million</td>
<td>Repurchase agreements and mortgage derivatives</td>
</tr>
<tr>
<td>1994</td>
<td>Bank of Montreal's Harris Trust and Savings Bank</td>
<td>$51.3 million</td>
<td>Mortgage derivatives</td>
</tr>
<tr>
<td>1994</td>
<td>CS First Boston Investment Management</td>
<td>$40 million</td>
<td>Misc. derivatives</td>
</tr>
<tr>
<td>1994</td>
<td>Sears</td>
<td>$237 million</td>
<td>Swaps</td>
</tr>
<tr>
<td>1994</td>
<td>Chemical Bank</td>
<td>$70 million</td>
<td>Currency derivatives</td>
</tr>
<tr>
<td>1994</td>
<td>Orange County, California</td>
<td>$1.6 billion</td>
<td>Leveraged repurchase agreements</td>
</tr>
<tr>
<td>1995</td>
<td>Barings PLC</td>
<td>£900 million</td>
<td>Stock index futures and options</td>
</tr>
<tr>
<td>1995</td>
<td>Sumitomo Bank</td>
<td>$1.8 billion</td>
<td>Copper futures</td>
</tr>
<tr>
<td>1996</td>
<td>BZW</td>
<td>£11.5 million</td>
<td>Currency derivatives</td>
</tr>
<tr>
<td>1997</td>
<td>NatWest</td>
<td>$136 million</td>
<td>Options</td>
</tr>
<tr>
<td>1998</td>
<td>Peregrine Investments</td>
<td>$129 million</td>
<td>FX swaps</td>
</tr>
<tr>
<td>1998</td>
<td>Yakult Honsha</td>
<td>$769 million</td>
<td>FX derivatives</td>
</tr>
<tr>
<td>1998</td>
<td>LTCM</td>
<td></td>
<td>Levered trades</td>
</tr>
<tr>
<td>1998</td>
<td>Scudder Kemper</td>
<td>$16.3</td>
<td>Treasury futures</td>
</tr>
<tr>
<td>2001</td>
<td>Sears</td>
<td>$236 million</td>
<td>Fixed Rate swap</td>
</tr>
<tr>
<td>2001</td>
<td>Amex</td>
<td>$400 million</td>
<td>Junk/CDO’s</td>
</tr>
<tr>
<td>2002</td>
<td>Allied Irish Bank</td>
<td>$750 million</td>
<td>FX</td>
</tr>
</tbody>
</table>

Metallgesellschaft

Metallgesellschaft AG (hereafter referred to as MG) is a large industrial conglomerate involved in diversified activities from mining to engineering, trade and financial services. The problems at MG first came to light when a report appeared in a German newspaper on December 6, 1993 that the company's US oil subsidiary Metallgesellschaft Refining and Marketing (MGRM) was experiencing liquidity problems due to its positions on NYMEX. By the end of the month there were many top
management changes, including the ouster of the Chairman, Mr. Hans Schimmelbusch. MGRM's disaster has attracted lot of attention and was a richly documented case study in hedging, notably by Culp and Hanke (1994), Edwards and Canter (1995) and Gulp and Miller (1995).

The decade of eighties had brought in a semblance of relief from oil price hikes and spikes when oil prices fell from $35 to $18 a barrel. But the Gulf war in 1990 made the oil prices move up sharply from $18 to $36 a barrel; reminding the oil consumers, traders and distributors that the volatility genie may haunt them yet again. At this juncture, MGRM identified a good marketing opportunity for long-term fixed price guarantees on deliveries of gasoline, heating oil and diesel oils ranging from 5 to 10 years. One of the contracts designed by MGRM allowed the customer to take fixed monthly deliveries at fixed prices and the other important contract allowed the customer the leeway in setting the delivery schedule of a part of the total volume; more specifically the customer could demand 20 per cent of the contracted volume for any one year with a one and a half months' notice period. MGRM also allowed the customers to terminate the contracts early if the futures price moved over the fixed contracted price, in which case the customer would get 50 per cent of the difference between the futures price and contracted price from MGRM. In this way, customers could protect themselves as well as reap in profits in a simple way if there was a sudden rise in the oil price.

Most of the contracts were entered into in the summer of 1993 when the oil prices were falling and customers were more than willing to lock in the lower prices for future. MGRM agreed to supply 160 million barrels of gasoline and heating oil over a 10-year period. The contracts included a profit of around $3 to $5 a barrel over the then prevailing spot price. As long as the prices kept falling, MGRM made profits but in case of a price rise, it was exposed to the price risk. If oil prices rise in future-in fact if prices rise substantially—the entire profits will erode and may even have to put up with losses. MGRM could have hedged its price risk by using a strip hedge, i.e., buying future contracts in such a way that the promised delivery dates match the future expiry dates. But oil futures generally trade for a maximum of three years and liquidity of the contracts decrease as the maturity goes beyond 18 months. Moreover, if such contracts are available with the desired liquidity, there is no market for MGRM's programme in the first place itself. So, MGRM used a stack hedge using the NYMEX contracts covering 55 million barrels and the remaining using oil swaps in the OTC market. A stack hedge involves buying short-dated futures to hedge longer term exposure and the short-dated contracts will be rolled over just before expiration by liquidating the short-dated contracts and buying another stack of further dated contracts. Therefore, MGRM's hedge is concentrated with the short-dated contracts and had to be rolled over periodically so as to remain hedged. Through this hedge the firm replaced the price risk with another risk, termed as basis risk—the short term prices might diverge from long-term prices. In Chapter 1, we had discussed the basis with respect to spot and futures market. The same principles apply in the case of short- and long-term futures. MGRM thought that stack hedge could be profitable given the backwardation in the oil prices. Since in a backwardation market the spot prices are higher than the futures prices at the time of rollover, MGRM could realise gains on the short term futures that were being liquidated. Such gains are termed as rollover gains. Therefore, MGRM assumed that the oil prices will exhibit backwardation but once the near term futures began showing contango, MGRM has to realise losses at the time of each rollover. In fact, for most of 1993, the futures market was in contango and MGRM incurred huge losses as and when the hedge was rolled over. Moreover, the spot oil prices declined from around $22 a barrel in September 1992 to $13 a barrel in December 1993. Consequently, MGRM had to
crystallise losses to the tune of $1.2 billion on its hedge. The final straw on the camel’s back came when NYMEX decided to revoke ‘hedger exemption’ status to MGRM and imposed a super margin which involved around two times the normal margin and the margin had to be brought in the form of cash. In response to this, the Board of MGRM conducted some preliminary investigations by Deutsche Bank and Dresdner Bank, who found the strategy to be fallacious and the Board gave marching orders to its Chairman, Finance Director and a couple of members of the top brass and quickly got not only the hedge (futures, swaps) but also the forward delivery agreements with the customers were liquidated and in the process the potential receivable profits from the customers were foregone.

The post-facto evaluation of the hedge in the literature finds that MGRM faced operational risk, arriving at the appropriate hedge ratio on all occasions and further managing is a daunting task and MGRM was exposed to this. Another important risk to which MGRM got exposed was the basis risk that could lead to substantial losses. More importantly, MGRM faced funding risks since the hedge was subject to mark-to-market gains/losses while the forwards contracts yielded gains/losses only at the time of expiry. Therefore, MGRM should have been equipped with enough cash to meet the margin calls. Hence it was naive to call MGRM’s unfortunate event as speculation in derivatives market; it was a clear case of operational risk and the top management had not properly read the risks prevalent in this hedge. Finally, MGRM intentionally took huge price risks without the required capital to guard itself if the hedge went against it.

**Barings Bank**

Derivatives which were obscure financial instruments till a few years ago have entered the public discourse—as any reader of a business daily in the 1990s will agree—because of the Barings bank’s fiasco. Some people expected the Barings Bank to rise like a phoenix a second time, but it did not enjoy the same luck as it did in 1890 when it went bust over bad loans to Argentina. To start with, the revered bank came down because of the trades done by Nick Leeson who took positions not in any esoteric or exotic derivatives, but most of the deals were executed in index futures which are transparent and quite credit-efficient. If this is the case, one may wonder why did it happen? One of the distinguishing features of the futures contract is the enormous amount of leverage, i.e., with little upfront margin, the trader can take a huge position. This leverage can give spectacular profits if the trader called it right and if he errs, the results can be disastrous.

Leeson’s initial authorisation was to carry out low-risk arbitrage and switching activities between Singapore and Osaka markets on Nikkei 225 contracts and Japanese Government Bond (JGB) futures. Owing to differences in liquidity and information leads/lags, there may be some minor price differences for short periods of time. Most institutional investors specialise in a variety of arbitrages and this role can be considered as a necessary pre-requisite for market efficiency.

Apparantly, arbitrage is risk-free, but in practice it is not so, since traders have to decide which lot (buy or sell) has to be executed first and while executing the trades, they may get one leg done and not be able to do the other side of the deal. Both the deals leave the trader exposed to the risk and in the intervening time the market may move against them. Therefore, it requires very strict discipline on the trader’s part because the returns on arbitrage are quite small.

With the mandate to do arbitrage, no sooner Leeson turned out to be speculating and started taking huge positions in these contracts. When his unit reported spectacular profits, the top management instead of probing whether he is assuming any directional positions, rewarded him with
hefty bonuses, a promotion and praised him as turbo arbitrageur. This is surprising and one may wonder whether the senior management was oblivious of the risk-return relationship and the market efficiency paradigm.

If we analyse the trading strategies used by Leeson, it appears that he had taken long positions in significant numbers on Nikkei 225 futures and sold straddles on the same. The first strategy was like betting on the direction of the market, whereas the second was a volatility trading strategy. Simultaneously, he was short on JGB futures. It appears that he hoped that stock market will rise without being volatile and the interest rates will rise. We can infer this from the long Nikkei futures position and straddles will be beneficial only when market is relatively calm and the short position in JGB futures will be rewarding when interest rates rise. His intuition was economically sound when we consider the trades of index and interest rate futures.

Figure 1.7 shows that interest rates were already at the trough and technically speaking, they would rise as the economic activity picked up. Hence, his interest rate futures were expected to gain and as the economy picked up, the stock market was expected to rise, which would make his index futures position also beneficial and this rise was associated with a decrease in volatility.

When Leeson sold straddles, he was achieving two things: (1) receiving the option premium which he might use to pay the margin calls on long futures position, and (2) he took a view that the market will become less volatile and will be range-bound. When the chips were down, Leeson indulged playing the 'doubling up' game, i.e., after the Kobe earthquake, he suffered huge losses and to cover this loss, he doubled his positions presuming that he halved the amount that the market needs to turn before he starts making money. Of course, there is no doubt that his risk will be doubled in such case. In short, he became increasingly risk-taking when he should have been risk-avoiding. In order to rein in such behaviour, FIs/banks decided to establish position limits and exposure limits, which were conspicuously absent in the Barings’ case.
Even though it is simple to pin down Leeson as the perpetrator of the closure, by doing so we are being unduly kind to some others who held considerable responsibility in the disaster, i.e., the senior management. The top management failed to implement appropriate control and monitoring mechanisms. It is also surprising to note that the information systems were also very weak at Barings and were fully at the mercy of this trader. For example, BFS has to send four reports everyday to London—the trade file, price file, margin file and the file containing positions. In July 1992, Leeson ordered the Singapore office that for the infamous account no. 8888S only margin file be sent. So, despite the absence of other three files, Barings London moved millions of pounds without raising any questions. Also, it appears that the bonus system was lopsided; the incentive depended only on trading profits without adjusting for risk. So, indirectly Barings abetted high risk. Another cardinal principle ignored by the top management was keeping the dealers too long on the same desk. In fact, a system of compulsory annual leave for all the dealers could have led the story somewhere else. For making such gross institutional errors, the oldest bank of UK paid the ultimate price—closure.

**Long-Term Capital Management (LTCM)**

It is really harsh to hold derivatives responsible for the collapse of LTCM since they form only a small part of the instruments that were used by LTCM. Nevertheless, why we are going to discuss this mishap is because of the celebrated principles behind the company and to remind that no one is infallible in financial markets—not even the likes of brilliant academics like Prof. Robert Merton or Prof. Myron Scholes or even successful traders like John Meriwether & Co. The birth, growth and even the collapse of LTCM is stupendous and hence, it attracted so much of attention. LTCM is a hedge fund founded in 1993 by John Meriwether, a very successful bond trader at Salomon Brothers. He was known for bringing in academicians like Prof. Eric Rosenfeld, a Harvard Business School professor and many brilliant academicians and Ph.D. holders to Salomon Brothers. After a successful stint at Salomon, Meriwether decided to start his own hedge fund. A hedge fund is similar to a mutual fund but is largely unregulated, presuming that the investors in a hedge fund are erudite enough unlike the average mutual fund investor. Hedge funds are supposed to stay ‘hedged’ against market moves, i.e., they are ‘market-neutral’. Another important feature of these funds is that they typically use borrowed money to leverage their bets. LTCM is also one such hedge fund with many luminaries as its principals, viz., John Meriwether, a Harvard Business School professor, Robert Merton, Myron Scholes, who had been a professor at both the Massachusetts Institute of Technology and the Stanford Graduate School of Business, and David Mullins, former Assistant Treasury Secretary and also a former Vice Chairman of the Federal Reserve Board who had been associated with the Brady Report that investigated the 1987 stock market crash. LTCM believed in market efficiency but thought there will be a few discrepancies that will disappear in the long run. So, if LTCM could identify such pricing inefficiencies, it could pick up the arbitrage profits but the only glitch this strategy had was that profits would be very meager since the markets were reasonably efficient. Hence, LTCM had to have a reasonably large capital to invest such that it were ‘vacuuming nickels that others could not see’, as in the words of one of the partners, Prof. Myron Scholes, a Nobel laureate. Accordingly, LTCM was able to pool in a whopping $1.25 billion in capital and its clients included not only rich individual as well as institutional investors but also quasi governmental agencies like the Bank of Italy, Dresden Bank of Germany, and several Swiss and Japanese banks.

Most of the trades undertaken by LTCM are convergence and relative value trades. In a convergence trade, there will be a certain date on which two securities' value will converge; then LTCM will buy that security which is undervalued and sell the other one which is overvalued. These will be held till both prices are consistent with each other. While a relative value trade is based on the assumption
that two security prices will converge, even though the chance of not convergence is not ruled out as well. For example, one of LTCM's initial successful trades was based on a long position in the 29 1/2-year U.S. Treasury bonds and the short sale of 30-year Treasury bonds to exploit what it assumed was an unwarranted spread between the prices of the two securities. With the above mentioned position, it was ‘market-neutral’ against any uniform price moves in the bond market.

It took advantage of the deviation of the spread from the historical levels and as these prices converged, LTCM made a smart profit in a relatively short period of time on a paltry investment of its own capital. LTCM entered into many such trades and showed spectacular profits in the formative years. For instance, in February 1994—the year of coming into existence—it earned 19.9 per cent (net of expenses) for its investors followed by 42.8 per cent in 1995, 40.8 per cent in 1996, and 17.1 per cent in 1997. By the end of 1997, LTCM had more money than it wanted and naturally investors made a beeline to put more money into the fund since LTCM was unable to find new trades quickly enough (because of competition from other investment banks and hedge funds who started imitating LTCM's trades) to keep pace with the growth of its capital. So it returned $2.7 billion to its investors. As the equity got reduced, LTCM's leverage rocketed to 25:1. The year 1998 proved to be the worst year for LTCM and the market conditions deteriorated violently and in mid-August, the Russian government devalued the Rouble and declared a moratorium on its debt obligations to the tune of $13.5 billion. Panic broke out in the global markets and suddenly the emerging markets became very risky and there was an abrupt demand for credit-worthy bonds triggering a widening of the spreads. Here LTCM was on the other side, i.e., it held positions assuming the spreads will narrow down. Soon after the Russian default on August 21, 1998, the single day losses of LTCM were to the tune of $550 million and by the end of August its capital came down to $2.3 billion. Amidst serious difficulties, LTCM requested its investors to infuse fresh capital. At this point, the fund’s problems became public and as there was no support forthcoming, the collapse became inevitable. However, considering the disastrous effects that the fund's failure had on financial markets, the U.S. fed itself considered to lead the rescue efforts but on September 23, a consortium comprising Berkshire Hathaway (Warren Buffet's firm), Goldman Sachs and AIG bailed out LTCM by investing around $4 billion of capital, out of which $250 million was used to buy out the capital of existing shareholders and $3.75 billion was infused as new capital into the firm. But LTCM rejected the offer and finally, by the end of the day, another consortium of 14 banks, led by the Federal Reserve Bank of New York, bought 90 per cent of LTCM for $3.65 billion. The funds from this bail-out, combined with the equity remaining in the fund, brought the total equity value to approximately $4 billion, and the leverage ratio back to a reasonable level. LTCM’s case reveals that even to undertake arbitrage, the firm requires considerable capital. The other takeaway from this case is that liquidity risk has to be properly understood—particularly leverage in combination with liquidity is a definite formula for failure.

What can we learn from many such unfortunate events? In this concluding paragraph we reiterate what we have stated in Chapter 1, that derivatives are like sub-atomic particles that can be used to destroy whole cities or to light up the same cities and drive away the darkness. More precisely, the following important points emerge:

1. **Caveat emptor**, i.e., let the top management, principals be thoroughly aware of the potential of these products not only the favourable part, but also the hidden and obvious risks that accompany derivatives.
2. A fundamental duty of the management is to separate the front office (responsible for trading), mid-office (looks after the risk management) and the back office (looks after settlement and record keeping) functions expressly and under no circumstances should these functions be supervised by same individuals.

3. Excessive profits should be investigated with the same spirit as losses would be investigated into, since the source of the profits might be undisclosed or excessive risks being assumed by the traders.

4. The superlative performers or the star traders have to be monitored carefully so that these performers are not assuming risks beyond the limits. In fact, it may be a good practice if the traders can be rotated.

5. The quantitative models that are being used should be stress-tested and are to be used in conjunction with judgement. In fact models fail or behave abnormally when markets become excessively volatile because almost all models assume normal market conditions.

A reasonable understanding of the risk involved in the derivative positions can be obtained by using some risk-measurement techniques like Value at Risk (VaR, the appendix to this chapter gives an overview of VaR) or Expected Tail Loss (ETL) and consider whether the risk of their portfolios is tolerable or not.

**SUMMARY**

The study of derivatives involves an approach different from the customary. In conventional analysis, trading involves buying and selling an asset. In the derivatives segment, trading involves not only selling and buying of the asset itself, but also a right on the asset. This right does not carry with it any obligation and comes at a price called the premium. There are many types of derivatives instruments, the most notable among them being forwards, futures, options and swaps. In addition, interest-rate derivatives and credit derivatives have become very popular in the United States and other countries in recent years.

Derivatives are useful for managing the risk of an organisation. Usually, companies develop a strategy for active risk-management using derivatives. Stock-based derivatives have become very popular in India and result in great trading volumes. Forwards and futures are in great use in the commodity segment. It is also common to have forwards contracts in foreign exchange transactions.

In this chapter, the fundamentals of financial derivatives are the subject matter of discussion. Derivatives are basically deriving value from the underlying assets. The focus is on the meaning of derivatives, features and history of its origination. Derivatives are classified in to two. One is financials and another one is commodities. Financials can be classified into basics and complex derivatives. Basics includes forwards, futures, options, warrants and convertible securities. Two types of securities are mentioned. One is index and another one is individual stock, whereas complex includes swaps and OTC derivatives. The chapter discussed the meaning and characteristics of all the above-mentioned derivatives. It also discussed the usefulness of the financial derivatives for the investors.
REVIEWS QUESTIONS

1. Define Derivatives.
2. Explain the origin of Derivatives Market.
3. Elucidate the benefits of Derivatives Market.
4. What are the types of Derivatives Market? Explain their usefulness.
5. Explain the difference between Exchange-traded and OTC derivatives.
6. What is present scenario of Derivatives market in in India? Explain in detail.
7. How is the risk-management system functioning?
8. Discuss the accounting treatment for Derivatives as per ICAI Accounting standards.