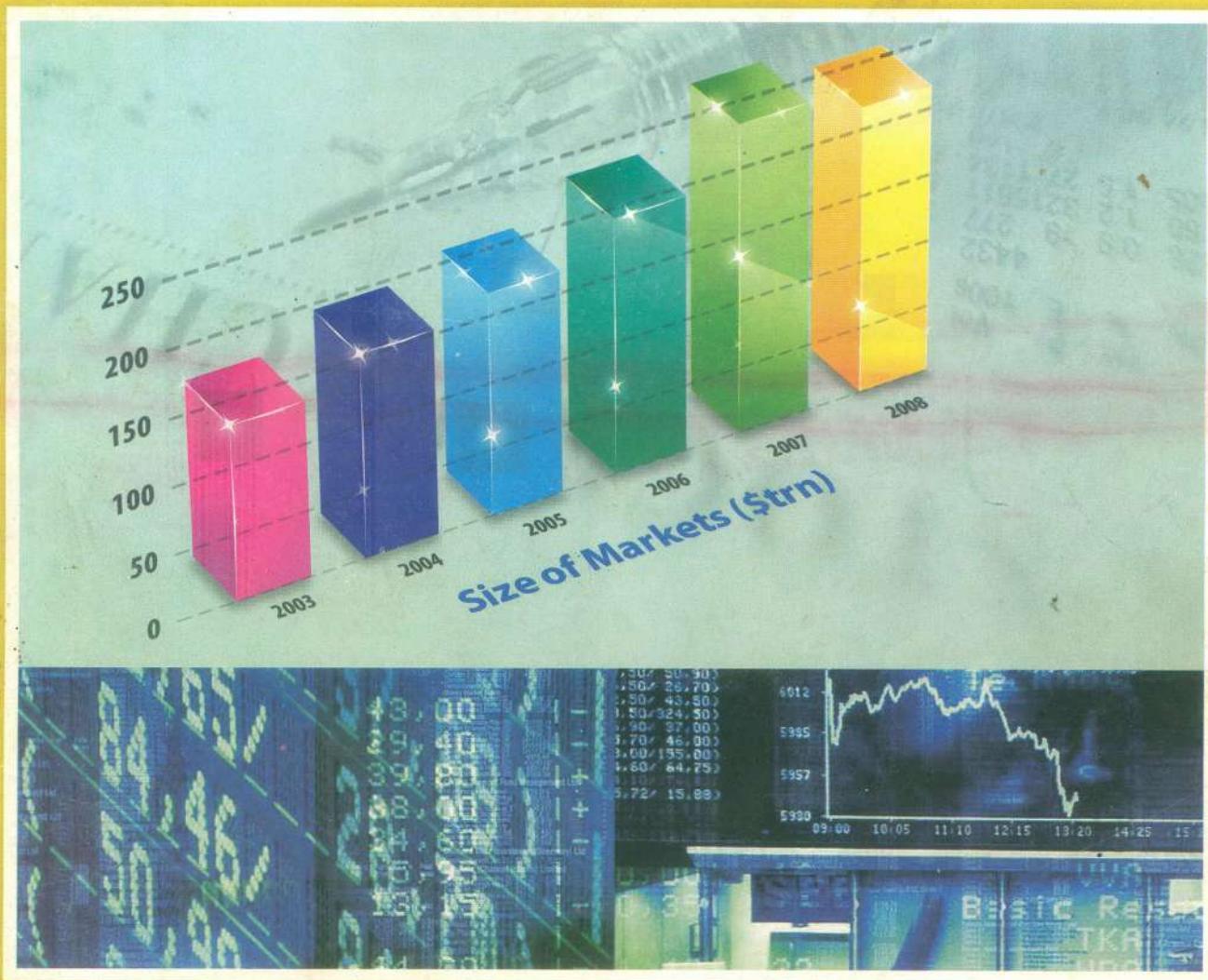




## MFP-2 EQUITY DERIVATIVES



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“शिक्षा मानव को बन्धनों से मुक्त करती है और आज के युग में तो यह लोकतंत्र की भावना का आधार भी है। जन्म तथा अन्य कारणों से उत्पन्न जाति एवं वर्गगत विषमताओं को दूर करते हुए मनुष्य को इन सबसे ऊपर उठाती है।”

— इन्दिरा गांधी

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*“Education is a liberating force, and in our age it is also a democratising force, cutting across the barriers of caste and class, smoothing out inequalities imposed by birth and other circumstances.”*

— Indira Gandhi

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Block

# 1

## **INTRODUCTION TO DERIVATIVES**

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## **BLOCK 1 INTRODUCTION TO DERIVATIVES**

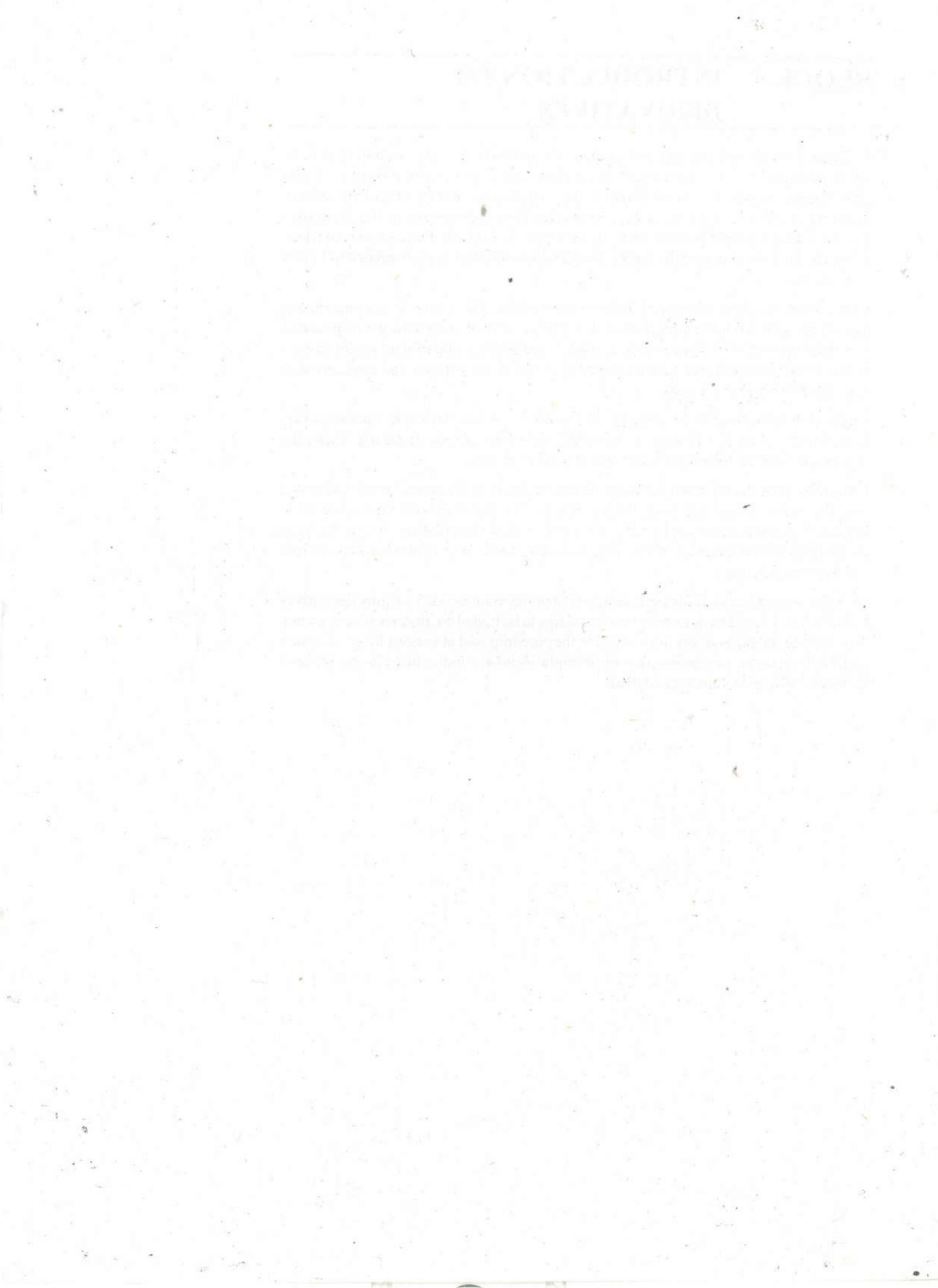
Financial derivatives came into the spotlight along with the rise in uncertainty of post-1970, when the US announced an end to the Bretton Woods System of fixed exchange rates leading to introduction of currency derivatives followed by other innovations, including stock index futures. Today, derivatives have become part of the day-to-day life for ordinary people in most parts of the world. This block discusses the concepts related to derivatives especially equity and all other important aspects related to Equity Derivatives.

**Unit 1** explains the evolution of derivatives markets. The major developments and milestones achieved in the formation of global financial markets and the development of derivatives post 2000 when electronification of futures took place broad perspective of world markets in exchange traded options. It explains the purpose and application of derivatives in various markets.

**Unit 2** elaborates basic derivatives products such as futures, forwards, options, swap, interest rate products, currency, commodity and other exotics. It clearly draws the difference between forward, futures and options contracts.

**Unit 3** explains the significance of spot price and how is derivative price calculated from the same. The unit also covers the concept of convergence and how price relationship impacts the derivative concepts such as Contango and Backwardation. The unit helps in understanding the operation of arbitrage between equity and Futures markets, its role and earnings potential

**Unit 4** discusses the basic understanding of the policy framework for equity derivatives in Indian market and basic criteria to select scrips to be traded on, in derivative segment. The unit also talks about the limit and how they are imposed at various levels in equity and F&O segment. i.e, the position limit implications for individual clients, brokers, institutional investors and mutual funds.



# **UNIT 1 EVOLUTION AND SIGNIFICANCE OF DERIVATIVE MARKETS**

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## **Objectives**

After studying this unit, you should be able to:

- define the concept of derivatives;
- understand the evolution of derivatives;
- explain the basic purpose of derivatives and the broad application of derivatives in various markets;
- appreciate the size and breadth of derivative markets in the world;
- understand the Indian framework of derivatives and recent developments over the last 15 years in this industry; and
- appreciate the exchange traded and over the counter divisions in the derivatives industry.

## **Structure**

- 1.1 Introduction
- 1.2 Brief History of Derivatives
- 1.3 Evolution of Derivatives Trading in India
- 1.4 Derivatives Markets
- 1.5 Need for Derivatives Markets
- 1.6 Types of Derivatives
- 1.7 Uses of Derivatives
- 1.8 Derivatives Users
- 1.9 Size of Derivatives Markets
- 1.10 Some Misconceptions about Derivatives
- 1.11 Summary
- 1.12 Self Assessment Questions
- 1.13 Further Readings

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### **1.1 INTRODUCTION**

Imagine a small farmer 5,000 years ago in ancient Pataliputra. His only crop is wheat and he faces enormous financial and other risks, including that of a lion from a nearby jungle invading his house and village and eating him alive!!! While we cannot help him from lion related risks, let us examine if his financial risks could be managed (even in that ancient era) using innovative financial instruments or practices.

One of the major risks he faces is that of his price of wheat not being high enough to remunerate him for his costs of seeds, water, and labor and leave him with a small margin for survival. Suppose these costs are Rs. 2.00 per kg including his profit, he will surely face severe economic difficulties if his realization is less than Rs. 2.00 per kg. He has sown his seeds and expects to produce 3 tons of wheat in four months time.

### What does he do?

Well, he walks down to the mandi (market) in his village and meets a friendly and trustworthy shopkeeper and informs him that he will be producing 3 tons of wheat in four months time and asks the shopkeeper if he could buy these 3 tons from him at that time. The two parties discuss and negotiate prices and finally agree upon a price of Rs 2.10 per kg of wheat, to be delivered after 4 months.

This very simple agreement is the world's first derivative contract. The two parties have agreed to buy and sell wheat which currently does not even exist. In today's derivatives dictionary, such an agreement would be called a 'forward' contract. In this contract, most of the terms and conditions are very clear today itself. Let us examine some of the relevant terms and definitions:

- 1) Buyer (shopkeeper)
- 2) Seller (farmer)
- 3) Underlying (that on which the contract has been framed – in this case, wheat)
- 4) Specifications (wheat would be described in a two pager detailing what exactly wheat means along with its quality, size, age and other characteristics)
- 5) Quantity (3 tons in our example)
- 6) Price (Rs 2.10 per kg in our example)
- 7) Date of Delivery
- 8) Time of Delivery
- 9) Location of Delivery
- 10) Dispute settlement related terms

At the end of 4 months, what is left to be executed is merely: (a) delivery by the farmer, and (b) payment by the shopkeeper. In the modern world, this is called 'final settlement'.

Thus, you can be sure that derivatives originated almost with the origin of money (as money created risks for humanity and risk management as immediately necessitated). As time passed, these agreements became more complex and more formally described. Specialized players emerged for whom derivative structuring and trading became a source of living. Mathematical modeling brought in dynamics and excess liquidity brought in excessive speculation. In this block and subsequent ones, we embark on a journey to explore this interesting and fascinating world of Derivatives.

Let us now turn to a more formal discussion on evolution and economics of Derivatives.

Financial Derivatives are instruments whose value is derived from one or more underlying financial asset. The underlying instrument could be a financial security, a securities index, or some combination of securities, indexes, and commodities.

Most common financial derivatives can be classified as one, or a combination, of four types: swaps, forwards, futures, and options that are based on interest rates, currencies or commodities.

Financial derivatives are contracts between two parties under which they agree to an exchange. Often the exchange involves either cash flows or another financial instrument, the value of which may vary during the term of the contract. Derivatives are meant essentially to facilitate temporarily (usually for a few months) hedging of price risk of inventory holding or a financial/commercial transaction over a certain period.

In practice, every derivative "contract" has a fixed expiration date, mostly in the range of 3 to 12 months from the date of commencement of the contract. In the market's idiom, they are "risk management tools". The use of forward/futures contracts as hedging techniques is a well-established practice in commercial and industrial operations. Their

1988 ruling in the Arkansas Best case. The Best decision denied the deductibility of capital losses against ordinary income and effectively gave hedging a tax disadvantage. Fortunately, this interpretation was overturned in 1993.

Another significant event of the 1950s was the ban on onion futures. Onion futures do not seem particularly important, though that is probably because they were banned, and we do not hear much about them. But the significance is that a group of Michigan onion farmers, reportedly enlisting the aid of their congressman, a young Gerald Ford, succeeded in banning a specific commodity from futures trading. To this day, the law in effect says, "you can create futures contracts on anything but onions."

In 1972, the Chicago Mercantile Exchange, responding to the now-freely floating international currencies, created the International Monetary Market, which allowed trading in currency futures. These were the first futures contracts that were not on physical commodities. In 1975, the Chicago Board of Trade created the first interest rate futures contract, one based on Ginnie Mae (GNMA) mortgages. While the contract met with initial success, it eventually died. The CBOT resuscitated it several times, changing its structure, but it never became viable. In 1975 the Merc responded with the Treasury bill futures contract. This contract was the first successful pure interest rate futures. It was held up as an example, either good or bad depending on your perspective, of the enormous leverage in futures. For only about \$1,000, and now less than that, you controlled \$1 million of T-bills. In 1977, the CBOT created the T-bond futures contract, which went on to be the highest volume contract. In 1982 the CME created the Eurodollar contract, which has now surpassed the T-bond contract to become the most actively traded of all futures contracts. In 1982, the Kansas City Board of Trade launched the first stock index futures, a contract on the Value Line Index. The Chicago Mercantile Exchange quickly followed with their highly successful contract on the S&P 500 index.

The year 1973 marked the creation of both the Chicago Board Options Exchange and the publication of perhaps the most famous formula in finance, the option pricing model of Fischer Black and Myron Scholes. These events revolutionized the investment world in ways no one could imagine at that time. The Black-Scholes model, as it came to be known, set up a mathematical framework that formed the basis for an explosive revolution in the use of derivatives. In 1983, the Chicago Board Options Exchange decided to create an option on an index of stocks. Though originally known as the CBOE 100 Index, it was soon turned over to Standard and Poor's and became known as the S&P 100, which remains the most actively traded exchange-listed option.

In 1994, the derivatives world was hit with a series of large losses on derivatives trading announced by some well-known and highly experienced firms, such as Procter and Gamble and Metallgesellschaft. One of America's wealthiest localities, Orange County, California, declared bankruptcy, allegedly due to derivatives trading, but more accurately, due to the use of leverage in a portfolio of short-term Treasury securities. England's venerable Barings Bank declared bankruptcy due to speculative trading in futures contracts by a 28-year old clerk in its Singapore office. These and other large losses led to a huge outcry, sometimes against the instruments and sometimes against the firms that sold them. While some minor changes occurred in the way in which derivatives were sold, most firms simply instituted tighter controls and continued to use derivatives.

The 1980s marked the beginning of the era of swaps and other over-the-counter derivatives. Although over-the-counter options and forwards had previously existed, the generation of corporate financial managers of that decade was the first to come out of business schools with exposure to derivatives. Soon virtually every large corporation, and even some that were not so large, were using derivatives to hedge, and in some cases, speculate on interest rate, exchange rate and commodity risk. New products were rapidly created to hedge the now-recognized wide varieties of risks. As the problems became more complex, Wall Street turned increasingly to the talents of mathematicians

and physicists, offering them new and quite different career paths and unheard-of money. The instruments became more complex and were sometimes even referred to as “exotic.”

### **1.3 EVOLUTION OF DERIVATIVES TRADING IN INDIA**

“The introduction of derivatives trading will separate leveraged positions from the spot markets and make it easier for exchanges to implement rolling settlement. This should reduce volatility in the existing markets, and make risk containment and regulation easier by making markets safer”, said Ashish Kumar Chauhan, Vice-President, National Stock Exchange (NSE).

All markets face various kinds of risks. This has induced the market participants to search for ways to manage risk. The derivatives are one of the categories of risk management tools. As this consciousness about risk management capacity of derivatives grew, the markets for derivatives developed.

Derivatives markets generally are an integral part of capital markets in developed as well as in emerging market economies. These instruments assist business growth by disseminating effective price signals concerning exchange rates, indices and reference rates or other assets and thereby render both cash and derivatives markets more efficient. These instruments also offer protection from possible adverse market movements and can be used to manage or offset exposures by hedging or shifting risks particularly during periods of volatility thereby reducing costs. By allowing for the transfer of unwanted risk, derivatives can promote more efficient allocation of capital across the economy, increasing productivity in the economy.

Factors that generally attributed as the major driving force behind growth of financial derivatives are:

- a) Increased Volatility in asset prices in financial markets.
- b) Increased integration of national financial markets with the international markets.
- c) Marked improvement in communication facilities and sharp decline in their costs.
- d) Development of more sophisticated risk management tools, providing economic agents a wider choice of risk management strategies.
- e) Innovations in the derivatives markets, which optimally combine the risks and returns over a large number of financial assets, leading to higher returns, reduced risk as well as transaction costs as compared to individual financial assets.

The plan to introduce derivatives in India was initially mooted by the National Stock Exchange (NSE) in 1995. The main purpose of this plan was to encourage greater participation of foreign institutional investors (FIIs) in the Indian stock exchanges. Their involvement had been very low due to the absence of derivatives for hedging risk. However, there was no consensus of opinion on the issue among industry analysts and the media. The pros and cons of introducing derivatives trading were debated intensely. The lack of transparency and inadequate infrastructure of the Indian stock markets were cited as reasons to avoid derivatives trading.

Derivatives were also considered risky for retail investors because of their poor knowledge about their operation. Inspite of the opposition, the path for derivatives trading was cleared with the introduction of Securities Laws (Amendment) Bill in Parliament in 1998.

The introduction of derivatives was delayed for some more time as the infrastructure for it had to be set up. Derivatives trading required a computer-based trading system, a depository and a clearing house facility. In addition, problems such as low market capitalization of the Indian stock markets, the small number of institutional players and the absence of a regulatory framework caused further delays. Derivatives trading

eventually started in June 2000. The introduction of derivatives was well received by stock market players. Trading in derivatives gained substantial popularity, and soon the turnover of the NSE and BSE derivatives markets exceeded the turnover of the NSE and BSE cash markets.

A series of reforms of the stock market between 1993 and 1996 paved the way for the development of exchange-traded equity derivatives markets in India. Chronology of events is as mentioned:

- In 1991, Liberalization process initiated.
- In 1993, the government created the NSE in collaboration with state-owned financial institutions. NSE improved the efficiency and transparency of the stock markets by offering a fully automated screen-based trading system and real-time price dissemination.
- In 1995, NSE asked SEBI for permission to trade index futures.
- In 1996, the NSE sent a proposal to SEBI for listing exchange-traded derivatives. The report of the L. C. Gupta Committee, set up by SEBI, recommended a phased introduction of derivative products, and bi-level regulation (i.e., self-regulation by exchanges with SEBI providing a supervisory and advisory role).
- In November, 1996, SEBI setup L.C.Gupta Committee to draft a policy framework for index futures.
- In 1998, L.C.Gupta Committee submitted report.
- Another report, by the J. R. Varma Committee in 1998, worked out various operational details such as the margining systems.
- In 1999, the Securities Contracts (Regulation) Act of 1956, or SC(R) A, was amended so that derivatives could be declared "securities." This allowed the regulatory framework for trading securities to be extended to derivatives. The Act considers derivatives to be legal and valid, but only if they are traded on exchanges.
- In July, 1999, RBI gave permission for OTC forward rate agreements (FRAs) and interest rate swaps.
- In May, 2000, SEBI gave permission to NSE and BSE to do index futures trading.
- In June, 2000, Trading of BSE Sensex futures commenced at BSE.
- In June, 2000, Trading of Nifty futures commenced at NSE.
- In September, 2000, Nifty futures trading commenced at SGX.
- In June, 2001, Individual Stock Options & Derivatives.

Derivatives trading commenced in India in June, 2000, after SEBI granted the final approval to this effect in May, 2001. 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.

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. Foreign Institutional Investors (FIIs) are permitted to trade in all Exchange traded derivative products.

## 1.4 DERIVATIVES MARKET

The following are the different segments/categories of Derivative markets.

### Commodity Markets

Organized commodity derivatives in India started as early as 1875, barely about a decade after they started in Chicago. However, many feared that derivatives fuelled unnecessary speculation and were detrimental to the healthy functioning of the markets for the underlying commodities. As a result, after independence, commodity options trading and cash settlement of commodity futures were banned in 1952. A further blow came in 1960s when, following several years of severe draughts that forced many farmers to default on forward contracts (and even caused some suicides), forward trading was banned in many commodities considered primary or essential. Consequently, the commodities derivative markets dismantled and remained dormant for about four decades until the new millennium when the Government, in a complete change in policy, started actively encouraging the commodity derivatives market. Since 2002, the commodities futures market in India has experienced an unprecedented boom in terms of the number of modern exchanges, number of commodities allowed for derivatives trading as well as the value of futures trading in commodities.

### Foreign Exchange Derivatives Markets

Foreign Exchange derivatives market is possibly one of the oldest derivative markets in India. The economic liberalization of the early nineties facilitated the introduction of derivatives based on interest rates and foreign exchange. In August 1994, the rupee was made fully convertible on current account. As Indian businesses became more global in their business approach, evolution of a broad based, active and liquid forex derivatives markets provided them with a spectrum of derivative products to effectively manage their foreign exchange exposures. Business houses started actively approaching foreign markets not only with their products but also as a source of capital and direct investment opportunities. These reforms allowed increased integration between domestic and international markets, and created a need to manage currency risk.

An important segment of the forex derivatives market in India is the Rupee forward contracts market. This has been growing rapidly with increasing participation from corporates, exporters, importers, banks and FIIs.. Importers, exporters and banks use the rupee forward market to hedge their foreign currency exposure. Turnover and liquidity in this market has been increasing, although trading is mainly in shorter maturity contracts of one year or less. In a currency swap, banks and corporations may swap its rupee denominated debt into another currency (typically the US dollar or Japanese yen), or *vice versa*.

The easing of various restrictions on the free movement of interest rates resulted in the need to manage interest rate risk.

### Equity Derivatives Markets

Equity derivatives trading started in India in June 2000. India's experience with the launch of equity derivatives market has been extremely positive, by world standards. NSE is now one of the prominent exchanges, amongst all emerging markets, in terms of equity derivatives turnover.

Statistics from the NSE show that retail investors — not institutional — have been the largest participants in the derivatives markets in the past four-five years, accounting, on average, for around 60 per cent of all derivatives activity.

In less than three decades of their coming into vogue, derivatives markets have become the most important markets in the world. Today, derivatives have become part and parcel of the day-to-day life for ordinary people in major part of the world.

### Credit derivatives Markets

A credit derivative is a contract between two parties that allows for the use of a derivative instrument to transfer credit risk from one party to another. The party transferring risk away has to pay a fee to the party that will take the risk. Credit derivatives are today the fastest growing segment of the OTC derivatives market. Credit derivatives are at a very nascent stage in India. In May, 2007, the Reserve Bank of India released discussion paper on introduction of credit default swaps in India.

Other examples of underlying exchangeable are:

- Property (mortgage) derivatives.
- Energy derivatives that pay off according to a wide variety of indexed energy prices. Usually classified as either physical or financial, where physical means the contract includes actual delivery of the underlying energy commodity (oil, gas, power, etc.).
- Freight derivatives.
- Inflation derivatives.
- Weather derivatives.

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## 1.5 NEED FOR DERIVATIVES MARKETS

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Derivatives markets perform a number of economic functions:

- 1) They help in transferring risks from risk adverse people to risk oriented people. A derivative enables a trader to hedge some preexisting risk by taking positions in derivatives markets that offset potential losses in the underlying or spot market. In India, most derivatives users describe themselves as hedgers (Fitch Ratings, 2004) and Indian laws generally require that derivatives be used for hedging purposes only.
- 2) They help in the discovery of future as well as current prices.
- 3) They catalyze entrepreneurial activity.
- 4) They increase the volume traded in markets because of participation of risk adverse people in greater numbers.
- 5) They increase savings and investment in the long run.
- 6) Another motive for derivatives trading is speculation (i.e., taking positions to profit from anticipated price movements). In practice, it may be difficult to distinguish whether a particular trade was for hedging or speculation, and active markets require the participation of both hedgers and speculators.
- 7) Another type of trading, called arbitrage, where arbitrageur profits from discrepancies in the relationship of spot and derivatives prices, and thereby helps to keep markets efficient. Analysts describe India's long history in arbitrage trading, with line operators and traders arbitraging prices between exchanges located in different cities, and between two exchanges in the same city.

### Factors Driving Growth of Financial Derivatives

- 1) Increased volatility in asset prices in financial markets.
- 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.

- 5) Innovations in the derivatives markets, which optimally combine the risks and returns over a large number of financial assets leading to higher returns, reduced risk as well as transactions costs as compared to individual financial assets.

## **1.6 TYPES OF DERIVATIVES**

Broadly speaking there are two distinct groups of derivative contracts, which are distinguished by the way they are traded in market:

**Over-the-counter (OTC) derivatives** are contracts that are traded (and privately negotiated) directly between two parties, without going through an exchange or other intermediary. Products such as swaps, forward rate agreements, and exotic options are almost always traded in this way. The OTC derivative market is the largest market for derivatives, and is largely unregulated with respect to disclosure of information between the parties, since the OTC market is made up of banks and other highly sophisticated parties, such as hedge funds.

OTC (over-the-counter) contracts, such as forwards and swaps, are bilaterally negotiated between two parties. The terms of an OTC contract are flexible, and are often customized to fit the specific requirements of the user.

Reporting of OTC amounts are difficult because trades can occur in private, without activity being visible on any exchange. Because OTC derivatives are not traded on an exchange, there is no central counterparty. Therefore, they are subject to counterparty risk, like an ordinary contract, since each counter party relies on the other to perform.

**Exchange-traded Derivatives (ETD)** are those derivatives products that are traded via specialized derivatives exchanges or other exchanges. A derivatives exchange acts as an intermediary to all related transactions, and takes Initial margin from both sides of the trade to act as a guarantee. An exchange-traded contract, such as a futures contract, has a standardized format that specifies the underlying asset to be delivered, the size of the contract, and the logistics of delivery. They trade on organized exchanges with prices determined by the interaction of many buyers and sellers.

The world's largest derivatives exchanges (by number of transactions) are the Korea Exchange (which lists KOSPI Index Futures & Options), Eurex (which lists a wide range of European products such as interest rate & index products), and CME Group (made up of the 2007 merger of the Chicago Mercantile Exchange and the Chicago Board of Trade and the 2008 acquisition of the New York Mercantile Exchange).

In India, two exchanges offer derivatives trading: the Bombay Stock Exchange (BSE) and the National Stock Exchange (NSE). However, NSE now accounts for virtually all exchange-traded derivatives in India.

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

- 1) The management of counter-party (credit) risk is decentralized and located within individual institutions,
- 2) There are no formal centralized 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 organization, although they are affected indirectly by national legal systems, banking supervision and market surveillance.

## Common Derivatives Contract Types

Since their inception, financial derivative instruments have mushroomed very quickly from simple financial futures to a wide variety of exotic and complicated securities. Mentioned below are the four basic types of derivative contracts, their underlying security, and their estimated proportion of the market.

- **Futures contracts** are exclusively traded at organized exchanges. The exchanges trade standard contracts on specific financial securities of specified amounts to be delivered at a designated time. Private parties enter into a contract with a central clearing house, which becomes the opposite party to the transaction. In this manner the clearing house brings together parties seeking to take opposite positions. The risk of default by a party is low, because the clearing house is the opposite party and the clearing house uses daily mark-to-market settlement rules to reduce its risk exposure.
- Illustration: On 1<sup>st</sup> September, Mr. 'L' enters into a futures contract to purchase 100 equity shares of 'X Ltd.' at an agreed price of Rs. 100 in December. If on the maturity date (as determined by the rules of the exchange for the month of December) the price of the equity stock rises to Rs. 120 Mr. 'L' will receive Rs. 20 per share and otherwise if the price of the share falls to Rs. 90 Mr. 'L' will pay Rs. 10 per share.

Futures contracts are often used by commercial enterprises as 'hedging tools' to reduce the risk of expected future purchases or sales of the underlying asset. If used to speculate, risk increases. So risk depends on the underlying instrument and the use of the future.

- **Forward contracts:** These are the simplest form of derivative contracts. A forward contract is an agreement between parties to buy/sell a specified quantity of an asset at a certain future date for a certain price. One of the parties to a forward contract assumes a long position and agrees to buy the underlying asset at a certain future date for a certain price. The other party to the contract assumes a short position and agrees to sell the asset on the same date for the same price. The specified price is referred to as the delivery price. The contract terms like delivery price and quantity are mutually agreed upon by the parties to the contract. No margins unlike the futures markets that offer standardized exchange-traded contracts with specific amount and delivery dates, forward markets consist of contracts that are custom-made and privately negotiated between parties.

Illustration: On 1<sup>st</sup> April, Mr. 'A' enters into a forward contract with Mr. 'B' and agrees to purchase 1000 shares of 'X Ltd.' for a pre-determined price of Rs. 10 three months forward. Here on the fixed future date, Mr. 'A' will get the 1000 shares and will pay the price i.e. Rs. 10,000 and Mr. 'B' will deliver the shares and will receive the money.

- **Swaps** are privately negotiated contracts between two parties that stipulate the exchange of cash payments determined by the price of the underlying asset or the difference in the returns to different assets. Depending on the terms of the contract, the periodic payments could be a fixed amount or a variable (floating) amount based on either one or some combination of foreign exchange rates, interest rates, equity indexes, or commodity prices. By entering into a swap contract, parties are able to exchange their existing payment patterns for their desired payment streams.

Illustration: Mr. 'A' has borrowed from Mr. 'X' at LIBOR (London Interbank Offered Rate) + 2%. Mr. 'A' to cover the transaction from unanticipated fluctuations in the interest rate, agrees to pay a fixed rate of 9% to Mr. 'B' and in return Mr. 'B' agrees to pay a floating rate i.e., LIBOR + 2% to Mr. 'A'. Although the actual

payments between Mr. ‘A’ and Mr. ‘B’ will take place only on a net basis. The net result of the transaction for each of the parties will be as follows:

- Mr. ‘X’ will receive the amount at LIBOR + 2%.
- Mr. ‘A’s liability is fixed at 9%.
- Mr. ‘B’s liability depends on the fluctuating rate i.e. LIBOR.

Let us take two cases: 1) LIBOR = 10%. In this case Mr. ‘A’ will pay to Mr. ‘X’ at the rate of 12%. Mr. ‘B’ will pay to Mr. ‘A’ at the rate of 3%. Hence the net liability of Mr. ‘A’ is 9% only. 2) LIBOR = 5% In this case Mr. ‘A’ will pay to Mr. ‘X’ at the rate of 7% and Mr. ‘A’ will pay to Mr. ‘B’ at the rate of 2%. Hence the net liability of Mr. ‘A’ remains the same at 9%. FLOATING LIBOR + 2% FIXED 9%.

- **Options** are contracts that give the owner the right, but not the obligation, to buy (in the case of a call option) or sell (in the case of a put option) an asset. The price at which the sale takes place is known as the strike price, and is specified at the time the parties enter into the option. The option contract also specifies a maturity date. In the case of a European option, the owner has the right to require the sale to take place on (but not before) the maturity date; in the case of an American option, the owner can require the sale to take place at any time up to the maturity date. If the owner of the contract exercises this right, the counterparty has the obligation to carry out the transaction.

Illustration: Mr. ‘L’ pays \$ 2,000 to buy a ‘December 103’ call option on a \$ 100,000 US Treasury bond at an exercise price of \$ 103. If the price rises above \$ 103, Mr. ‘L’ will gain from the difference and if the price falls below \$ 103, the maximum amount which Mr. ‘L’ may lose is the amount of premium paid.

The four basic derivative instruments described above form the building blocks for creating a more complex array of custom-made and situation-specific derivative instruments.

Other financial products that have witnessed growth in the recent years include the “hybrids,” which are instruments that have characteristics of more than one type of financial instrument. The list of complex derivatives is never-ending as innovative and creative financial strategists continue to develop new products tailor-made for each application.

#### **Types of risks**

Financial transactions and asset-liability positions are exposed to three broad types of price risks, viz:

- Equities “market risk”, also called “systematic risk” (which cannot be diversified away because the stock market as a whole may go up or down from time to time).
- Interest rate risk (as in the case of fixed-income securities, like treasury bond holdings, whose market price could fall heavily if interest rates shot up), and
- Exchange rate risk (where the position involves a foreign currency, as in the case of imports, exports, foreign loans or investments).

The above classification of price risks explains the emergence of: (a) equity futures, (b) interest rate futures, and (c) currency futures, respectively. Equity futures have been the last to emerge.

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## **1.7 USES OF DERIVATIVES**

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#### **Risk Management**

Risk management has been the traditional role of the futures markets and the driving force behind the development of financial futures contracts during the early 1970s. For

example, traders use currency futures to protect (hedge) themselves against fluctuations in exchange rates that may be detrimental to their profit margins. A U.S. trader who needs foreign currency for a business transaction in six months could sell futures foreign currency contract for the same amount maturing in six months. If after six months the U.S. dollar depreciated relative to the foreign currency, the trader would incur losses in the spot market, but those losses would exactly be offset by gains from the futures contract. On the other hand, if the dollar appreciated relative to the foreign currency, the trader would incur losses in the futures market that would exactly offset gains in the spot market. Thus, in a typical hedge, the gains/losses from derivative and spot markets tend to offset each other.

### Lowering Financing Cost

The creative use of derivative products can enhance a firm's ability to reduce its cost of debt. Businesses can generally use derivatives to reduce their financing costs by the following mechanisms:

- A business may be able to obtain better financing terms from lenders by reducing the risk of its venture by engaging in hedging activities.
- Firms can capitalize on differences in interest rates across borders and maturities. A firm could issue debt in a country with lower interest rates and use currency swaps to protect itself against foreign exchange risk.

### Completing the Market for Investors

Derivatives provide investment opportunities not available at organized exchanges. Derivatives offer investors with a means to venture into unfamiliar equity markets around the globe at lower cost and risk than the traditional means. OTC derivatives tailored to meet the needs of specific business situations also extend the investment and capital formation opportunities beyond those offered in equity markets.

In general, derivatives provide a useful function by reducing price uncertainty, which has a positive impact on the overall economy because the production levels are higher under certain prices relative to uncertain market prices. Derivatives facilitate global commerce by providing firms with an ability to reduce their foreign exchange risk, reduce their cost of obtaining funds, and reduce the risk and transactions costs of investing in foreign equity markets.

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## 1.8 DERIVATIVES USERS

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Financial derivative participants can be divided into two groups — end-users and dealers. As end-users, banks utilize derivatives to take positions as part of their proprietary trading or for hedging as part of their asset/liability management. As dealers, banks use derivatives by quoting bids and offers and committing capital to satisfy customers' needs for managing risk.

In the developmental years of financial derivatives, dealers, for the most part, acted as brokers, finding counterparties with offsetting requirements. Then, dealers began to offer themselves as counterparties to intermediate customer requirements. Once a position was taken, a dealer immediately either matched it by entering into an opposing transaction or temporarily used the futures market to hedge unwanted risks — until a match could be found.

In order to illustrate the use of this risk hedging technique, take the familiar example of a processor or manufacturer, for whom an important source of risk is the fluctuation in the market price of his main raw material. For instance, a maker of gold jewellery may have accepted an export order to be delivered over the next three months. If, in the

meanwhile, the cash price of gold (the raw material) rises, the jewellery maker's manufacturing and exporting activity can become economically unviable. The availability of gold futures alleviates the manufacturer-exporter's problem. He/she can buy gold futures. Any loss caused by rise in the cash price of gold purchased for the export order will then be offset by profit on the futures contract. Any extra profit due to fall in gold price will also be offset as there will be loss on the futures contract. Thus, hedging is the equivalent of insurance facility against risk from market price variation: A world without hedging facility is like a world without insurance with respect to the particular kind of risk.

The manufacturer-exporter in the example given above could, of course, have bought all the raw material requirement in advance but that would have entailed heavy interest, insurance and storage costs. Thus, the facility of futures trading offers a cost-efficient and convenient way for hedging against price risk.

Apart from the risk from variation of raw material price, the manufacturer-exporter, in the above example, also faces another risk from variation of exchange rate. If the rupee appreciates before he is able to bring the export proceeds into India, his rupee receipts would be reduced. He/she may hedge against such currency risk too.

### **Hedgers vs. Speculators**

Derivative markets are dominated by speculators who have a view on an underlying and are comfortable with the risks associated in trading based on their view. For example, if a speculator is bullish about silver, he may buy Silver Futures. If the price of silver appreciates, the price of Silver Futures will also appreciate and the speculator may generate enormous gains. On the contrary, if the price of Silver falls, that of Silver Futures will also fall and the speculator may suffer enormous losses. Risks and rewards in derivative markets will be much higher in magnitude than that in underlying spot markets because the investment in derivative markets is much lower than spot markets. For example, if you buy one kilogram of Silver, you will have to pay the price for one kilogram of Silver. However, if you buy one kilogram of Silver Futures, you may have to pay a small margin of say 5% of the price of Silver. You will not obtain delivery of Silver, but you may not need delivery as you do not intend to own or possess Silver. You are merely betting on the price of Silver.

There will be found a few participants in these markets who use derivative products for hedging. Hedging is resorted to when you have a position in an underlying (say Silver) and you are facing risks associated with that underlying. If you possess Silver, you will be nervous that the price of Silver may fall. In this context, you may sell Silver Futures to hedge yourself. Any fall in the price of Silver will generate a loss on Silver inventories. However, the Silver Futures contract will generate gains. As these gains tend to offset your inventory losses, you will find that your net gain or loss is much lower than an unhedged position.

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## **1.9 SIZE OF DERIVATIVES MARKET**

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Derivatives on stock indexes and individual stocks have grown rapidly since inception. In particular, single stock futures have become hugely popular; accounting for about half of NSE's traded value in October, 2005. In fact, NSE has the highest volume (i.e. number of contracts traded) in the single stock futures globally, enabling it to rank 16 among world exchanges in the first half of 2005.

A significant fraction of the recent growth in the notional amount of over-the-counter (privately negotiated) derivative contracts can be attributed to market participants unwinding their contracts before maturity. In an exchange-traded contract, participants

can “close” their positions before maturity by reversing their initial transaction. However, the privately negotiated contracts can only be “closed” before maturity by entering into another derivative contract that offsets the payoff stream of the initial contract. Therefore, the old contract remains in place and the new contract increases the measured size of the market.

## 1.10 SOME MISCONCEPTIONS ABOUT DERIVATIVES

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Common misconceptions about financial derivatives are listed below.

- Derivatives are new, complex, high-tech financial products. Stock market’s “rocket scientists” continually are creating new, complex, sophisticated financial derivative products. However, these all are built on a foundation of the four basic types. Most of the newest innovations are designed to hedge complex risks in an effort to reduce future uncertainties and manage risks more effectively. The newest innovations require a firm understanding of the tradeoff of risks and rewards.
- Derivatives are purely speculative, highly leveraged instruments. The explosive use of financial derivative products in recent years was brought about by three primary forces: more volatile markets, deregulation, and new technologies. Derivatives originally were intended to be used to hedge certain risks effectively.
- The economic benefits of derivatives are not dependent on the size of the institution trading them. The decision about whether to use derivatives should be driven not by the company’s size, but by its strategic objectives. The role of any risk-management strategy should be to ensure that the necessary funds are available to pursue value-enhancing investment opportunities. However, it is important that all users of derivatives, regardless of size, understand how their contracts are structured, the unique price and risk characteristics of those instruments, and how they will perform under stressful and volatile economic conditions.
- The risks associated with derivatives are similar to those associated with traditional financial instruments. Although they can be far more complex. They include credit, operating, and market risks. Risks from derivatives originate with the customer. For example, when new homeowners negotiate with a lender to borrow a sum of money, they create risks by the type of mortgage they choose — risks to themselves and the lending company.

Financial derivatives have changed the face of finance by creating new ways to understand, measure, and manage financial risks. Ultimately, they offer organizations the opportunity to break financial risks into smaller components and then to buy and sell those components to meet specific risk-management objectives. Moreover, derivatives allow for the free trading of individual risk components, thereby improving market efficiency. Using financial derivatives should be considered a part of any business’ risk-management strategy to ensure that value-enhancing investment opportunities can be pursued.

## 1.11 SUMMARY

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Financial derivatives have grown rapidly in recent years due to improvements in computer technology, innovations in financial theory, and the need to manage risks arising from volatility in the interest and currency exchange rates. Derivatives are increasingly being used to manage various kinds of risk exposure, to obtain desirable financing, and to enhance investment and speculative opportunities.

## 1.12 SELF ASSESSMENT QUESTIONS

- 1) What are derivatives?
- 2) Explain the various types of derivatives markets in the world?
- 3) What are the major factors driving the growth of derivatives markets?
- 4) Elaborate on the uses of the derivatives instruments?
- 5) Explain how the derivatives instruments help the hedgers?
- 6) Explain the various types of the derivatives contract used by the investor community? Explain how these instruments help in mitigating the risks, with the help of an example?
- 7) Explain the various misconceptions associated with the derivatives?

## 1.13 FURTHER READINGS

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## **UNIT 2 BASIC DERIVATIVE PRODUCTS**

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### **Objectives**

After studying this unit, you should be able to:

- understand Futures Contracts and Forward Contracts;
- appreciate the difference between Futures and Forwards;
- describe various types of Swaps at a basic level; and
- analyse difficult types of Options at a basic level.

### **Structure**

- 2.1 Introduction
- 2.2 Futures and Forwards
- 2.3 Futures Contracts
- 2.4 Forwards Contracts
- 2.5 Difference between Futures and Forwards
- 2.6 Swaps
- 2.7 Forward Rate Agreements
- 2.8 Options
- 2.9 Summary
- 2.10 Self Assessment Questions
- 2.11 Further Readings

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### **2.1 INTRODUCTION**

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Derivative instruments enable the participants to either transfer risk (or reward) or assume risk (and reward) without obtaining ownership or possession of the underlying asset. For example, if you believe that the price of Gold will rise (bullish view), you could actually buy Gold and hold it in your inventory for some time and gain if the price of Gold actually moves up in accordance with your view. However, this transaction will involve practical challenges like need for cash (to buy Gold), storage and safe custody of Gold and managing the inventory of Gold. Instead you could buy a derivative instrument which may react as far as prices are concerned in a manner very similar to Gold prices but without (a) paying for it in full (b) being concerned about inventory handling and storage. One of such instruments could be Gold Futures which are traded on commodity exchanges all over the world.

In this unit, we will be discussing Futures (which are traded on stock exchanges and settlement is guaranteed by stock exchanges and the two parties do not know each other) and other derivative instruments including Forwards (which are contracts between two parties on a bilateral basis), Options and Swaps.

Futures and forward contracts are the simplest of derivative instruments and hence are discussed first. They are similar to each other in many respects. Hence, we first discuss both of them together. Then we will distinguish between the two and understand them at a more detailed level.

A futures or forward contract is a type of derivative instrument, or financial contract, in which two parties agree to exchange cash or financial instruments for cash or financial instruments or physical commodities for future delivery at a particular price.

## 2.2 FUTURES AND FORWARDS

Let's say, for example, that you decide to subscribe to a business journal. As the buyer, you enter into an agreement with the distributing company to receive a specific number of business journals at a certain price every month for the next year. This contract made with the distributing company is similar to a futures or forward contract, in that you have agreed to receive a product at a future date, with the price and terms for delivery already set. You have secured your price for now and the next year - even if the price of business rises during that time. By entering into this agreement with the distributing company, you have reduced your risk of higher prices.

That's how the futures and forward market works. Except that instead of a distributing company, a producer of cotton may be trying to secure a selling price for the next season's crop, or a textile manufacturer may be trying to secure a buying price of cotton so as to be more assured of his profits from production of textiles from cotton. So the farmer and the textile manufacturer may enter into a futures or forward contract requiring the delivery of 5,000 units of cotton to the buyer in June at a price of Rs 500 per unit. By entering into this futures contract, the farmer and the textile manufacturer secure a price that both parties believe will be a fair price in June. It is this contract and not the cotton *per se* that can then be bought and sold in the futures market.

So, a futures contract is an agreement between two parties:

- A short position – the party who agrees to deliver a commodity (or a financial instrument)
- A long position – the party who agrees to receive a commodity (or a financial instrument)

In the above scenario, the farmer would be the holder of the short position (agreeing to sell) while the textile manufacturer would be the holder of the long (agreeing to buy). We will talk more about the outlook of the long and short positions in the section on strategies, but for now it's important to know that every contract involves both positions.

In every futures and forward contract, the important terms are specified and understood clearly upfront (at the point of execution of the derivative contract). : the buyer, the seller, the underlying, quality specifications of the underlying, the quantity, the specific price per unit, the date of delivery, the time of delivery, the location of delivery, dispute redressal mechanisms if any are all put down in writing. The "price" of a futures or forward contract is represented by the agreed-upon price of the underlying commodity or financial instrument that will be delivered in the future. For example, in the above scenario, the price of the contract is 5,000 units of cotton at a price of Rs. 500 per unit. The notional value of the contract would be determined at Rs. 2,500,000. The term notional is used because at the point of transacting the contract, this amount is not exchanged. Sometimes, the term 'exposure' is used to indicate that the parties are exposed to risks and rewards with reference to this notional value.

In many cases, the underlying asset in a futures or forward contract may not be traditional "commodities" at all. In financial future and forwards, the underlying asset can be currencies, securities or financial instruments and intangible assets or referenced items such as stock indexes and interest rates.

## 2.3 FUTURES CONTRACTS

A futures contract is a standardized contract, to buy or sell a specified commodity of standardized quality at a certain date in the future, at a market determined price (the futures price). The contracts are traded on a futures exchange. Futures Contracts are not "direct" securities, like stocks, bonds, rights or warrants. In most countries, such futures contracts fall within the definition of the term securities and are governed by regulations that apply to securities.

A futures contract gives the holder the obligation to make or take delivery under the terms of the contract. The seller delivers the underlying asset to the buyer, or, if it is a cash-settled futures contract, then cash is transferred from the futures trader who sustained a loss to the one who made a profit. To exit the commitment prior to the settlement date, the holder of a futures position will offset his/her position by either selling a long position or buying back (covering) a short position, effectively closing out the futures position and its contract obligations.

The profits and losses of a futures contract depend on the daily movements of the market for that contract and are calculated on a daily basis. For example, say the futures contracts for cotton increases to Rs. 520 per unit, the day after the above farmer and textile manufacturer enter into their futures contract of Rs 500 per unit. The farmer, as the holder of the short position, has lost Rs. 20 per unit because the selling price just increased from the future price at which he/she is obliged to sell his cotton. The textile manufacturer, as the long position, has profited by Rs. 20 per unit because the price he is obliged to pay is less than what the rest of the market is obliged to pay in the future for cotton.

On the day the change occurs, the farmer's account is debited Rs 100,000 (Rs. 20 per unit x 5,000 units) and the textile manufacturer's account is credited by Rs. 100,000 (Rs. 20 per unit x 5,000 units). As the market moves every day, these kinds of adjustments are made on a day to day basis. Unlike the stock market, futures positions are settled on a daily basis, which means that gains and losses from a day's trading are deducted or credited to a person's account each day. In the stock market, the capital gains or losses from movements in price aren't realized until the investor decides to sell the stock or cover his/her short position.

As the accounts of the parties in futures contracts are adjusted every day, most transactions in the futures market are settled in cash, and the actual physical commodity is bought or sold in the cash market. Prices in the cash and futures market tend to move parallel to one another, and when a futures contract expires, the prices merge into one price. So on the date either party decides to close out their futures position, the contract is settled as far as that party or those parties are concerned. If the parties in our example settle the cotton futures contract at Rs 550 per unit, the textile manufacturer makes a profit of Rs. 50 per unit and the farmer makes a loss of Rs. 50 per unit in the futures market.

But after the settlement of the futures contract, the textile manufacturer still needs cotton to make cloth, so he will in actuality buy his cotton in the cash market (or from a cotton pool). If he were to buy this cotton at Rs. 580 per unit (a total of Rs. 29,00,000), his net cost will be Rs. 530 because his profit of Rs. 50 per unit from the futures market will help him to reduce his final cost of cotton.

The farmer will sell his cotton in the spot market at Rs. 580 per unit, but his net realization is only Rs. 530 per unit because of the loss of Rs. 50 per unit that he has suffered in the futures market.

Now that you observe that a futures contract is really more like a financial position, you can also notice that the two parties in the cotton futures contract discussed above could

be two speculators rather than a farmer and a textile manufacturer. In such a case, the short speculator would simply have lost Rs. 50 per unit while the long speculator would have gained that amount. In other words, neither would have to go to the cash market to buy or sell the commodity after the contract expires.

Futures contracts are structured by an exchange. The exchange acts as counterparty (in legality) to each player. Thus, if player A makes a gain and player B makes a loss, player A need not be concerned about whether player B will remit his losses on time or not. The exchange takes responsibility for paying the gains of player A to A on timely basis. This is legally referred to as novation.

Futures contracts carry an expiry date on which day all open positions are squared up. The methodology applicable to final settlement prices is disseminated in advance. For example, in the Indian equity derivatives market, futures prices on final expiry are based on the last thirty minutes volume weighted average price of the underlying equity market.

The exchange's clearing house (or clearing corporation) also establishes mechanisms for risk management, lays down admission criteria for broker members and regulates their functioning, lays down capital adequacy and liquid net worth norms for its member brokers, specifies margins that are to be collected and released, provides for clearing of trades, provides a framework for daily settlement and provides legal settlement guarantee to all participants.

### Standardization

Futures contracts ensure their liquidity by being highly standardized, usually by specifying:

- The underlying asset or instrument. This could be anything from a barrel of crude oil to a short term interest rate.
- The type of settlement, either cash settlement or physical settlement.
- The amount and units of the underlying asset per contract. This can be the notional amount of bonds, a fixed number of barrels of oil, units of foreign currency, the notional amount of the deposit over which the short term interest rate is traded, etc.
- The currency in which the futures contract is quoted.
- The grade of the deliverable. In the case of bonds, this specifies which bonds can be delivered. In the case of physical commodities, this specifies not only the quality of the underlying goods but also the manner and location of delivery. For example, the NYMEX Light Sweet Crude Oil contract specifies the acceptable sulphur content and API specific gravity, as well as the pricing point — the location where delivery must be made.
- The delivery month.
- The last trading date.
- The last trading time.
- The expiry date.
- The methodology of computing daily settlement prices.
- The methodology of computing final settlement prices.

### Settlement — Physical Vs. Cash Settlement

Settlement can be done in one of two ways, as specified per type of futures contract: There are two types of settlement – physical and cash (or gross and net).

- i) **Physical delivery:** The quantum of the underlying asset specified in the contract is delivered by the seller of the contract to the exchange, and similar quantum by the

exchange to the buyer of the contract. The buying party pays the requisite amount of cash to the exchange, which is promptly handed over to the seller by the exchange. Physical delivery is more common in commodities and bonds. In practice, it occurs only on a minority of contracts. Most contracts are cancelled out by purchasing a covering position, i.e., buying a contract to cancel out an earlier sale (covering a short), or selling a contract to liquidate an earlier purchase (covering a long).

If you have entered into a long futures contract to buy 10 tons of cotton, you will pay for these 10 tons on expiry. Your counterparty will physically deliver these 10 tons of cotton to the exchange.

ii) **Cash settlement:** A net cash payment is made or received based on the underlying reference rate.

If you have entered into a long futures contract to buy 10 tons of cotton and the price of your transaction is Rs. 80,000 per ton and the price on expiry day is Rs. 85,000 per ton, you will receive Rs. 5,000 per ton, i.e., Rs. 50,000 from the exchange on expiry. The counterparty (seller), will pay the amount of Rs. 50,000 to the exchange.

Expiry is the time and the day that a particular delivery month of a futures contract stops trading and the final settlement price for that contract month and year obtains.

### Players

The players in the futures market fall into three categories: speculators, hedgers and arbitrageurs.

#### i) Hedgers

Farmers, manufacturers, importers and exporters can all be hedgers. A hedger buys or sells in the futures market to secure the future price of a commodity intended to be sold at a later date in the cash market. This helps protect against price risks.

The holders of the long position in futures contracts (the buyers of the commodity), are trying to secure as low a price as possible. The short holders of the contract (the sellers of the commodity) will want to secure as high a price as possible. The futures contract provides a definite price certainty for both parties, which reduces the risks associated with price volatility. Hedging by means of futures contracts can also be used as a means to lock in an acceptable price margin between the cost of the raw material and the retail cost of the final product sold.

#### ii) Speculators

Speculators have no inherent interest in the underlying other than to benefit from possible future price movements. They aim to profit from the very price change that hedgers are protecting themselves against. Hedgers want to minimize their risk no matter what they're investing in, while speculators want to increase their risk and therefore maximize their profits.

It is quite possible that speculator buying a futures contract low in order to sell high in future would most likely be confronting a hedger as counterparty who is selling that contract in order to secure a certain price for him and reduce the risk that the price of the underlying may decline in the future.

#### iii) Arbitrageurs

Arbitrageurs are hard working professionals who are on the hunt for any mispricing that markets may throw up from time to time. They are on the lookout for zero risk or very low risk opportunities whereby they can generate a reasonable but assure return on their positions. Most of the time, their positions are in combinations which tend to cancel

out each other in concept, but in practice generate a small differential. Most arbitrages are similar to buying potatoes in Mumbai at Rs. 10 per kg and selling them in Navi Mumbai at Rs. 10.20 per kg and profiting 20 paise from this trade.

### Margins

In the futures market, margin has a definition distinct from its definition in the stock market, where margin is the use of borrowed money to purchase securities. In the futures market, margin refers to the initial deposit of “good faith” made into an account in order to enter into a futures contract. Initial margin is the money required to open a derivatives position. It is a security deposit to ensure that traders have sufficient funds to meet any potential loss from a trade.

In case of loss or if the value of the initial margin is being eroded, the broker will make a margin call in order to restore the amount of initial margin available. A futures account is marked to market daily. If the margin drops below the margin maintenance requirement established by the exchange listing the futures, a margin call will be issued to bring the account back up to the required level.

The minimum-level margin is determined by the futures exchange and is usually 5% to 10% of the futures contract. These predetermined initial margin amounts are continuously under review: at times of high market volatility, initial margin requirements can be raised.

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## 2.4 FORWARD CONTRACTS

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A forward contract is a binding obligation to buy or sell a certain asset at a pre-agreed price, on a certain future date. It is a contract undertaken between two parties who are willing to take a risk on each other (counterparty) for performance of the obligations imposed by the contract. If you view the forward contract from the buyer's point of view, the price of the underlying instrument, in whatever form, at the time of expiry of the forward contract and the underlying is delivered by the counterparty. The most typical forward is a forward foreign currency contract, which involves the exchange among two currencies such as U.S. dollars and Indian rupees.

The forward price of such a contract is commonly contrasted with the spot price, which is the price at which the asset changes hands on the spot date. The difference between the spot and the forward price is the forward premium or forward discount. In the case of a premium, the purchasing party is ready to pay a higher price than the spot rate. In the case of a discount, the selling party is ready to sell at a price that is lower than the spot rate.

### How a forward contract works

Suppose Mr. A wants to buy an apartment a year from now. At the same time, suppose that Mr. B currently owns a Rs. 10,00,000 house that he wishes to sell a year from now. Both parties could enter into a forward contract with each other. Suppose that they both agree on the sale price in one year's time of Rs. 14,00,000 (more below on why the sale price should be this amount). Mr. A and Mr. B have entered into a forward contract. Mr. A, because he is buying the underlying, is said to have taken a long position. Conversely, Mr. B will have taken a short position.

At the end of one year, suppose that the market valuation of Mr. B's house is Rs. 16,00,000. Then, because Mr. B is obliged to sell to Mr. A for only Rs. 14,00,000, Mr A will make a profit of Rs. 2,00,000. To see why this is so, one needs only to recognize that Mr. A can buy from Mr. B for Rs. 14,00,000 and immediately sell to the market for Rs. 16,00,000. Mr. A has made the difference in profit. In contrast, Mr. B has suffered a loss of Rs. 2,00,000.

Let us consider a business example in the currency market. Say there is an import transaction where an importer's shipment will be reaching India after three months and the payment is due on receiving the shipment. It is possible that due to exchange fluctuations USD INR rate may move upwards against the INR and he may have to pay more in rupee terms. If the importer believes that the exchange rate after three months at the time of retirement of the import bill will not be favorable to him, he may like to fix an assured rate for this future transaction. He will walk across to a friendly neighbourhood bank and book a long forward on the USD, whereby his USD rate will be fixed today for settlement after three months.

If he enters into this forward contract at Rs. 47.25, he will pay Rs. 47.25 after three months and the bank will pay him one US Dollar in return. He can use these dollars to pay for his imports. If the spot rate of the US Dollar is Rs. 49.00, the importer would be overjoyed as he would save Rs. 1.75 because of this long forward. If the spot rate of the US Dollar were to be Rs. 45.00, he would feel sad as he would have lost Rs. 2.25 because of this forward trade. The forward trade in this example is not intended to maximize profits but to minimize losses and to reduce uncertainty and risks inherent in this transaction.

Unlike futures contracts (which occur through a exchange and an associated clearing house), forward contracts are privately negotiated and are not standardized. Further, the two parties must bear each other's credit risk, which is not the case with a futures contract. Also, since the contracts are not exchange traded, there is no marking to market requirement, which allows a buyer to avoid almost all capital outflows initially (though some counterparties might set collateral requirements).

Forwards are priced in a manner similar to futures. Like in the case of a futures contract, the first step in pricing a forward is to add the spot price to the cost of carry (interest forgone, convenience yield, storage costs and interest/dividend received on the underlying). Unlike a futures contract though, the price may also include a premium for counterparty credit risk, and the fact that there is not daily marking to market process to minimize default risk. If there is no allowance for these credit risks, then the forward price will equal the futures price.

Forwards are a convenient vehicle for hedging or speculation. For example, an airline can conveniently hedge its fuel costs by purchasing jet fuel several months forward. The hedge eliminates price exposure, and it doesn't require an initial outlay of funds to purchase the fuel. The airline is hedged without having to take delivery of or store the jet fuel until it is needed. It doesn't even have to enter into the forward with the ultimate supplier of the jet fuel. If the forward is cash settled, the hedge can be put on with any counterparty.

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## 2.5 DIFFERENCE BETWEEN FUTURES AND FORWARDS

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Fundamentally, forward and futures contracts have the same function: both types of contracts allow people to buy or sell a specific type of asset at a specific time at a given price.

However, it is in the specific details that these contracts differ. First of all, futures contracts are exchange-traded and, therefore, are standardized contracts. Forward contracts, on the other hand, are private agreements between two parties and are not as rigid in their stated terms and conditions. Because forward contracts are private agreements, there is always a chance that a party may default on its side of the agreement. Futures contracts have clearing houses that guarantee the transactions, which drastically lowers the probability of default to almost never.

Secondly, the specific details concerning settlement and delivery are quite distinct. For forward contracts, settlement of the contract occurs at the end of the contract. Futures contracts are marked-to-market daily, which means that daily changes are settled day by day until the end of the contract. Furthermore, settlement for futures contracts can occur over a range of dates. Forward contracts, on the other hand, only possess one settlement date.

Lastly, because futures contracts are quite frequently employed by speculators, who bet on the direction in which an asset's price will move, they are usually closed out prior to maturity and delivery usually never happens. On the other hand, forward contracts are mostly used by hedgers that want to eliminate the volatility of an asset's price and delivery of the asset or cash settlement will usually take place. In many cases, exiting a forward contract before expiry may be difficult or financially unattractive.

## **2.6 SWAPS**

A swap is an agreement between two parties to exchange sequences of cash flows for a pre-set period of time. Usually, at the time the contract is initiated, at least one of these series of cash flows is determined by a random or uncertain variable, such as an interest rate, foreign exchange rate, equity price or commodity price.

### **Characteristics of Swap Markets**

The main characteristics of swaps are:

- Swaps are custom tailored to the needs of the counter parties. Swaps meet the specific needs of the customers / counter parties.
- Exchange trading necessarily involves some amount of transparency. By contrast in the swap market only the counter parties know about the transaction.
- Counter parties can tailormake the contract specifications including notional values, currencies, tenor etc.
- Futures and options exchanges are subject to considerable regulations. Till today, the swap market faces much lower rigor in this regard.
- Swap market face the following limitations:
  - i) Each party must find a counter party which wishes to take opposite position.
  - ii) Since swap is an agreement between two private parties it cannot be terminated at one's instance. The termination also requires acceptance by the counter party.
  - iii) Future and option exchanges are guarantors to the transactions where as there is no such guarantee with the swap.

Let us now discuss the two most common and most basic types of swaps:

- Plain vanilla interest rate swaps, and
- Currency swaps

#### **i) Plain Vanilla Interest Rate Swaps**

Interest rate swaps are used to hedge interest rate risks as well as to take on interest rate risks. If a treasurer is of the view that interest rates will be falling in the future, he may convert his fixed interest liability into floating interest liability; and also his floating rate assets into fixed rate assets. If he expects the interest rates to go up in the future, he may do *vice versa*. Since there are no movements of principal, these are off balance sheet instruments and the capital requirements on these instruments are minimal.

The most common and simplest swap is a "plain vanilla" interest rate swap. In this swap, Party A agrees to pay Party B a predetermined, fixed rate of interest on a notional

principal on specific dates for a specified period of time. Concurrently, Party B agrees to make payments based on a floating interest rate to Party A on that same notional principal on the same specified dates for the same specified time period.

In a plain vanilla swap, the two cash flows are paid in the same currency. The specified payment dates are called settlement dates, and the time between are called settlement periods. Because swaps are customized contracts, interest payments may be made annually, quarterly, monthly, or at any other interval determined by the parties.

Going purely by the definition, it is hardly clear why the two parties to an interest rate swap would wish to enter into such an agreement. To understand why an interest rate swap can be advantageous to both parties, consider the following example:

Two companies both wish to borrow Rs. 10 million. Company A is a giant conglomerate with an excellent credit rating. Company B is a medium sized company of ten years standing with a lower credit rating. Both companies have the option of borrowing either at fixed rates or at floating rates. Company A would prefer a fixed rate obligation while company B prefers a floating rate. The quoted rates of interest to the two companies are as follows:

Company	Quoted Interest Rate	
	Fixed (%)	Floating (%)
A	7.5	MIBOR +0.5%
B	9.0	MIBOR +3.5%

Clearly B's cost of funds is higher than A whether the loan is on fixed rate or on floating rate basis. However in the fixed rate case, B's extra cost is 1.5% (9.0% - 7.5%) while in the floating rate market the extra cost is 3%. (In economic terms, A has an absolute advantage over B in both fixed and floating rate markets, but B has a comparative advantage in the fixed rate market).

C Ltd a broker (or a banker), comes forward and arranges a swap. Under this arrangement, A actually borrows Rs 10 million from a bank at MIBOR + 0.5% and B borrows Rs 10 million from a bank at 9.0%. As a separate transaction (which constitutes the swap) A, B and C agree as follows:

- i) A will pay C a fixed rate of 7.0%
- ii) A will receive from C a floating rate of MIBOR +0.5%
- iii) B will pay C a floating rate of MIBOR +0.5%
- iv) B will receive from C a fixed rate of 6.5%

The transactions i) to iv) constitute the swap. It should be noted that the swap is independent of the borrowing initially undertaken by A and B and the banks, which lent the funds to A and B, are in no way concerned with the swap. A remains liable for all obligations to its bank and likewise B to its Bank. The swap binds only A, B and C.

To understand the benefits from the swap, consider the net cash flows of A, B and C in the table below:

Party	Outflow on Loan from Market	Swap Outflow	Swap inflow	Total
A	-(MIBOR + .5%)	-7.0 %	(MIBOR + .5%)	-7.0 %
B	-9.0 %	-(MIBOR + .5%)	+6.5%	-(MIBOR + 3%)
C-1	NIL	-(MIBOR + .5%)	(MIBOR + .5%)	
C-2		-6.5%	+7.0 %	+0.5%

It may be seen that the net result is :

- a) For A, a fixed rate obligation at 7% (this is better than the 7.5% for which A would have paid if it had directly taken a fixed rate loan);
- b) For B, a floating rate obligation at MIBOR + 3.0% (this is better than the MIBOR + 3.5% which B would have paid if it had directly taken a floating rate loan);
- c) For C, a profit of 0.5% for arranging the transaction.

It was noted earlier that the interest differential on floating rate debt was 3% while on fixed rate debt it was 1.5%. The gap between the differentials was  $(3-1.5)\% = 1.5\%$ . It is this 1.5% which has been shared as gains by A, B and C, each getting 0.5%.

## ii) Currency Swaps

Currency swaps involve an exchange of cash flows in two different currencies. These are generally used to raise funds in a market where the corporate has a comparative advantage and to achieve a portfolio in a different currency of its choice, at a cost lower than if it accessed the market of the second currency directly. However, since these types of swaps involve an exchange of two currencies, an exchange rate, generally the prevailing spot rate is used to calculate the amount of cash flows, apart from interest rates relevant to these two currencies. By its special nature, these instruments are used for hedging risk arising out of interest rates and exchange rates.

A currency swap is a contract which commits two counter parties to an exchange, over an agreed period, of two streams of payments in different currencies, each calculated using a different interest rate, and an exchange, at the end of the period, of the corresponding principal amounts, at an exchange rate agreed at the start of the contract.

The rationale for currency swaps can be explained with the help of the following example.

Suppose a Indian company (say, ABC Ltd) wants to raise funds in the USA. At the same time, a prominent American company, say, XYZ wants to borrow in Indian rupees for a project in India. ABC Ltd, though a blue chip in India, may not be well known in the US debt market and would therefore have to pay a higher rate of interest than its credentials would otherwise warrant. Similarly, XYZ may not receive a rate of interest in India that truly reflects its credit rating because of the obscurity of the name in India.

It would be beneficial to both companies if ABC Ltd borrows in rupees, XYZ in dollars and the two then swap the liabilities.

ABC, an Indian company and XYZ, an American multinational are both contemplating raising of funds. XYZ, by virtue of its larger size, greater diversification etc has a better credit rating than ABC in both markets. The rates at which the companies can borrow is as follows:

<i>Company</i>	<i>Quoted Interest rate</i>	
	<i>Rupees (%)</i>	<i>Dollars (%)</i>
ABC	14	6
XYZ	13	3

ABC needs dollars while XYZ needs rupees.

The differential is 1% in India but 3% in America. Both parties stand to gain by the following arrangement through MD a middleman. (Assume Rs. 40 = \$1)

- a) ABC will borrow in India, a sum of Rs 40 crores at 14%.
- b) XYZ will borrow \$ 10 million in the USA at 3%.

- c) Both parties enter into a swap on the following terms:
- The principal sums are exchanged i.e., ABC pays XYZ Rs 40 crore and receives \$ 10 million
  - ABC will pay MD dollar interest at 5.5% and receive rupee interest at 14%.
  - XYZ will pay MD rupee interest at 12.5% and receive from MD dollar interest at 3%.

The cash flows are as under:

Party	Interest outflow on Loan	Swap outflow	Swap inflow	Net Flow
ABC	Rs-14.0	\$-5.5	Rs+14.0	\$-5.5
XYZ	\$-3.0	Rs-12.5	\$+3.0	Rs-12.5
MD	-	Rs-14.0	Rs+12.5	Rs-1.5
		\$-3.0	\$+5.5	\$+2.5

ABC and XYZ have both achieved a lower cost of capital than if they had borrowed directly in the other currency. MD gains 2.5% in dollars and loses 1.5% in rupees, producing a net gain of 1%. (However it should be noted that MD bears an exchange rate risk. It is possible to arrange the payments differently with the swap parties bearing some or all of the risk).

The differential in rates was 3% in USA and 1% in India; this left a gap of 2% to be shared as gains by the parties to the swap transaction. In the above transaction, ABC gains 0.5% (by effectively borrowing at 5.5% instead of 6%), XYZ gains 0.5% (by borrowing at an effective rate of 12.5% instead of 13%) and MD gains 1% (+2.5% in dollars, -1.5% in rupees).

We can now see from the above that currency swaps differ from interest rate swaps in that currency swaps involve:

- An exchange of payments in two currencies.
- Not only exchange of interest, but also an exchange of principal amounts.
- Unlike interest rate swaps, currency swaps are not off balance sheet instruments since they involve exchange of principal at the end of the period.
- The interest payments at various intervals are calculated either at a fixed interest rate or a floating rate index as agreed between the parties.
- Currency swaps can also use two fixed interest rates for the two different currencies – different from the interest rate swaps.
- The agreed exchange rate need not be related to the market.
- The principal amounts can be exchanged even at the start of the swap

### Equity Swaps

An equity swap is an arrangement by which one party pays to the counter party an amount based on the value of the shares in a company, and receives from the counter party an amount of fixed or floating interest on an equivalent notional value. In effect, an equity position is converted into a deposit or debenture (and vice versa for the counterparty).

A Ltd owns a large stake of ten lakh shares in B Ltd a quoted sister company. The shares are currently quoted at Rs. 1,000 per share. A is apprehensive that the price of B's shares may fall, but does not want to sell its stake as that would mean relinquishing its say over the management of B Ltd. Instead it enters into an equity swap with C Ltd, a financial institution, whereby,

- i) A will pay C annually the value of all dividends declared by B plus or minus any net appreciation or depreciation in the share price (from the base value of Rs. 1,000) on its ten lakh shares.
- ii) C will pay A annually the market floating rate of interest on a sum of Rs. 100 crore, being the market value of A's holding at the time of the swap.

### **Other Swaps**

#### **Principal only swap**

This is a swap of foreign currency with Indian rupee where no interest payments on foreign currency take place. The foreign currency and Indian rupee principal would be exchanged on maturity and the forward premium would be recovered through a series of periodic INR payments.

#### **Coupon swap**

This is a currency swap where only the interest payments are swapped between counterparts and the principals themselves are not exchanged. A stream of US\$ LIBOR interest payments can be exchanged into INR payments at a fixed or floating rate on an equivalent INR notional.

#### **Constant maturity treasury swaps**

In these swaps the floating rate benchmark is of a tenor, which is different from the settlement tenor itself. To quote an example, consider a 5 year swap with annual resets, where the floating rate benchmark is the 5 year GoI bond, as opposed to a 1 year bond.

#### **Quantos**

This is a swap with varying combinations of interest rate; currency and equity swap features, where payments are based on the movement of two different countries' interest rates. The floating rate benchmark could relate to a currency different from the currency of a swap. An example of such a swap is an INR IRS where a fixed rate is exchanged for US\$ LIBOR benchmark, applied to a notional principal.

Though they deal with two different currencies, payments are settled in the same currency. For example, a typical quanto swap would involve a U.S. investor paying six-month LIBOR in U.S. dollars (for a US\$1 million loan), and receive payments in U.S. dollars at the six-month MIBOR + 75 basis points.

This implies that while the notional principal currency is in USD, the floating benchmark is not a USD benchmark, but that of other currency.

Such products are attractive for speculators and investors who wish to have exposure to a foreign asset, but without the corresponding exchange rate risk.

Quantos are attractive because they shield the purchaser from exchange rate fluctuations. If a US investor were to invest directly in the Japanese stocks that comprise the Nikkei, he would be exposed to both fluctuations in the Nikkei index and fluctuations in the USD/JPY exchange rate. Essentially, a quanto has an embedded currency forward with a variable notional amount.

#### **Cap and Floor Agreements**

Cap and floor agreements are those in which one party for a premium agrees to compensate the other if a designated reference is different from a predetermined level.

When the seller agrees to pay the buyer if the designated reference exceeds a predetermined level, the agreement is referred to as a **cap**. The agreement is referred to as a **floor** when the seller agrees to pay the buyer if a designated reference falls below a predetermined level.

The designated reference could be a specific interest rate such as LIBOR or the prime rate, the rate of return or on some domestic or foreign stock market index such as the NSE or the DAX, or an exchange rate such as the exchange rate between the US dollar and the Japanese Yen. The predetermined level is called the **strike**. As with a swap, a cap and a floor are based on a notional amount.

A corporate may borrow from its bank at a floating rate of MIBOR + 3%. In this transaction, the corporate is exposed to possible increases in MIBOR. To protect itself, the corporate may buy a cap (say MIBOR at 8%) from a derivative counterparty where, the counterparty will pay the corporate any excess if MIBOR were to move above 8%. If MIBOR moves to 8.50%, the corporate would receive 0.5% from the derivative counterparty. The corporate has effectively capped its maximum interest rate at 11% (MIBOR of maximum 8% plus spread of 3%). To get such a facility, the corporate would pay a premium to the derivative counterparty. In this example, 8% would be referred to as the **strike**.

If MIBOR stays within 8% during the tenor of this cap, the corporate will receive nothing.

### Interpretation of a Cap and Floor

In a cap or floor, the buyer pays a fee that represents the maximum amount the buyer can lose and the maximum amount the seller of the agreement can gain. The only party required to perform is the seller. The buyer of a cap benefits if the designated reference rises above the strike because the seller must compensate the buyer. The buyer of a floor benefits if the designated reference falls below the strike because the seller must compensate the buyer.

### Some Applications of Swaps

Banks use swaps among themselves to offset positions created in outright forwards done with customers.

For instance, suppose a firm bought CHF forward against dollar three month forward on August 30. The delivery date is December 1. By late November, it realizes that it does not need the CHF on December 1 but on December 14. On November 29, it can do a swap, selling CHF spot and buying it for delivery on December 14. The CHF received from the original forward contract is used to deliver against the spot leg of the swap.

Another application of swaps is in so called "*Roll-over Forward contracts*". In some countries, forward markets do not exist beyond certain maturities.

For example, at one time in India forward transactions beyond six months were not possible. Consider the case of a firm, which has contracted a foreign currency loan of \$ 1,000,000. The principal has to be repaid in 10 six-monthly installments starting six months from today. Ignoring the interest payments (which can be easily figured into the calculations), the firm has definite outflows of \$100,000 every six months for the next five years. The firm would like to know the rupee value of its entire liability at all times.

However, it cannot buy dollars more than six months forward at any time. It can use swaps as follows:

- Buy USD 1,000,000 six-month forward at a rate known today.
- Six months later, take delivery, use USD 100,000 to repay the first installment. For the remaining USD 900,000 do a six-month swap i.e., sell in the spot market, buy six months forward. Rupee outflow six months later is again known with certainty.
- Repeat this operation every six months till the loan is repaid.

## 2.7 FORWARD RATE AGREEMENTS

The forward, or future rate agreement, is a contract between two counterparties to fix a future interest rate. This contract defines the interest rate for a future period based on a principal. If on the agreed date (fixing date) the FRA-contract-rate differs from the agreed reference rate, a settlement payment depending on the difference must be paid by one of the contractors. The principal is not exchanged and there is no obligation by either party to borrow or lend capital.

A forward rate agreement is an over the counter derivative instrument that trades as a part of the money markets. These are off balance sheet instruments. FRAs are commonly used by banks and corporates to hedge interest rate exposure. They are also used to speculate on the level of future interest rates.

### The FRA can be used

- By market participants who wish to hedge against future interest rate risks by setting the future interest rate today (at trading date).
- By market participants who want to make profits based on their expectations of the future movements in interest rates.
- By market participants who try to take advantage of the different prices of FRAs and other financial instruments, e.g., futures, by means of arbitrage.

FRAs are used more frequently by banks, for applications such as hedging their interest rate exposures, which arise from mis-matches in their money market books. FRA's are also used widely for speculative activities.

## 2.8 OPTIONS

Options are unique financial instruments that confer upon the holder the right to do something without the obligation to do so. More specifically, an option is a financial contract in which the buyer of the option has the right to buy or sell an asset, at a pre specified price, on or upto a specified date if he chooses to do so.

However, there is no obligation for him to do so. In other words, the option buyer can simply let his right lapse by not exercising his option. The seller of the option has an obligation to take the other side of the transaction if the buyer wishes to exercise his option. Obviously, the option buyer has to pay the option seller a fee for receiving such a one sided privilege.

Options have proved to be a very versatile and flexible tool for risk management in a variety of situations arising in corporate finance, stock portfolio risk management, interest risk management and hedging of commodity price risk. By themselves and in combination with other financial instruments, options permit creation of tailor made risk management strategies. Options also provide a way by which individual investors with moderate amounts of capital can speculate on the movements of stock prices, exchange rates, commodity prices and so forth. The limited loss feature of options is particularly advantageous in this context.

### Options Terminology

Before we discuss the working of options and their applications, we must understand the market terminology associated with options, while our context is that of options on spot foreign currencies, the terms described below carry over to other types of options as well.

The two parties to an option contract are the *option buyer* and the *option seller*, also called *option writer*. For exchange-traded options, as in the case of futures, once an agreement is reached between two traders, the exchange (the clearing house) interposes itself between the two parties, becoming buyer to every seller and seller to every buyer. The clearinghouse guarantees performance on the part of every seller.

### Call and Put, American and European Options

#### Call option

A call option gives the buyer the right to purchase a currency Y (or any other underlying) against a currency X, at a stated price say K units of X per unit of Y, on or before a stated date. For exchange-traded options, one contract represents a standard amount of the currency Y. The writer of a call option must deliver currency Y in exchange for X at the rate K, if the option buyer chooses to exercise his option.

#### Put Option

A put option gives the option buyer the right to sell a currency Y against a currency X (or any other underlying) at a specified price K on or before a specified date. The writer of a put option must take delivery of Y and deliver X if the option is exercised.

#### Strike Price (also called Exercise Price)

If we continue the currency example, above, the price K specified in the option contract at which the option buyer can purchase the currency (or any other underlying) (call option) or sell the currency (or any other underlying) (put option) Y against X.

#### Maturity or Expiry Date

This is the date on which the option contract expires. Exchange traded options have standardized maturity dates.

#### American Option

An option, call or put that can be exercised by the option buyer on any business day from contract date to maturity.

#### European Option

This is an option that can be exercised only on the maturity date.

#### Premium (Option Price, Option value)

The fee that the option buyer must pay the option writer 'up-front' i.e., at the time the contract is initiated. If the option lapses unexercised, the buyer loses this amount.

The best way to understand an option is to use an illustration. (This example is for illustration only, and should not be construed as expected values for options, or expected returns.)

Imagine an aggressive investor is looking to buy some real estate. During his search, he notices someone is selling 10 acres of land for Rs 10,000 each, (Rs. 100,000 total). During this time, he also comes across a very interesting rumor. A friend of his that works at the planning office tells him that there is talk of a new shopping mall being built in a particular section of town, just a couple miles from the land he saw. He knows that if the mall is built, the price of land will skyrocket. However, if it isn't built, he knows he'll be stuck with some property he didn't want. He presents the seller of the land with an interesting proposition; he will give her Rs 10,000 to let him buy the land within the next three months. If he decides to purchase, he'll pay the full Rs. 100,000. If he decides

not to purchase, the seller can keep the money. Thus, he's not buying the land...he's buying the right to buy the land.

- This would be referred to as a CALL option - it allows him to buy within a given period of time. (A PUT option would allow him to sell within a given of time.)
- The Underlying would be the 10 acres of land - what he would receive if the purchase took place.
- The Premium would be Rs 10,000 - this is the amount he must pay to enter into the agreement.
- The Strike would be Rs 100,000 - the price he would pay the seller for the underlying.
- The Expiration would be three months - how long the agreement is valid.

If the rumor turns out to be true, he could exercise his option, and buy the land for the agreed upon price of Rs 100,000 and if the rumour turned out to be just a rumor, then he would sacrifice the premium paid and not buy the land after all.

## 2.9 SUMMARY

The unit elaborated on the basic instruments used in the category of derivatives, explaining their working with examples. The instruments are important to understand from a student's perspective because Indian economy is expanding and in the coming times it will become very complex. The conventional financial instruments for investment would wear out in the near future because of fewer returns earned by them, as more people invest in these instruments. Therefore, people would like to look at new instruments in order to gain higher returns; given their risk bearing ability is higher. Although, the instruments discussed above bear more than average risk but there are strategies which can cover these risks and make a financial instrument customised to the investor's requirement. Considering this anticipated scenario, the student should be more aware of the various financial instruments benefits and the strategies which can be built on them.

## 2.10 SELF ASSESSMENT QUESTIONS

- 1) What are futures contracts? How are the futures different from forwards?
- 2) What are the various characteristics of a futures instrument?
- 3) What are the various types of Swaps? Please explain with examples currency and equity swaps?
- 4) Explain the working of a Forward Rate Agreement (FRA)?
- 5) What are Call options? Explain their working?
- 6) What are Put options? Explain their working?
- 7) What are American options? How are they different from European options?

## 2.11 FURTHER READINGS

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# **UNIT 3 SPOT AND DERIVATIVE MARKETS**

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## **Objectives**

After studying this unit, you should be able to:

- appreciate the role of Derivative markets in equity;
- explain the relationship between Spot Price and Futures Price;
- understand the meaning and implications of Contango and Backwardation; and
- analyse the operation of Arbitrage between equity and Futures markets, its role and earnings potential.

## **Structure**

- 3.1 Introduction
- 3.2 Equity Spot and Derivatives Market
- 3.3 Spot and Futures Prices
- 3.4 Cost of Carry
- 3.5 Arbitrage
- 3.6 Summary
- 3.7 Self Assessment Questions
- 3.8 Further Readings

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### **3.1 INTRODUCTION**

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A market in which goods, services or financial assets are traded for immediate delivery is known as spot market. This differs from futures markets where the delivery would be made at a future date. In the context of Indian stock markets, the settlement cycle for the spot market (the time period in which delivery of financial assets sold and payments for financial assets bought) is T+2, implying that the transaction would be completed 2 days after trade is done.

Spot market instruments are simple financial instruments like equity, bonds and debentures. As the markets grew in volume along with increase in volatility there was a felt need for instruments which can be used for the purpose of hedging, arbitrage, speculation and risk cover. As a result of this, derivative instruments were introduced in the Indian markets. The derivative instruments derive their price from the value of the underlying asset. The main instruments clubbed under the general term derivatives are: a) Forwards, b) Futures, c) Options, d) Options on futures, e) Forward rate agreement, and f) Swaps.

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### **3.2 EQUITY SPOT AND DERIVATIVES MARKET**

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#### *Equity Spot Market*

The spot market gives the investor an opportunity to invest in stocks of companies listed on a stock exchange at an agreed price prevailing on the exchange with immediate (spot) settlement (payment and delivery). In practice, spot settlement happens on day t + 2, which is two days after the trading day. Example – you can purchase stock of Reliance from The Stock Exchange, Mumbai (BSE) and the National Stock Exchange (NSE) through your broker on any trading day at prevailing prices. When you buy shares of a company in the spot market, you are commonly referred to as an investor or a shareholder. When you own a share, you are sharing in the success of the business, and you actually become a part owner of the corporation like Reliance.

### **Equity Derivative Markets**

A derivative is an asset whose value is derived from the value of some other asset. The other asset is generally known as the underlying (for example, a commodity like Gold or financial assets like Shares or Equity Indices). Imagine that you have signed a legal contract that, with the payment of a small upfront margin gives you the right to buy a fixed quantity of an underlying asset like, Reliance Stock at a price determined now at any time in the next three months. Here you have not paid the full amount but a small upfront margin and you have an obligation to buy a certain quantum of Reliance shares in the forthcoming next three months. Such kind of exotic contracts are called as derivatives. The above example represents a Futures contract within the universe of Derivatives. The segment of organized stock exchanges where trading in Derivatives takes place is known as derivatives segment. In India, equity derivatives are traded within regular stock exchanges under a separate segmental framework. India does not have exclusive exchanges for equity derivatives.

### **Rationale for Derivative Markets**

Derivative products have been introduced in a phased manner starting with Index Futures Contracts in June 2000. Index Options and Stock Options were introduced in June 2001 and July 2001 followed by Stock Futures in November 2001. Sectoral indices were permitted for derivatives trading in December 2002. During December 2007 SEBI permitted mini derivative (F&O) contract on Index (Sensex and Nifty). The maximum tenor of these contracts was three months. In January 2008, longer tenor Index options contracts and Volatility Index contracts were introduced and in April 2008, Bond Index was introduced. In addition to the above, during August 2008, SEBI permitted Exchange traded Currency Derivatives.

The interactions and correlations between markets that were once considered separate are today closely connected, with prices in one market significantly impacting another.

**Table 3.1: Phenomenon Growth of Futures**

Month/ Year	Index Futures		Stock Futures	
	No. of Contracts	Turnover (Rs.crore)	No. of Contracts	Turnover (Rs.crore)
1	3	4	5	6
BSE				
Jun-00 to Mar-01	77743	1873	-	-
2001-02	79552	1276	17951	452
2002-03	111324	1811	25842	644
2003-04	246443	8572	128193	5171
2004-05	449630	13600	6725	213
2005-06	89	5	12	1
2006-07	1638779	55491	142433	3515
2007-08	7157078	234680	295117	7609
NSE				
Jun-00 to Mar-01	90580	2365	-	-
2001-02	1025588	21482	1957856	51516
2002-03	2128763	43951	10676843	286532
2003-04	17191668	554462	32368842	1305949
2004-05	21635449	772174	47043066	1484067
2005-06	58537886	1513791	80905493	2791721
2006-07	81487424	2539575	104955401	3830972
2007-08	156598579	3820667	203587952	7548563

(Source: SEBI)

Participants in physical markets use Futures market for price discovery and price risk management. It is widely believed that, in the absence of a regulated Futures market, they might speculate on unorganized markets.

A trader buying shares in the spot market will be required to pay the entire amount in two days time. In the Futures market, the trader will be required to pay a small initial margin (say 10%) and he takes up a "long" position (meaning a position where he has bought). Returns on the Futures market will be much more attractive than the cash market as the impact of leverage (much smaller investment) will be enjoyed by the trader whose view happens to be correct. It is important to understand that if the trader's view is wrong, his losses (as a percentage of the amount invested) will also be magnified.

Here is an example of an informed investor generating a substantial gain from Futures market. Let us assume that the market lot on the Nifty is 50 units and that a Futures position requires an initial margin payment of 20% of the notional value.

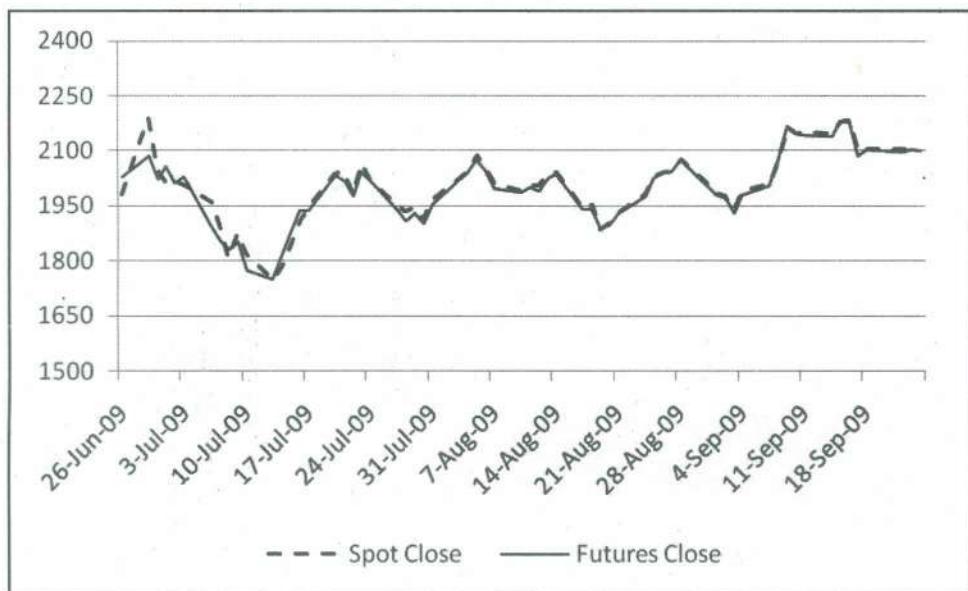


Figure 3.1: Futures and Spot for Reliance (Expiry 24 Sept. 2009)

Suppose he went long on Reliance in Spot and Futures market on 01-Sep-09.

He closed his positions on 24-Sep-09.

Suppose Reliance future lot size is 100 that is, he purchased Reliance Futures having 100 stocks as underlying.

In the Cash Market his profit on 100 stocks is:

$$(2100.95 - 1980.85) * (100) = 12010$$

$$\text{Return on Investment} = 12010 / (1980.85) = 12010 / 1980.85 = 0.606\%$$

In the Futures Market his profit on 1 lot is:

$$(2100.6 - 1983.4) * (100) = 11720$$

$$\text{Return on Investment} = 11720 / (20\% \text{ of } 1983.4) = 11720 / 3966.8 = 29.54\%$$

(Here we have assumed that no other margin other than initial margin of 20% is paid)

### Types of Derivative Markets

Derivative products are either traded on stock exchanges (Exchange Traded Derivatives) or bought and sold privately (Over the Counter Market). Exchange traded derivatives are those derivatives which are traded through specialized derivative exchanges whereas

over the counter (OTC) derivatives are those which are privately traded between two parties and involves no exchange or intermediary as a third party. Those Derivatives which are traded on exchanges are standardized products as exchanges cannot customize products to suit individual needs. Those that are bought or sold over the counter could be customized to your needs.

**Forwards:** A forward contract is a contractual agreement made directly between two parties. One party agrees to buy a commodity or a financial asset on a date in the future at a fixed price. The other side agrees to deliver that commodity or asset at the predetermined price. In a forward contract, the two parties are taking a risk on each other and if the counterparty does not perform, the first party may suffer a loss. In the sub-prime crisis that recently rocked the financial world, banks were afraid to deal with each other as each bank ran the risk that the other bank may not be in a position to perform its part of the derivative contract.

**Futures:** A futures contract is essentially the same as a forward, except that the deal is affected through an organized and regulated exchange. The stock exchange provides settlement guarantee. The two parties do not know each other and do not carry a risk of the other party not performing as per the contracted terms. If the counterparty does not perform, the exchange is legally required to step into the shoes of the non-performing party.

**Swap:** A swap is an agreement made between two parties to exchange payments on regular future dates, where the payment legs are calculated on a different basis. As swaps are OTC (Over Trade Counter) deals, there is a risk that one side or the other might default on its obligations.

**Options:** An Option gives one party the right to buy or sell an underlying asset by a certain date at a fixed price. The party buying the option has an option (meaning it is not bound to perform), while the other party selling the option has an obligation (meaning that it is bound to perform).

In India, equity Futures and Options are standardized contracts which are traded on the BSE and the NSE. Both these exchanges have carved out separate segments to trade in derivatives. Over the Counter equity derivatives are not allowed by SEBI regulations.

### Benefits of Derivative Markets

Introduction of derivatives market has given a boost to the investment and trading arena. It has provided a great amount of flexibility to traders, wide choice of instruments and most importantly it has provided more leverage to trade not only to speculators but also to investors or hedgers who are also motivated to be an active part of the market using these instruments. Some of the benefits of derivative markets are as under:

1) **Price Discovery:** Due to its highly competitive nature, the futures market has become an important economic tool to determine prices based on today's and tomorrow's estimated amount of supply and demand. Futures market prices depend on a continuous flow of information from around the world and thus require a high amount of transparency. Factors such as weather, war, large fiscal deficits, elections and political stability, investments and divestments by foreign institutional investors - all have a major effect on supply and demand and, as a result, on the present and future prices of equity shares, commodities and other financial assets. This regular information flow and reactions of investors and traders to such flow constantly changes the price of an underlying asset. This process is known as price discovery. As investment required to take positions in derivative markets is small, investors and traders are in a position to take such positions (or square up existing positions) very quickly in response of information flow. Such rapidity of position building would not have been possible in cash markets as availability of enough flow of funds would have become a constraint.

2) **Risk Management:** Risk management is the process of identifying the desired level of risk, identifying the actual level of risk and altering the latter to equal the former. This process can fall into the categories of hedging and speculation.

Hedging has traditionally been defined as a strategy for reducing the risk in holding a market position while speculation referred to taking a position in the way the markets will move. Today, hedging and speculation strategies, along with derivatives, are useful tools or techniques that enable companies to more effectively manage risk.

3) **Derivatives also Help Reduce Market Transaction Costs:** Huge volumes in derivative markets enable service providers to keep costs low, which in turn encourages more investors and traders to take positions in derivative markets, leading to low costs and higher trading interest. As a result, hedging and speculative trading strategies are executed economically.

### **3.3 SPOT AND FUTURES PRICES**

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Important terminologies in Futures and spot markets are:

#### ***Spot Price***

The spot price/spot rate of a security (scrip or index) is the price that is quoted for immediate (spot) settlement (payment and delivery) on a stock exchange. Spot markets are also referred to as Cash markets or Equity markets. In India, cash market settlement happens on day  $t + 2$ , i.e., the second day after trading.

#### ***Futures Expiry***

The Futures price is the price agreed upon for a financial asset between two parties to buy or sell an equity share or equity index at a certain future point in time. This date is called the Futures delivery date or expiry date or final settlement date. Expiry is the time and the day that a particular delivery month of a futures contract stops trading and the final settlement price for that contract month and year obtains.

#### ***Future settlement price***

The official price of the futures contract at the end of a day's trading session on the exchange is called the settlement price for that day of business on the exchange at a price specified today. On a day to day basis, the futures closing price is computed by the exchanges in India on the basis of the last thirty minutes weighted average traded price of Futures contracts. On the expiry date, this closing price is the last thirty minutes weighted average traded price of underlying Equity.

#### ***Going long***

When an investor goes long, i.e., enters a contract by agreeing to buy and receive delivery of the underlying at a set price – it means that he/she is trying to profit from an anticipated Futures price increase.

#### ***Going short***

An investor who goes short, i.e., enters into a Futures contract by agreeing to sell and deliver the underlying at a set price - is looking to make a profit from declining price levels. By selling high now, the contract can be repurchased in the Futures at a lower price, thus generating a profit for the investor.

## Cost of Carry - Relation between spot and Futures

The relationship between the spot and Futures price of an asset reflects the net cost of holding (or carrying) that asset relative to holding the Futures. The term is derived from concept of Carrying Charges in commodities market (The cost of storing a physical commodity over a period of time; includes storage costs, insurance and interest lost on the invested funds as well as other incidentals). It is also known as Spot Futures Parity.

$$\text{Futures} = \text{Spot} + \text{Cost of Carry}$$

Price convergence can also be understood with respect to the cost of carry. There are various costs which are incurred in holding an underlying asset from the present date to a predetermined date like storage, insurance and interest costs used to finance the asset. All these costs together form the cost of carry. As per the conventional formula of calculating the futures price, the cost of carry is added to the Spot or cash price to get the Futures price.

Cost of carry can be negative or positive. If the cost of carry is substantially positive or negative, it offers arbitrage opportunities for traders. If the cost of carry is positive, traders can sell Futures and buy the underlying in the cash market to effect arbitrage. If the cost of carry is negative, traders can buy Futures and sell the underlying to make riskless profit. This concept is discussed later in detail and the purpose here is only to define the Cost of Carry.

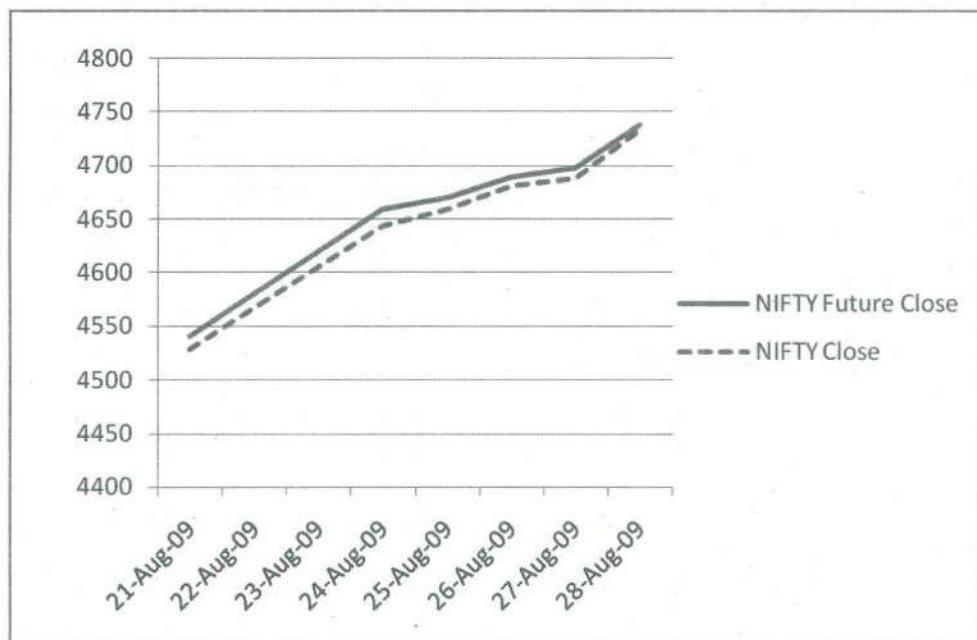


Figure 3.2: How Futures and Spot move in tandem

### Activity 1

What is relationship between spot price and future price?

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In the futures market, leverage refers to having control over large notional amounts of equity with comparatively small amounts of capital. In other words, with a relatively small amount of cash, you can enter into a futures contract that is worth much more than the notional values of your contracts. It is said that in the futures market, more than any other form of investment, price changes are highly leveraged, meaning a small change in a futures price can translate into a huge gain or loss. Thus, it is Double-Edged Sword.

### Lead and Lag – Futures Lead and Spot Lags

We normally see slight lead in derivative and lag in spot during the Bull market .This is because of bullishness in markets and thus increase in Open Interest.

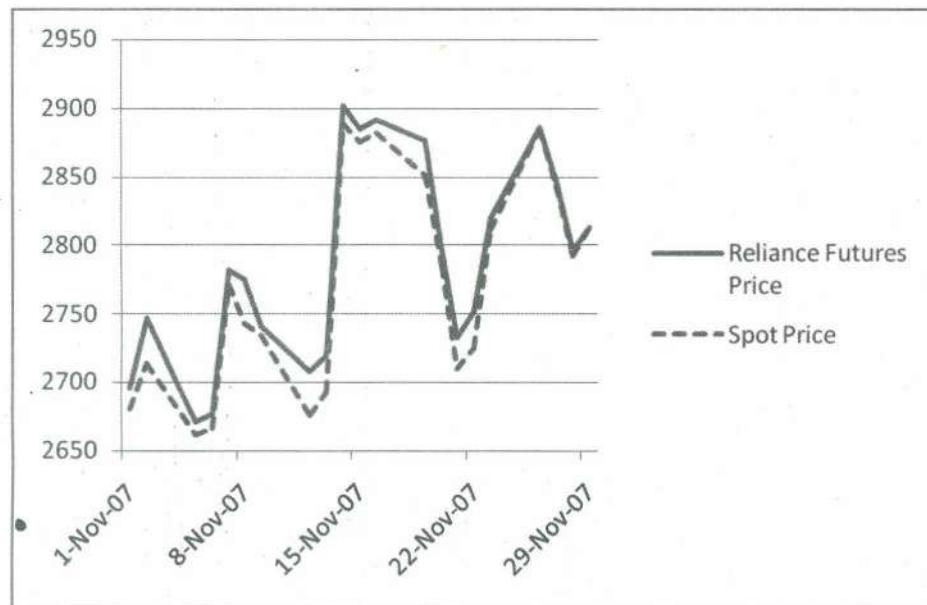


Figure 3.3: Lead in derivative and lag in spot (Reliance 29-Nov-07 Expiry)

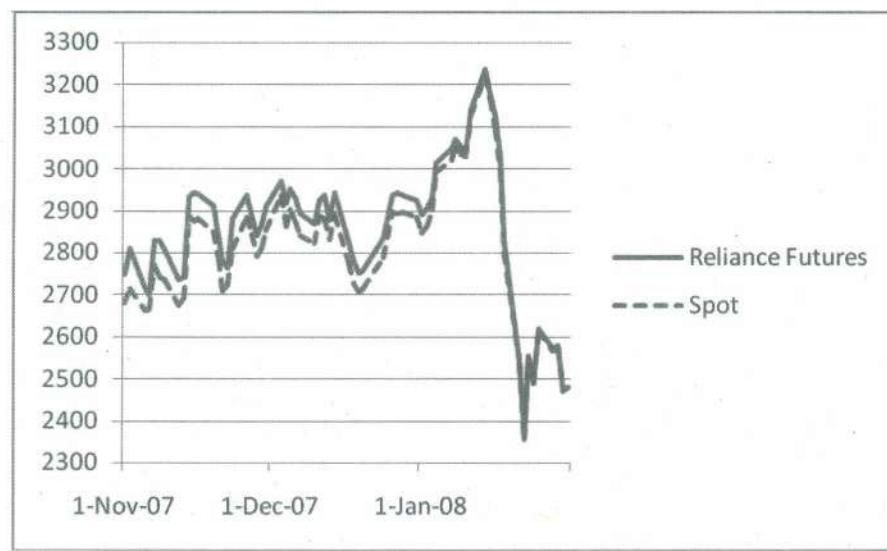


Figure 3.4: Lead in derivative and lag in spot (Reliance 31-Jan-08 Expiry)

**Open interest** is the measurement of those participants in the futures market with outstanding trades. Open interest is the net value of all open positions in one market or contract and portrays the depth of volume that is possible in that market. A market with a low number of contracts per day but also a large open interest tells the trader that there are many participants who will enter the market only when the price is right.

In India open interest is measured and reported either in terms of number of units or number of contracts or in Rs. cr. All these measures are equally compatible with the definition. For the purpose of understanding trends in open interest, you may use measure consistently. For market wide open interest, Rs crores is the best measure as adding up heterogeneous contracts of various underlying would be illogical.

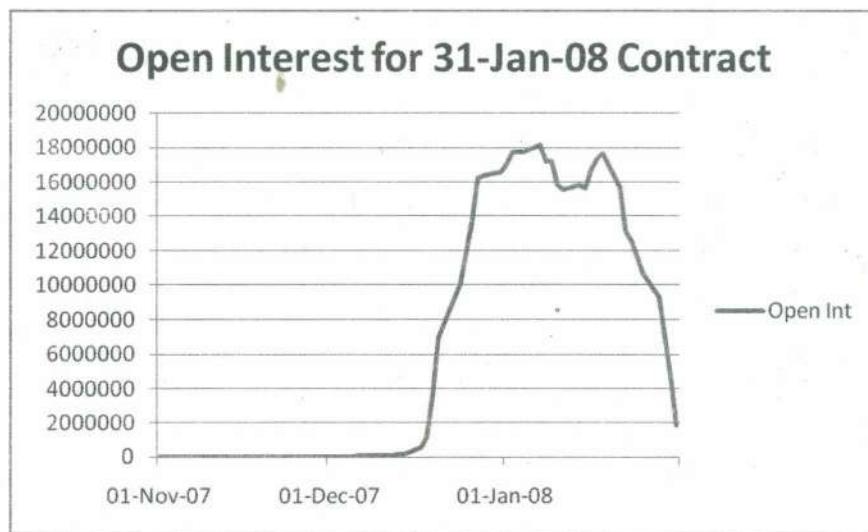


Figure 3.5 : How open interest behaved (Reliance 31-Jan-08 Expiry)

There might not be even a narrow spread between Futures and spot prices that is Futures and Cash prices can not deviate (Figure 3.6).

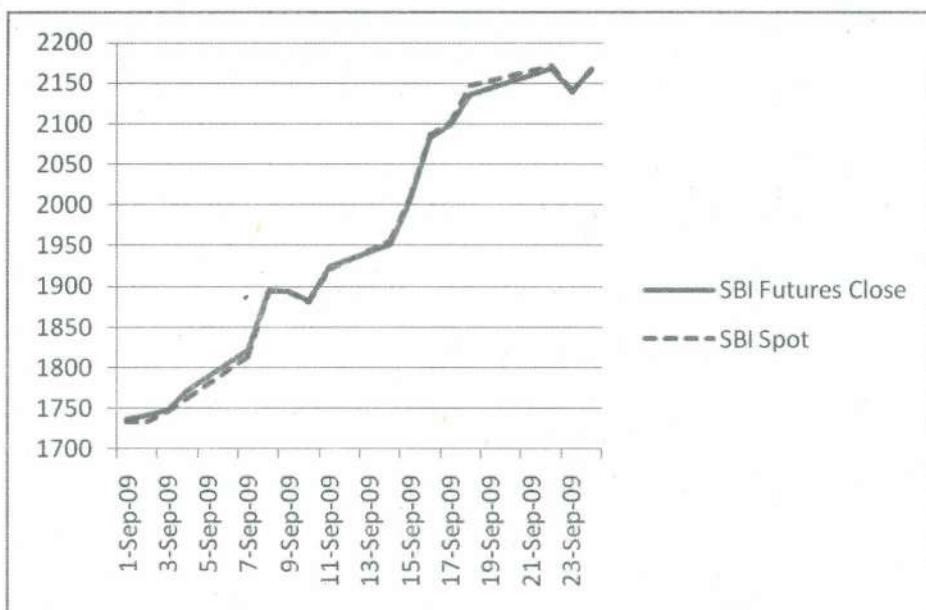


Figure 3.6 : SBI Futures and spot moving in almost perfect linear correlation

Sometimes this spread is large (Figure 3.7). This can give benefit of exploiting price discrepancies. The process is known as arbitrage. Arbitrage is explained latter in this chapter.

The settlement of all outstanding Futures contracts happens at the underlying spot price. So, though the closing prices (last 30 min Volume Weighted Average Price) may be different for the stocks and Futures, all futures are settled at the cash price. If the Futures prices are far from the cash price, arbitrage is possible. Futures prices start converging a few days before expiry. Actual convergence happens on expiry day. Arbitrage ensures this happens.

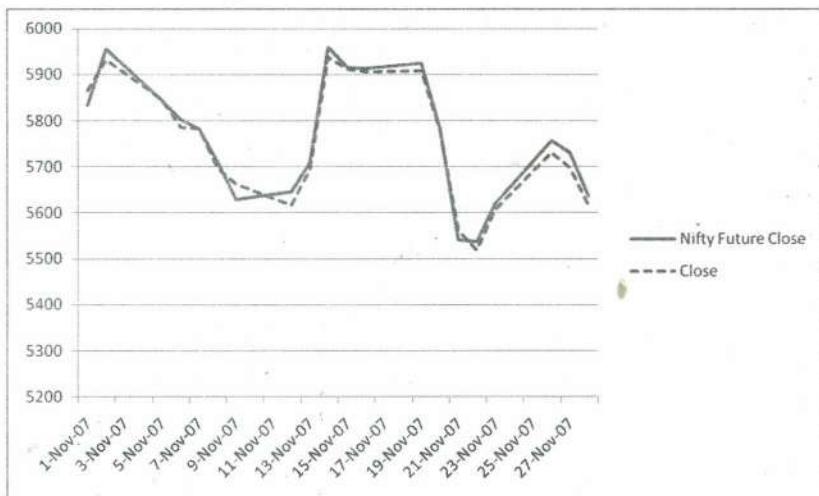


Figure 3.7 : How open interest behaved (Reliance 31-Jan-08 Expiry)

### Convergence

As a Futures contract nears expiration, the Futures price and the cash price converge to eventually become the same price. The relationship between the spot and Futures price of an asset reflects the net cost of holding (or carrying) that asset relative to holding the Futures. Cost Of Carry denotes the interest earned on the underlying assuming continuous compounding.

$$F = S * e^{(r*t)}$$

Where:

F= Futures Price

S = Spot price

e = 2.718 for continuous compounding

r = Cost of financing

t = Time till expiration (years)

On the day when the contact expires t will become 0

$$F = S * e^{(r*0)}$$

$$F = S * e^0$$

$$F = S \text{ (Since } e^0 = 1\text{)}$$

Convergence happens because of a phenomenon known as arbitrage (described in detail latter).

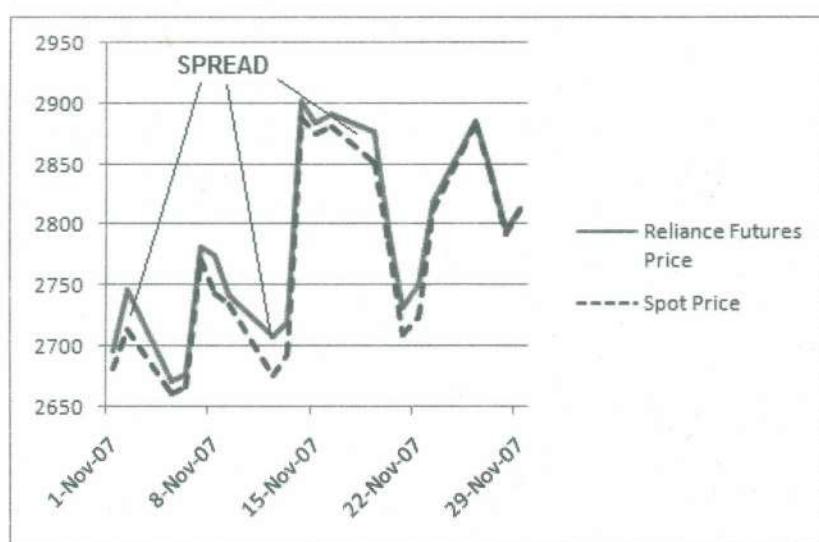


Figure 3.8 : Convergence Real Example (On expiry 29 Nov., Spot and Futures Converged)

**Table 3.2: Basis (Future – Spot) Calculation for Reliance Futures (29-Nov-07 expiry)**

<i>Date</i>	<i>Reliance Future Price</i>	<i>Spot Price</i>	<i>Basis</i>
01-Nov-07	2695.7	2680.6	15.1
02-Nov-07	2746.25	2713.3	32.95
05-Nov-07	2671.35	2661.15	10.2
06-Nov-07	2676.25	2666.2	10.05
07-Nov-07	2782.1	2770.9	11.2
08-Nov-07	2774.55	2742.85	31.7
09-Nov-07	2741.4	2734.4	7
12-Nov-07	2707.4	2675.6	31.8
13-Nov-07	2719.25	2693.1	26.15
14-Nov-07	2901.8	2888.45	13.35
15-Nov-07	2884.6	2875.1	9.5
16-Nov-07	2891.75	2881.65	10.1
19-Nov-07	2875.85	2850.9	24.95
20-Nov-07	2796.25	2784.85	11.4
21-Nov-07	2732.2	2709.5	22.7
22-Nov-07	2751.5	2724.75	26.75
23-Nov-07	2819.05	2811.2	7.85
26-Nov-07	2886	2884.55	1.45
27-Nov-07	2846.55	2843.3	3.25
28-Nov-07	2795.65	2792.3	3.35
29-Nov-07	2812.55	2812.55	0

As shown in Table 3.2 when the expiry date is approaching basis reduces and at the day of expiry basis is zero. Let us understand in terms of the commodity markets,

For example, if a physical commodity is way above the MCX Futures price in some, this will bring in arbitrators, speculators and hedgers who will buy the “cheap” MCX Futures contract, rather than the physical commodity; this will create demand for the Futures contract pushing the price up towards the physical. In addition the high price of the physical will be under pressure due to the fact that users can buy the “cheaper” Futures. Less demand for the physical means the price comes down again pushing the markets towards convergence or prior to expiry a form of “balance”.

In cash settled contracts such as the Equity Indices, the price convergence between the Index and the Futures is automatic as there is an exchange settlement procedure so everyone gets the same price at expiry. This further highlights the relationship, and ultimate correlation, between the spot market and the Futures market.

#### **International Case: When Convergence not happened**

In 2007 and 2008, investment funds have poured so much money into wheat Futures that the cash price has stopped converging with the Futures price at the end of each month. Traders boosted demand, increasing the gap between futures and cash prices and making it difficult for prices to converge when Futures contracts expired, thereby earning abnormal profits. The CME Group (Largest Futures exchange) implemented new contract specifications with new limit positions to improve conditions. There was a hot debate by U.S. commodity regulator Commodity Futures Trading Commission (CFTC).

#### **Basis and Market Situations**

As we approach contract maturity (we might be long or short the Futures contract, it doesn't matter), the Futures price must converge toward the spot price. The difference is called the basis.

Basis = Futures Price - Cash Price  
 (Some experts define Basis in a reverse manner as Cash Price – Futures Price. In this write up, we will use the first definition, viz. Basis is Futures Price – Cash Price).

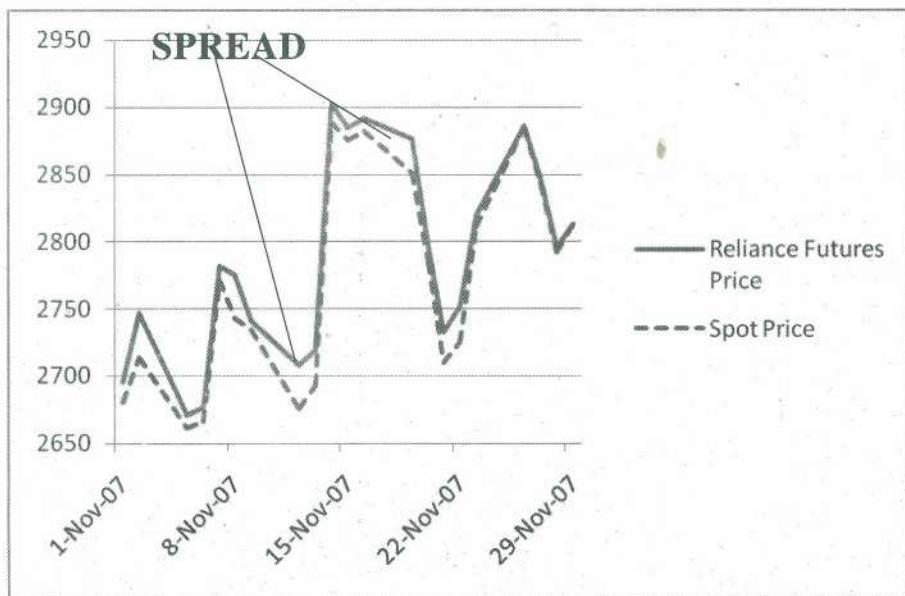


Figure 3.9: Basis for Reliance Futures (29-Nov-07 expiry)

More often than not, there is a positive basis in the Futures markets. The Futures price usually trades at a higher price than the cash price. As time passes and delivery approaches, the cost of carry nears zero. Thus, the Futures price converges to the spot price as delivery time approaches.

### Contango

When the Futures price is above the spot price (i.e., Basis is negative), the market is said to be in Contango. This could happen because of negative emotion. When traders are bearish on the stock, they would prefer to short Futures rather than sell Equity because shorting Futures is easier (no delivery required) and cheaper (the investment is the margin alone). In such situations, Futures prices fall below Equity prices and over time, they climb back towards Equity prices due to convergence at expiry.

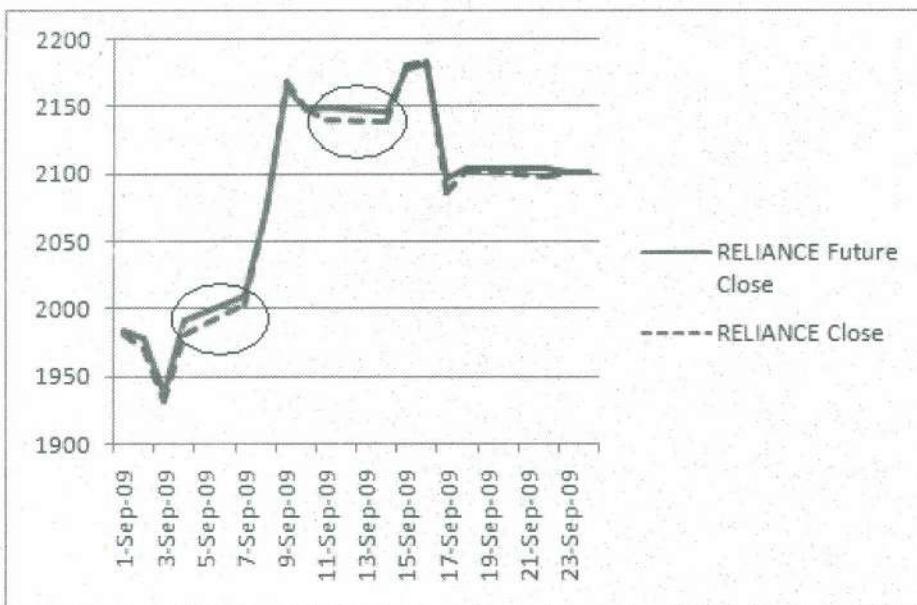


Figure 3.10: Contango during periods (05-07 Sep) and (10-14 Sep)

### Backwardation (Inverted Market)

When the price of the Futures contract is trading at a lower price than the underlying spot (Basis is negative), the market is said to be in backwardation. This term is the opposite of contango.

Backwardation happens due to various reasons. Sometimes indices and scrip are in backwardation when bearish market is expected.

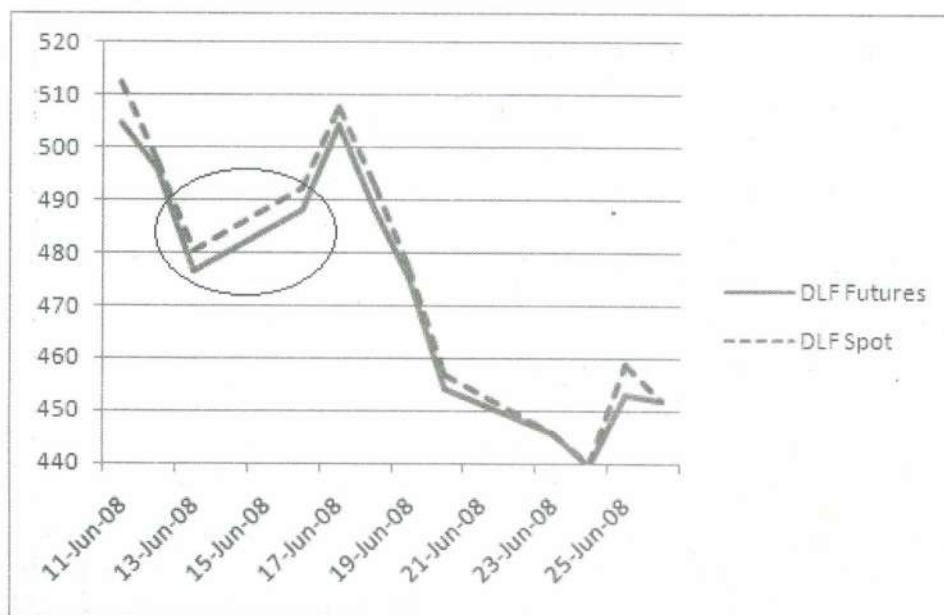


Figure 3.11: Backwardation for DLF (Jun expiry)

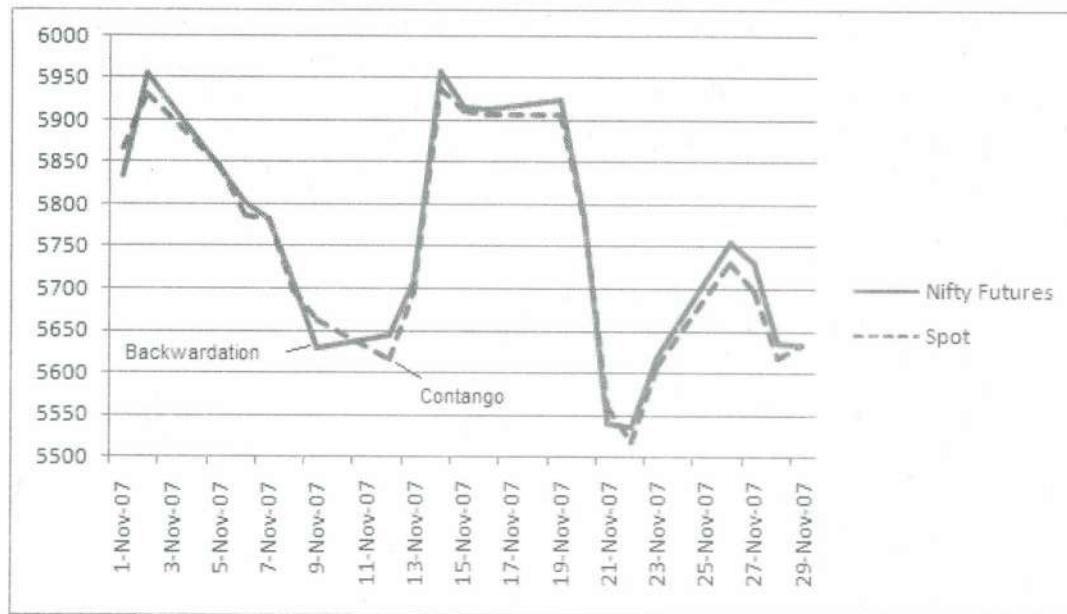


Figure 3.12: How basis can turn positive and negative (Creating Contango and backwardation)

## Live Market Screenshots

Spot and  
Derivative Markets



The screenshot is taken from the live equity market segment (From NSE). This shows the S&P CNX Nifty and its future (expiry December 31<sup>st</sup> 2009) is in Backwardation. i.e., the Cash segment is higher than the futures segment.

## Activity 2

What is the difference between Contango and Backwardation?

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## 3.4 COST OF CARRY

### Cost of Carry Computation

$$F = S * e^{(r*t)}$$

$$r = \log(F/S) / (t)$$

F= Futures Price

S = Spot price

e = 2.718 for continuous compounding

t = Time till expiration (years)

### Cost of Carry in Bullish & Bearish Markets

Generally, negative cost of carry indicates bearish sentiments, while positive cost of carry points to a bullish market undertone. At the same time, a very high negative cost of carry signifies building up of huge short positions on the counter. Here is a real world example when Nifty made new high and then slipped in Jan 2008.

In Jan, Nifty was at peak and then market turned ominously giving us ample opportunity to study changes in various factors. Figure 3.13 to Figure 3.16 indicate how various factors behaved in bull and bear phase on Nifty.

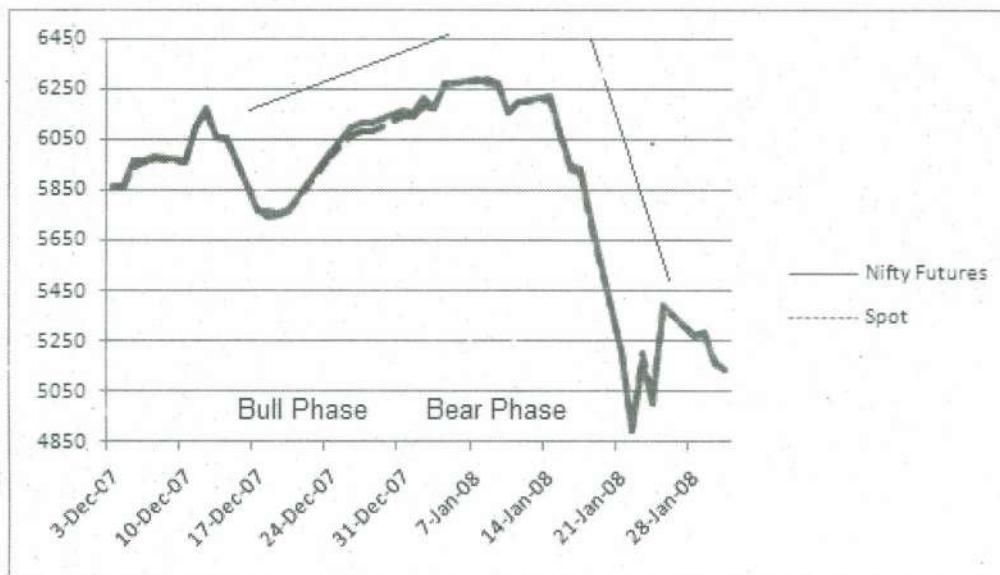


Figure 3.13: Real example of Bull and Bear phases on Nifty

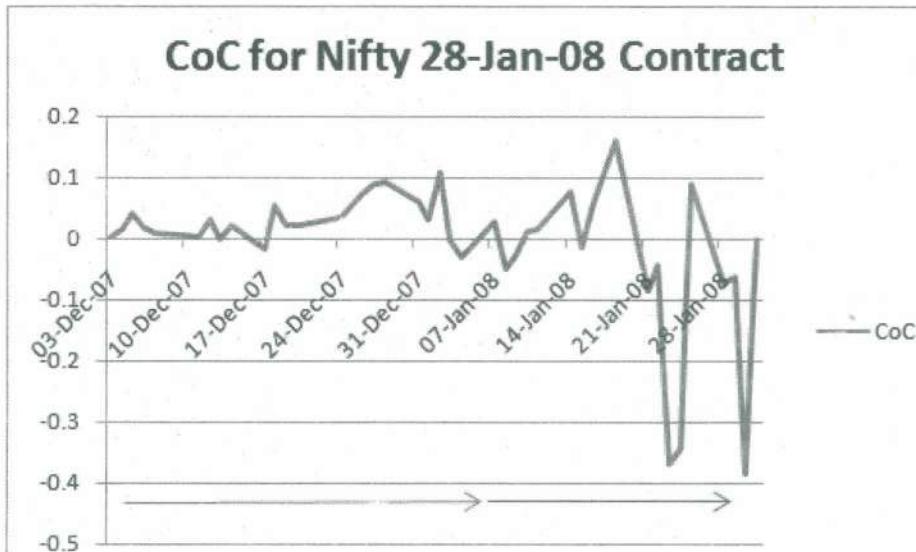


Figure 3.14: How CoC behaved during Bull and Bear Phases

In India open interest is measured and reported either in terms of number of units or number of contracts or in Rs. cr. All these measures are equally compatible with the definition. For the purpose of understanding trends in open interest, you may use any measure consistently. For market wide open interest, Rs crores is the best measure as adding up heterogeneous contracts of various underlying would be illogical.

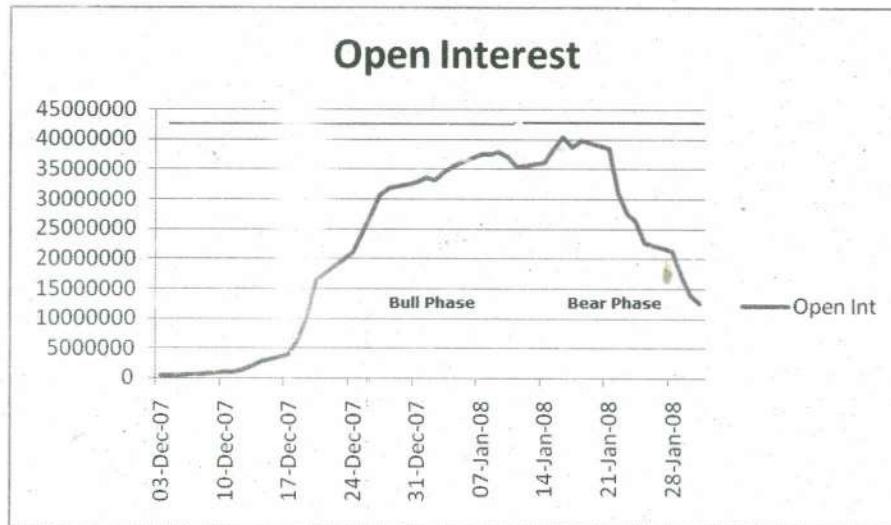


Figure 3.15: How Open Interest behaved during Bull and Bear Phase

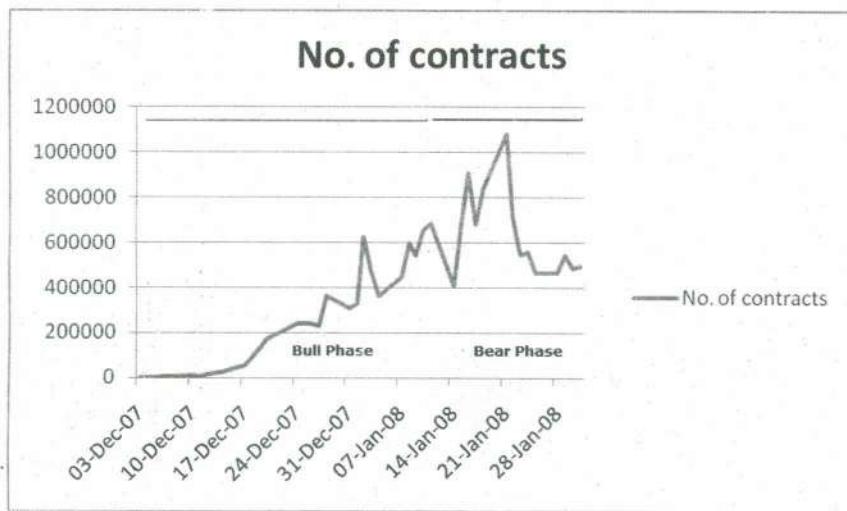


Figure 3.16: How No. of Contracts behaved during Bull and Bear Phase

Main reason of ferment movement on the Nifty during Jan-08 were:

- Commencement of still ongoing subprime mortgage crisis on global economy.
- Soaring Commodity Prices.

#### Examples of Cost of Carry

Table 3.3: Cost of Carry calculation for ACC Futures (24 Sep 09 expiry)

Date	ACC Futures	ACC Spot	Days Outstanding	COC (%)
03-Aug-09	897.9	892	38	0.063
04-Aug-09	888	899.95	37	-0.132
05-Aug-09	930	924.95	36	0.055
06-Aug-09	891	883.9	35	0.083
07-Aug-09	868.45	869.55	34	-0.014
10-Aug-09	814.4	809.9	33	0.061
11-Aug-09	818.4	819.35	32	-0.013
12-Aug-09	829	828.5	31	0.007
13-Aug-09	853.2	848.7	30	0.064

Introduction to Derivatives	14-Aug-09	829.3	830.5	29	-0.018
	17-Aug-09	786.1	792.7	28	-0.109
	18-Aug-09	795.55	797.8	27	-0.038
	19-Aug-09	750.8	756.3	26	-0.102
	20-Aug-09	759.15	758.7	25	0.009
	21-Aug-09	776.2	776.7	24	-0.010
	24-Aug-09	794.6	793.85	23	0.015
	25-Aug-09	786.3	789.05	22	-0.058
	26-Aug-09	797	799.85	21	-0.062
	27-Aug-09	794.5	797.1	20	-0.060
	28-Aug-09	806.35	809.3	19	-0.070
	31-Aug-09	801.85	807	18	-0.130
	01-Sep-09	775.45	780.25	17	-0.132
	02-Sep-09	770.45	778.35	16	-0.233
	03-Sep-09	765.45	769	15	-0.113
	04-Sep-09	785.55	792.75	14	-0.238
	07-Sep-09	799.55	800	13	-0.016
	08-Sep-09	793	796.1	12	-0.119
	09-Sep-09	793.1	796.55	11	-0.144
	10-Sep-09	782.9	789.75	10	-0.318
	11-Sep-09	773.1	773.6	9	-0.026
	14-Sep-09	763.65	763.9	8	-0.015
	15-Sep-09	770.7	774.25	7	-0.240
	16-Sep-09	798.8	801.15	6	-0.179
	17-Sep-09	830.65	828.8	5	0.163
	18-Sep-09	842.4	845.35	4	-0.319
	22-Sep-09	845.45	847.05	3	-0.230
	23-Sep-09	833.45	833.55	2	-0.022
	24-Sep-09	823.15	823.15	1	0.000

Cost Of Carry =  $r = \ln(F/S) / (t/365)$

F= Futures Price

S = Spot price

e = 2.718 for continuous compounding

t= Time till expiration (years)

On 23-Sep-09,

$r = \ln(833.45/833.55) / (2/365) = -0.022$

On 24-Sep-09,

$r = \ln(823.15/823.15) / (1/365) = 0 [\ln(1) = 0]$

Table 3.4: News during Aug-Sep 2009 (Overall sentiments are Bearish)

Aug 04, 2009	ACC July cement sales at 1.78 million tones (MT) versus 1.71 MT (YoY).
Sep 01, 2009	ACC among major losers in Sensex (It touched an intraday low of Rs. 775.10).
Sep 17, 2009	ACC among top gainers in Sensex (It touched an intraday high of Rs. 836).

### 3.5 ARBITRAGE

Arbitrage is the practice of taking advantage of a state of imbalance between two or more markets (Spot and Futures). Mismatch can be exploited because of price difference between the market prices.

#### Cash and Carry Arbitrage (Overpriced Futures)

If the Futures price is overvalued than spot price:

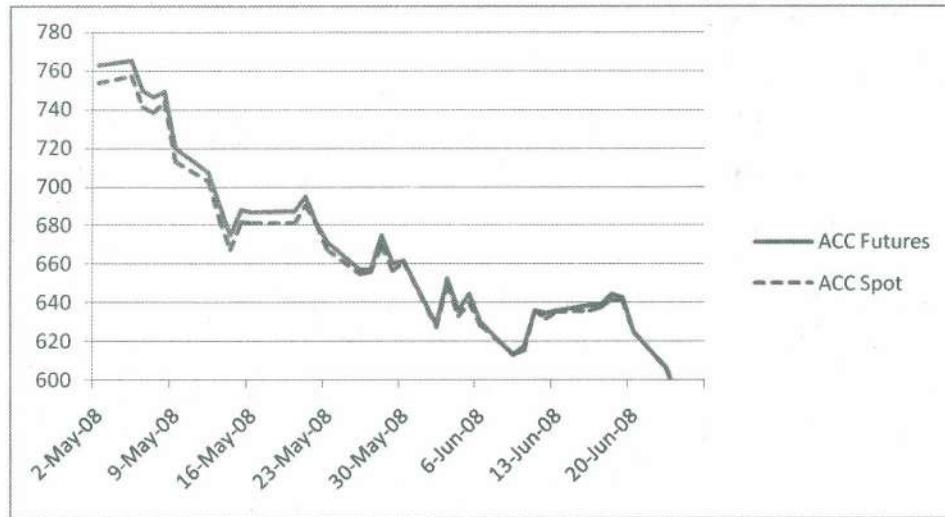
- 1) The arbitrageur shorts overvalued Futures; simultaneously he is long in spot.
- 2) On or before expiry date, the arbitrageur square off his Futures and settle spot position.
- 3) The difference between Futures prices and Spot prices on the purchase and settlement date is his gain.

Example:

- 1) The arbitrageur shorted 1 lots (100 underlying shares in 1 lot) of ACC on 02 May 2007 (See figure). Purchased 100 ACC shares. For simplification we assumed no margins or transaction taxes.
- 2) On 26 Jun 2007 he settled by offsetting the Futures position and selling the spot
- 3) The profit is calculated in Table 3.5.

**Table 3.5: Net Profit calculation on ACC**

Futures Profit	$(763.05 - 599.1) * 100$	16395
Cash Loss	$(599.1 - 753.7) * 100$	-15460
Net Profit		935



**Figure 3.17: Cash and Carry arbitrage on ACC**

Table 3.6: Basis and Cost of Carry calculations for ACC (Expiry 26-Jun-08)

Date	Open Interest	ACC Futures	ACC Spot	Basis	Cost Of Carry
02-May-08	14100	763.05	753.7	9.35	0.1154
05-May-08	15040	765.45	757	8.45	0.1066
06-May-08	18612	749.95	741.4	8.55	0.1131
07-May-08	18988	746.5	738.15	8.35	0.1140
08-May-08	18988	749.1	744.3	4.8	0.0670
09-May-08	42488	719.8	712.9	6.9	0.1034
12-May-08	52452	707.3	702.6	4.7	0.0737
13-May-08	63168	690.95	683.65	7.3	0.1212
14-May-08	86292	674.7	667.45	7.25	0.1272
15-May-08	95692	688	681.65	6.35	0.1128
16-May-08	106408	686.95	681.3	5.65	0.1039
20-May-08	154348	687.25	680.8	6.45	0.1229
21-May-08	172396	694.95	690.35	4.6	0.0898
22-May-08	371864	680.9	680.35	0.55	0.0113
23-May-08	517000	671.5	667.25	4.25	0.0927
26-May-08	756888	657.05	654.9	2.15	0.0498
27-May-08	1069344	657.1	655.85	1.25	0.0302
28-May-08	1420528	674.6	669.5	5.1	0.1259
29-May-08	1963096	660.5	656.2	4.3	0.1135
30-May-08	1958960	661.7	661.3	0.4	0.0110
02-Jun-08	2011976	628.3	627.2	1.1	0.0337
03-Jun-08	2192456	652.3	649.7	2.6	0.0810
04-Jun-08	2186440	635.8	633.25	2.55	0.0863
05-Jun-08	2110864	644.2	639.75	4.45	0.1581
06-Jun-08	2142448	630.3	628.45	1.85	0.0715
09-Jun-08	2008780	612.95	613.7	-0.75	-0.0319
10-Jun-08	1987536	617.8	615.15	2.65	0.1207
11-Jun-08	1974188	635.7	636.15	-0.45	-0.0215
12-Jun-08	2017992	634.65	631.85	2.8	0.1467
13-Jun-08	1962532	636.1	635.5	0.6	0.0344
16-Jun-08	1936964	638.85	635.85	3	0.1909
17-Jun-08	1942980	638.7	637.85	0.85	0.0608
18-Jun-08	1975316	644.65	641.8	2.85	0.2310
19-Jun-08	1908012	642.6	641.2	1.4	0.1327
20-Jun-08	1773404	625	625.25	-0.25	-0.0292
23-Jun-08	1626200	606.25	606	0.25	0.0376
24-Jun-08	1234220	590.95	591.9	-0.95	-0.1954
25-Jun-08	889804	594.8	594	0.8	0.2456
26-Jun-08	213004	599.1	599.1	0	0.0000

### Reverse Cash and Carry Arbitrage (Underpriced Futures)

The Futures price is undervalued than spot price:

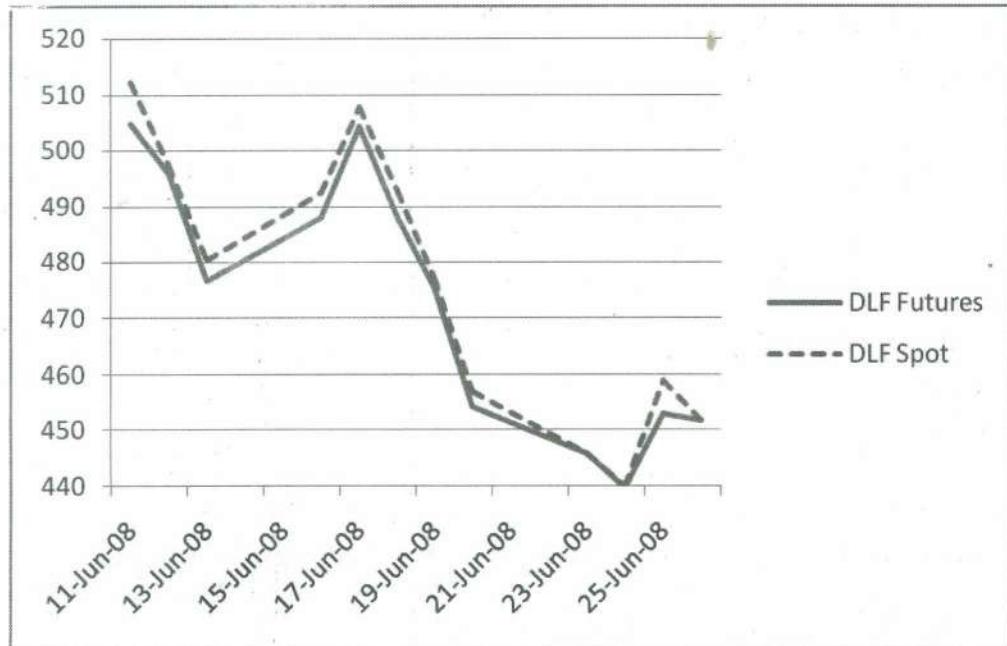
- 1) The arbitrageur shorts overvalued spot; simultaneously he is long in Futures.
- 2) On or before expiry date, the arbitrageur square off his Futures and settle spot position.
- 3) The difference between Futures prices and Spot prices on the purchase and settlement date is his gain.

Example:

- 1) The arbitrageur was long near month DLF Futures on 11-Jun-08(See figure).Shorted 100 DLF stocks. For simplification we assumed no margins or transaction taxes.
- 2) On 26-Jun-08 he settled by offsetting the Futures and the spot.
- 3) The profit calculation is given below.

**Table 3.7: Net Profit calculation on DLF**

Futures Loss	$(451.8 - 504.75) * 100$	-5295
Cash Profit	$(512.15 - 451.8) * 100$	6035
Net Gain		740



**Figure 18: Reverse cash and carry arbitrage on DLF**

**Table 3.8: Basis and Cost of Carry calculations for DLF (Expiry 26-Jun-08)**

Date	Open Interest	DLF Futures	DLF Spot	Basis	Cost of Carry
11-Jun-08	11727200	504.75	512.15	-7.4	-0.4427
12-Jun-08	12184400	495.95	497.45	-1.5	-0.1002
13-Jun-08	12560400	476.65	480.25	-3.6	-0.2746
16-Jun-08	11967200	487.9	492.3	-4.4	-0.3641
17-Jun-08	11541600	504.2	507.65	-3.45	-0.3111
18-Jun-08	11381200	488	492.6	-4.6	-0.4892
19-Jun-08	10376400	475.3	477.2	-1.9	-0.2427
20-Jun-08	9937600	454.25	456.8	-2.55	-0.4087
23-Jun-08	7981600	445.85	445.8	0.05	0.0102
24-Jun-08	6456400	439.6	439.95	-0.35	-0.0968
25-Jun-08	4285200	452.9	458.85	-5.95	-2.3820
26-Jun-08	3113200	451.8	451.8	0	0.0000

### Futures Price for an Investment Asset

If Futures Rate > Spot + Cost of Carry,

Arbitragers can buy the asset and short Futures contracts on the asset.

If Futures Rate < Spot + Cost of Carry,

Arbitragers can short the asset and buy Futures contracts on the asset.

## Examples of Arbitrage Mutual Fund Schemes in India

### UTI Spread Fund (Objective given in Fund Information Document)

'The investment objective of this scheme is to provide capital appreciation and dividend distribution through arbitrage opportunities arising out of price differences between the cash and derivative market by investing predominantly in equity & equity related securities, derivatives and the balance portion in debt securities'.

### Religare Arbitrage Fund (Objective given in Fund Information Document)

'Religare Arbitrage Fund is predominantly a "Long Cash – Short Futures" fund, which is a relatively risk-free strategy. A normal arbitrage opportunity is described as one where the price of a particular stock in the spot market is lower than the price for the same stock in the Futures market. Under these circumstances, Religare Arbitrage Fund would seek to lock in this differential by buying the stock in the spot market and simultaneously selling its Futures. While this would effectively negate any equity risk immediately, the difference in the two prices, termed as "carry" would be earned by the Fund. This ensures that investors are not exposed to equity market risk, as each position in equity stock is hedged by an equal and opposite position in the relevant derivative instrument.'

### Cash Settlement

For every Futures contract there can be two ways of settlement.

**Physical settlement** – the amount specified of the underlying asset of the contract is delivered by the seller of the contract to the exchange, and by the exchange to the buyers of the contract. Physical delivery is common with commodities and bonds.

**Cash settlement** – a cash payment is made based on the underlying reference rate, **Cash settled** Futures are those that, as a practical matter, could not be settled by delivery of the referenced item like how one deliver an index. Even delivering the indices' constituents is very tough job, because one has to track / monitor the different underlying stocks.

### International Case: CME Group

CME Group Inc. is the world's largest Futures exchange.

Apart from equity it is popular for stock Futures indices like DJIA (Dow Jones Industrial Average) and S&P 500 (*Standard & Poor's 500 Index*). All open positions at close of last day of trading are settled in cash.

Cash payment is made based on the closing value of a stock or stock market index. The parties settle by paying/receiving the loss/gain related to the contract in cash when the contract expires on the exchange like NSE. Cash settled Futures are those that, as a practical matter, could not be settled by delivery of the referenced item. Other way could be physical settlement of the underlying. In India stock or stock market indices are cash settled as of date.

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## 3.6 SUMMARY

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In the chapter we learned about stock related Derivative Markets in India.

We understood relationship between Spot Price and Futures Price.

We understood concepts of Contango and Backwardation using Basis.

We learned why Return on Investment in a Futures market can be more than spot.

We explored type of Derivative Markets and type of instruments in Derivative Markets.

We explored Price Discovery mechanism in Futures market.

We explored Leverage and margin in Futures market.

As a Futures contract nears expiration, the Futures price and the cash price converge to eventually become the same price.

We understood the concept of various types of Arbitrage.

### 3.7 SELF ASSESSMENT QUESTIONS

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- 1) What is spot price and Futures price?
  - 2) What do price converge?
  - 3) What is Contango and backwardation?
  - 4) How can an investor make profits from arbitrage activity?
  - 5) Why Return on Investment in a Futures market can be more than spot.
  - 6) What are of Derivative Markets and type of instruments in Derivative Markets.
  - 7) What is Price Discovery mechanism in Futures market?
  - 8) Why margin in Futures market is Double-Edged Sword?
  - 9) The Futures price and the cash price converge to eventually become the same price. Why?
  - 10) What is Cash and Carry Arbitrage?
  - 11) What is Reverse Cash and Carry Arbitrage?
  - 12) Calculate Return on Investment for Nifty in Cash Market and Futures Market if:  
(Lot size = 50, Nifty Spot = 4700, Nifty Futures = 5000, Initial Margin = 10%).
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### 3.8 FURTHER READINGS

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- John C Hull, Sankarshan Basu, 2009, *Options, Futures, and Other Derivatives*, 7/E, Pearson Education, India.
- Parasuraman, 2008, *Fundamentals of Financial Derivatives*, Wiley, India.
- Francesca Taylor, 2008, *Mastering Derivatives Markets: A Step-By-Step Guide to the Products, Applications and Risks*, 3/E, Pearson Education, India.
- Elton & Grubber, 2008, *Modern Portfolio Theory and Investment Analysis*, 7/E, Wiley, India.
- Aswath Damodaran, 2007, *Corporate Finance Theory and Practice*, 2/E, Wiley, India.
- SEBI, 2008, Handbook of Statistics On The India Securities Market.

## **UNIT 4 POLICY AND REGULATION**

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### **Objectives**

After studying this unit, you should be able to:

- understand the basic policy framework around Equity Derivatives;
- discuss how stocks are selected in the derivatives segment;
- explain what kind of limits are imposed on positions at the all India level; and
- appreciate position limit implications for individual clients, brokers, institutional investors and mutual funds.

### **Structure**

- 4.1 Introduction
- 4.2 Scrip Selection for Derivatives Segment
- 4.3 Selection of Indices to the Derivatives Segment
- 4.4 Computation of Quarter Sigma
- 4.5 Permitted Lot Sizes
- 4.6 Trading Cycle
- 4.7 Position Limits
- 4.8 Summary
- 4.9 Self Assessment Questions
- 4.10 Further Readings

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### **4.1 INTRODUCTION**

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This Unit outlines policy and regulations as formulated by SEBI and implemented by the NSE and the BSE in the equity derivatives market in India. Similar regulations would be formulated by other regulators in various countries of the world. For example, the SEC would provide regulatory guidance to exchanges in the US.

This Unit covers regulations relating to selection of stocks for the derivatives segment and position limits at country level as well as player level for each underlying in the derivative segment. Regulations have been sourced from the NSE India website for the purpose of this Unit though formulated by SEBI and partly by exchanges.

The introduction of derivatives in June, 2000 was preceded by the Dr. L.C. Gupta Committee Report on Derivatives in 1998. This Committee examined questions like whether India should build new exchanges to trade in derivatives or allow existing exchanges to start new derivative segments. It also considered whether the new derivative segments (if existing exchanges are to be allowed) should operate independent of existing equity segments or should the two segments be integrated.

The Dr. L.C. Gupta Committee recommended that existing exchanges should be permitted to launch new derivative segments but the new segment should operate independent of existing equity segments. The clearing, settlement, trading and surveillance mechanisms should be independent and a Chinese wall should be built between the two segments. Brokers were required to apply for new memberships for derivative segment and automatic membership to equity members was denied. Two exchanges, BSE and NSE, were permitted to open derivative segments in June, 2000.

Similarly, Futures trading in commodities was reintroduced in India in the year end 2003 with starting up of three Nationalized Stock exchanges (MCX, NCDEX & NMCE) along with 20 regional exchanges. At present, only futures contracts are traded on commodity exchanges. All nationalized commodity exchanges are regulated by Forward Market Commission (FMC) in India.

Recently in year 2008 August, government of India permitted foreign exchange trading using futures contracts on recognized currency exchanges. Presently we have three currency futures exchanges namely; MCX Stock Exchange (MCX-SX), National Stock Exchange (NSE) and Bombay Stock Exchange (BSE). USD/INR is the only currency pair as of now in which currency trading is allowed using currency futures on exchange platform.

## **4.2 SCRIP SELECTION FOR DERIVATIVES SEGMENT**

All scrips listed in the equity segment were not made automatically eligible for derivative trading. SEBI defined strict mathematical norms which the scrips would have to satisfy before gaining admission into the derivative club. You will therefore observe that while the BSE lists more than 5,000 scrips in its equity segment and the NSE lists more than 900, there are hardly 233 scrips in the derivative segment.

### **Criteria for scrip selection**

- 1) The scrip should form part of the top 500 stocks in terms of average daily market capitalization and average daily traded value in the previous six months on a rolling basis.
- 2) The volatility of each scrip is computed in terms of standard deviation of its daily returns (the technical details for computing volatility are discussed in a subsequent Unit on Option Pricing). Thereafter, 1/4<sup>th</sup> of the standard deviation is determined and designated as its quarter-sigma. It is common to use the term ‘sigma’ for standard deviation. The exchanges then determine the order value that is required to effect a change in the price of a stock equal to its quarter-sigma. For example, if you place an order of say Rs 10 lakhs, by how much will the price of the stock change? The price will change based on the various bids and asks at any moment in time. If the bids and asks are far apart, that would indicate that the scrip is not very liquid and hence the price will change substantially. This change is also called as ‘impact cost’. The scrips that qualify for the derivative segment are expected to be highly liquid. Hence, the order size that would impact the stock price by more than quarter sigma shall be at least Rs. 5 lakhs. In other words, if a small order (of less than Rs. 5 lakhs) can cause a quarter-sigma change in the price of the scrip, such a scrip is not liquid enough to qualify for selection into the derivative segment (A more detailed discussion on quarter-sigma is provided later in this Unit).
- 3) The free float holding of the scrip should be valued at least at Rs. 500 crores. Formal regulations state that the market wide position limit of the scrip should be at least Rs. 100 crores. This market wide position limit itself is defined as 20% of the free float in each scrip. Thus, the implication is that the free float holding should be at least 5 times the market wide position limit, which would work out to Rs. 500 crores. Thus, small scrips are denied entry into the derivative segment.
- 4) Stocks which have already been admitted into the derivative segment have to continue to fulfil some criteria. The free float market capitalization should continue to be at least Rs. 300 crores post admission. Further, the order size required to move the price of the scrip by quarter sigma should be at least Rs. 2 lakhs.

If a scrip fails to fulfill continuing criteria of Rs 300 crores/Rs. 2 lakhs as above for three months on a consecutive basis, the scrip shall be phased out from the derivatives segment.

Fresh series will not be opened in such scrips. Once the scrip is phased out of the derivatives segment, it cannot be admitted again at least for one year. If the scrip fulfills the admission criteria in the future, such criteria will need to be fulfilled for three consecutive months.

### 4.3 SELECTION OF INDICES TO THE DERIVATIVES SEGMENT

Indices which are traded on the Derivatives Segment should be such that stocks contributing to at least 80% of the weightage of the index should be individually eligible for admission into the derivatives club. Further, no single stock that is not eligible can have a weightage of more than 5% in the index. These criteria will be continuously evaluated every month and if the index does not meet these criteria for three consecutive months, the index shall be phased out of the derivatives segment. Unexpired contracts will however continue to run till the date of expiry.

### 4.4 COMPUTATION OF QUARTER SIGMA

The National Stock Exchange adopts the following procedure is adopted for calculating the Quarter Sigma Order Size:

- 1) The applicable VAR (Value at Risk) is calculated for each security based on the J.R. Varma Committee guidelines. This Committee was appointed in 1998 by SEBI to provide risk containment measures for the derivatives market. The formula suggested by J.R. Varma for computation of VAR for margin calculation is statistically known as 'Exponentially weighted moving average (EWMA)' method. In comparison to the traditional method, EWMA has the advantage of giving more weight to the recent price movements and less weight to the historical price movements.
- 2) In the computation of Value at Risk, the first step is to compute volatility of the scrip. This volatility is also called standard deviation or sigma and is generally expressed as a percentage say 5%. The implication of this number 5% is that the closing price of the scrip on the next trading day is likely to be within the range of 5% plus or 5% minus from today's closing price. In other words, the probability of a higher than 5% move from today's closing prices within a one day horizon is low (generally 1% probability).
- 3) From this one sigma figure (of say 5%), a quarter sigma number is derived - which would be 1.25% in our example.
- 4) From the order snapshots (taken four times a day from the exchange's order book) the average of best buy price and best sell price is computed.
- 5) The quarter sigma is then multiplied with the average price to arrive at quarter sigma price. The following example explains the same :

Security	Reliance
Best Buy (in Rs.)	2,271.00
Best Sell (in Rs.)	2,272.00
Average Price	2,271.50
One Sigma	5%
Quarter sigma	1.25%
Quarter sigma price (Rs.) (Average Price *Quarter sigma)	28.39

- 6) Now the challenge is to review the order book (and the various bid and ask prices which are contained therein) to identify the value of the order which would move the price upward from Rs. 2,271.50 to Rs. 2,299.89 (i.e., Rs. 2,271.50 plus Rs. 28.39) and downward from Rs. 2,271.50 to Rs. 2,243.11 (that is Rs. 2,271.50 minus Rs. 28.39). This exercise is carried out for all stocks at the rate of four snapshots every day for a six month period.
- 7) The median order size is then worked out based on all the snapshots considered together for the six month period.
- 8) Finally, the average of the median order sizes for the buy and sell side is computed and this average is designated as the quarter sigma order size for that scrip. As explained in the earlier paragraphs, this figure should be more than Rs. 5 lakhs for the scrip to be considered liquid enough to qualify for inclusion in the derivative segment.

## 4.5 PERMITTED LOT SIZES

The value of the futures contracts on individual securities may not be less than Rs. 2 lakhs at the time of introduction for the first time at any exchange as per SEBI guidelines. The permitted lot size for futures contracts and options contracts are the same for a given underlying scrip. Thus, the permitted lot size is determined by the exchange by back calculation. For example, if the price of the scrip is Rs. 500, then the number of units that can fit into the lot size requirement of Rs. 2 lakhs works out to 400 units. The exchange may in its wisdom specify a lot size of say 450 or 500 units. It will however, not specify a lot size of less than 400 units as that will not fulfil the Rs. 2 lakhs criteria. Please note that in special cases, SEBI may allow exchanges to launch mini-contracts which may not fulfill the Rs. 2 lakhs criteria.

### Scrips currently traded in the derivatives segment

A table of scrips trading on the National Stock Exchange as at May 30, 2009 is provided in Appendix 1 to this Unit. The list will change with time as new scrips are added based on their qualification criteria while existing scrips which fail to qualify are removed.

## 4.6 TRADING CYCLE

Futures and options contracts have a maximum of 3-month trading cycle - the near month (one), the next month (two) and the far month (three). New contracts are introduced on the trading day following the expiry of the near month contracts. The new contracts are introduced for a three month duration. This way, at any point in time, there will be 3 contracts available for trading in the market (for each security) i.e., one near month, one mid month and one far month duration respectively. For example, during the month of May, three series will be available, viz., May, June and July. The May contracts expired on the last Thursday of May, 2009, i.e., May 28, 2009. On Friday, May 29, 2009 exchanges will introduce August series so that from this Friday onwards; three series of June, July and August will be available to traders.

### Expiry day

Futures and options contracts expire on the last Thursday of the expiry month. If the last Thursday is a trading holiday, the contracts expire on the previous trading day.

### Price steps

The price step in respect of futures and options contracts is Re. 0.05 i.e., 5 paise. Thus, if the price currently is Rs. 2,271.05, the next quote cannot be Rs. 2,271.08 paise as a 3 paise interval is not permitted. The next quote can be either Rs. 2,271.10 or Rs. 2,271.00.

### Base Prices

Base price of futures contracts on the first day of trading (i.e., on introduction) would be the theoretical futures price. The concept of theoretical price is discussed in a subsequent Unit on Futures. The base price of the contracts on subsequent trading days would be the daily settlement price of the futures contracts.

### Price bands

There are no day minimum/maximum price ranges applicable for futures contracts. However, in order to prevent erroneous order entry by trading members, operating ranges are kept at +/- 20 %. In respect of orders which have come under price freeze, members would be required to confirm to the exchange that there is no inadvertent error in the order entry and that the order is genuine. On such confirmation the exchange may approve such order.

### Quantity freeze

Orders which may come to the exchange as a quantity freeze shall be based on a notional value of the contract of around Rs.5 crores. Quantity freeze is calculated for each underlying on the last trading day of each calendar month and is applicable through the next calendar month.

In respect of orders which have come under quantity freeze, broker members are required to confirm to the exchanges that there is no inadvertent error in the order entry and that the order is genuine. On such confirmation, the exchanges may approve such order. However, in exceptional cases, the exchanges may not allow the orders that have come under quantity freeze for execution for any reason whatsoever including non-availability of turnover/exposure limits.

**Order type/Order book/Order attribute** Exchanges allow the following order types in their trading systems for the derivative segment.

- Regular lot order
- Stop loss order
- Immediate or cancel
- Spread order

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## 4.7 POSITION LIMITS

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As a part of risk management controls, limits are prescribed at various levels to ensure that trading and exposures are within control. At the market level, a market wide position limit is first laid down. Under this overall limit, further specific limits are prescribed for Trading Members, Mutual Funds and Foreign Institutional Investors. At the bottom of the position limit pyramid, limits are prescribed at individual client level. The actual positions are monitored vis-à-vis prescribed limits on a continuous basis and violations are penalized by exchanges.

### Market Wide Position Limits

Open positions on individual scrips are restricted to 20% of the floating stock. The open positions on futures and options are aggregated for the purpose of this computation.

At the end of each day, exchanges test whether the market wide open interest for any scrip exceeds 95% of the market wide position limit for that scrip. If yes, clients and Trading Members are not allowed to take fresh positions in that scrip. They are only allowed to decrease their positions. Such securities are commonly referred to as 'banned' in market language. Normal trading in the scrip is resumed only after the open outstanding position comes down to 80% or below of the market wide position limit.

Alerts are issued to dealers in the derivatives market once the open interest in the futures and options contract in a security exceeds 60% of the market wide position limits specified for such security. Such alerts are presently displayed at time intervals of 10 minutes.

If it is found that any client or Trading Member has entered into fresh or additional positions during such ban period, he is penalized at 1% of the value of the incremental position subject to a minimum of Rs. 5,000 and a maximum of Rs. 1 lakh. The penalty is recovered from the clearing member affiliated with such trading members/clients on a T+1 day basis along with pay-in. The amount of penalty is informed to the clearing member at the end of the day.

The market wide position limit applicable to each scrip is published by the exchanges every month. The limits as applicable for June, 2009 are provided in the Appendix 2 to this Unit for your reference.

### **Position Limits for Trading Members, FIIs and Mutual Funds**

Several sub-limits have been prescribed for Trading Members, FIIs and Mutual Funds. These are discussed in the following paragraphs.

**Position limits in Index futures contracts:** Trading Members, FII and MF position limit in all index futures contracts on a particular underlying index shall be Rs. 500 crores or 15 % of the total open interest of the market in index futures, whichever is higher. This limit would be applicable on open positions in all futures contracts on a particular underlying index.

**Position limits in Index options contracts:** Trading Members, FII and MF position limit in all index options contracts on a particular underlying index is restricted to Rs.500 crores or 15 % of the total open interest of the market in index options, whichever is higher.

Further limits on FIIs and Mutual Funds are applicable as follows:

- Short positions in index derivatives (short futures, short calls and long puts) not exceeding (in notional value) the FII's/MF's holding of stocks.
- Long positions in index derivatives (long futures, long calls and short puts) not exceeding (in notional value) the FII's/MF's holding of cash, government securities, T-Bills and similar instruments..

### **Stock Futures & Options**

The following limits are applicable to Trading Members, FIIs and Mutual Funds for single stock futures and options:

- For stocks having applicable market-wise position limit (MWPL) of Rs. 500 crores or more, the combined futures and options position limit shall be 20% of applicable MWPL or Rs. 300 crores, whichever is lower and within which stock futures position cannot exceed 10% of applicable MWPL or Rs. 150 crores, whichever is lower.
- For stocks having applicable market-wise position limit (MWPL) less than Rs. 500 crores, the combined futures and options position limit would be 20% of applicable MWPL and futures position cannot exceed 20% of applicable MWPL or Rs. 50 crore whichever is lower.

### At the level of the sub-account of FIIs

**Index Futures and Options:** A disclosure is required from any person or persons acting in concert who together own 15% or more of the open interest of all futures and options contracts on a particular underlying index.

**Stock Futures and Options:** The gross open position across all futures and options contracts on a particular underlying security, of a sub-account of an FII, should not exceed the higher of:

- 1% of the free float market capitalization (in terms of number of shares) or
- 5% of the open interest in the derivative contracts on a particular underlying stock (in terms of number of contracts). These position limits shall be applicable on the combined position in all futures and options contracts on an underlying security.

Limits applicable to Trading Members, FIIs and Mutual Funds for June, 2009 are provided below for your understanding:

#### Computation of Position Limits

The position limits would be computed on a gross basis at the level of a FII and on a net basis at the level of sub-accounts and proprietary positions.

The open position for all derivative contracts would be valued as the open interest multiplied with the closing price of the respective underlying in the cash market.

#### Client Level Position Limits

The gross open position for each client, across all the derivative contracts on a underlying, should not exceed:

- 1% of the free float market capitalization (in terms of number of shares) or
- 5% of the open interest in all derivative contracts in the same underlying stock (in terms of number of shares) whichever is higher.

These limits are also published every month on the websites of exchanges. The limits for June, 2009 are provided in Appendix 3 to this Unit for your ready reference.

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## 4.8 SUMMARY

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The unit has explained the basic understanding of the policy framework for equity derivatives in Indian market and basic criteria to select scrips to be traded on, in derivative segment. The unit also talks about the limit and how they are imposed at various levels in equity and F&O segment.i.e the position limit implications for individual clients, brokers, institutional investors and mutual funds.

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## 4.9 SELF ASSESSMENT QUESTIONS

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- 1) What are the criteria for stock selection?
- 2) What are the criteria for index selection?
- 3) What is quarter sigma?
- 4) How is quarter sigma computed?
- 5) What is Value at Risk?
- 6) How are lot sizes determined?

- 7) How many series are announced for trading at any point in time?
- 8) What are price steps?
- 9) How is market wide position defined?
- 10) What are the position limits for FIIs?
- 11) How are client level position limits defined?

Policy and Regulation

#### **4.10 FURTHER READINGS**

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[www.nseindia.com <http://www.nseindia.com>](http://www.nseindia.com)

[www.sebi.gov.in <http://www.sebi.gov.in>](http://www.sebi.gov.in)

### Appendix 1

List of scrips trading in the F&O segment of the NSE as at May 30, 2009

Derivatives on Individual Securities	Lot Size
31 Infotech Ltd.	10,800
Amtek auto Ltd.	4,80
Ballarpur Industries Ltd.	14,600
Bharat Earth Movers Ltd.	750
Cipla Ltd.	1,250
IRB Infrastructure Developers Ltd.	4,400
Oil & Natural Gas Corp. Ltd.	450
Sterlite Industries (I) Ltd.	876

### Appendix 2

Maximum Open Interest permitted for June 2009

Scrip	Limit (Units)
ABAN	2,961,716
AMBUJA CEM	154,603,000
BPCL	25,842,665
DRREDDY	19,498,521
HCLTECH	42,590,789
PTC	35,883,800
PUNJLOYD	35,528,301
TATA MOTORS	40,634,924
YES BANK	40,047,185
ZEEL	50,780,948

### Appendix 3

Maximum position that can be taken by FIIs, Mutual Funds and Trading Members as at  
May 30, 2009

Scrip	Limit (Units)
31 INFOTECH	3,164,40
ABIRLANUVO	2,091,200
ALOKTEXT	5,582,304
ARVIND	5,624,400
BHEL	1,377,300
AXIS BANK	3,851,100
CAIRN	12,937,500
GAIL	9,999,000
GLAXO	1,671,300
HDFC	1,376,250
INDUSINDNK	7,969,500
POWERGRID	22,953,70
SIEMENS	6,044,576
TATAPOWER	2,802,400
TITAN	833,476

NOTES

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