NCFM

NSE's CERTIFICATION IN FINANCIAL MARKETS

Derivatives Market (Dealers) Module

NATIONAL STOCK EXCHANGE OF INDIA LIMITED

Test Details:

Sr. No.	Name of Module	Fees (Rs.)	Test Duration (in inutes)	No. of Questions	Maximum Marks	Pass Marks (%)	Certificate Validity (in years)
1	Financial Markets: A Beginners' Module *	1500	120	60	100	50	5
2	Mutual Funds : A Beginners' Module	1500	120	60	100	50	5
3	Currency Derivatives: A Beginner's Module	1500	120	60	100	50	5
4	Equity Derivatives: A Beginner's Module	1500	120	60	100	50	5
5	Interest Rate Derivatives: A Beginner's Module	1500	120	60	100	50	5
6	Commercial Banking in India: A Beginner's Module	1500	120	60	100	50	5
7	Securities Market (Basic) Module	1500	105	60	100	60	5
8	Capital Market (Dealers) Module *	1500	105	60	100	50	5
9	Derivatives Market (Dealers) Module *	1500	120	60	100	60	3
10	FIMMDA-NSE Debt Market (Basic) Module	1500	120	60	100	60	5
11	Investment Analysis and Portfolio Management Module	1500	120	60	100	60	5
12	NISM-Series-I: Currency Derivatives Certification Examination	1000	120	60	100	60	3
13	NISM-Series-II-A: Registrars to an Issue and Share Transfer Agents – Corporate Certification Examination	1000	120	100	100	50	3
14	NISM-Series-II-B: Registrars to an Issue and Share Transfer Agents – Mutual Fund Certification Examination	1000	120	100	100	50	3
15	NISM-Series-IV: Interest Rate Derivatives Certification Examination	1000	120	100	100	60	3
16	NISM-Series-V-A: Mutual Fund Distributors Certification Examination *	1000	120	100	100	50	3
17	NISM-Series-VI: Depository Operations Certification Examination	1000	120	100	100	60	3
18	NISM Series VII: Securities Operations and Risk Management Certification Examination	1000	120	100	100	50	3
19	Certified Personal Financial Advisor (CPFA) Examination	4000	120	80	100	60	3
20	NSDL–Depository Operations Module	1500	75	60	100	60 #	5
21	Commodities Market Module	1800	120	60	100	50	3
22	Surveillance in Stock Exchanges Module	1500	120	50	100	60	5
23	Corporate Governance Module	1500	90	100	100	60	5
24	Compliance Officers (Brokers) Module	1500	120	60	100	60	5
25	Compliance Officers (Corporates) Module	1500	120	60	100	60	5
26	Information Security Auditors Module (Part-1)	2250	120	90	100	60	2
	Information Security Auditors Module (Part-2)	2250	120	90	100	60	
27	Options Trading Strategies Module	1500	120	60	100	60	5
28	FPSB India Exam 1 to 4**	2000 per exam	120	75	140	60	NA
29	Examination 5/Advanced Financial Planning **	5000	240	30	100	50	NA
30	Equity Research Module ##	1500	120	65	100	55	2
31	Issue Management Module ##	1500	120	80	100	55	2
32	Market Risk Module ##	1500	120	50	100	55	2
33	Financial Modeling Module ###	1000	150	50	75	50	NA

* Candidates have the option to take the tests in English, Gujarati or Hindi languages.

Candidates securing 80% or more marks in NSDL-Depository Operations Module ONLY will be certified as 'Trainers'.

** Following are the modules of Financial Planning Standards Board India (Certified Financial Planner Certification)

- FPSB India Exam 1 to 4 i.e. (i) Risk Analysis & Insurance Planning (ii) Retirement Planning & Employee Benefits (iii) Investment Planning and (iv) Tax Planning & Estate Planning
- Examination 5/Advanced Financial Planning

Modules of Finitiatives Learning India Pvt. Ltd. (FLIP)

Module of IMS Proschool

The curriculum for each of the modules (except Modules of Financial Planning Standards Board India, Finitiatives Learning India Pvt. Ltd. and IMS Proschool) is available on our website: www.nseindia.com > NCFM > Curriculum & Study Material.

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Note:- Candidates are advised to refer to NSE's website: www.nseindia.com while preparing for NCFM test (s) for announcements pertaining to revisions/updations in NCFM modules or launch of new modules, if any.

CHAPTER 1: Introduction to Derivatives

The term 'Derivative' stands for a contract whose price is derived from or is dependent upon an underlying asset. The underlying asset could be a financial asset such as currency, stock and market index, an interest bearing security or a physical commodity. Today, around the world, derivative contracts are traded on electricity, weather, temperature and even volatility. According to the Securities Contract Regulation Act, (1956) the term "derivative" includes:

(i) a security derived from a debt instrument, share, loan, whether secured or unsecured, risk instrument or contract for differences or any other form of security;

(ii) a contract which derives its value from the prices, or index of prices, of underlying securities.

1.1 Types of Derivative Contracts

Derivatives comprise four basic contracts namely Forwards, Futures, Options and Swaps. Over the past couple of decades several exotic contracts have also emerged but these are largely the variants of these basic contracts. Let us briefly define some of the contracts

***1.1.1 Forward Contracts*:** These are promises to deliver an asset at a pre- determined date in future at a predetermined price. Forwards are highly popular on currencies and interest rates. The contracts are traded over the counter (i.e. outside the stock exchanges, directly between the two parties) and are customized according to the needs of the parties. Since these contracts do not fall under the purview of rules and regulations of an exchange, they generally suffer from counterparty risk i.e. the risk that one of the parties to the contract may not fulfill his or her obligation.

1.1.2 Futures Contracts: A futures contract is an agreement between two parties to buy or sell an asset at a certain time in future at a certain price. These are basically exchange traded, standardized contracts. The exchange stands guarantee to all transactions and counterparty risk is largely eliminated.

The buyers of futures contracts are considered having a long position whereas the sellers are considered to be having a short position. It should be noted that this is similar to any asset market where anybody who buys is long and the one who sells in short.

Futures contracts are available on variety of commodities, currencies, interest rates, stocks and other tradable assets. They are highly popular on stock indices, interest rates and foreign exchange.

1.1.3 Options Contracts: Options give the buyer (holder) a right but not an obligation to buy or sell an asset in future. Options are of two types - calls and puts. Calls give the buyer the right but not the obligation to buy a given quantity of the underlying asset, at a given price on

or before a given future date. Puts give the buyer the right, but not the obligation to sell a given quantity of the underlying asset at a given price on or before a given date. One can buy and sell each of the contracts. When one buys an option he is said to be having a long position and when one sells he is said to be having a short position.

It should be noted that, in the first two types of derivative contracts (forwards and futures) both the parties (buyer and seller) have an obligation; i.e. the buyer needs to pay for the asset to the seller and the seller needs to deliver the asset to the buyer on the settlement date. In case of options only the seller (also called option writer) is under an obligation and not the buyer (also called option purchaser). The buyer has a **right** to buy (call options) or sell (put options) the asset from / to the seller of the option but he may or may not exercise this right. Incase the buyer of the option does exercise his right, the seller of the option must fulfill whatever is his obligation (for a call option the seller has to deliver the asset to the buyer of the option and for a put option the seller has to receive the asset from the buyer of the option). An option can be exercised at the expiry of the contract period (which is known as European option contract) or anytime up to the expiry of the contract period (termed as American option contract). We will discuss option contracts in detail in chapters 5 and 6.

1.1.4 Swaps: Swaps are private agreements between two parties to exchange cash flows in the future according to a prearranged formula. They can be regarded as portfolios of forward contracts. The two commonly used swaps are:

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

Box 1.1: Over the Counter (OTC) Derivative Contracts

Derivatives that trade on an exchange are called exchange traded derivatives, whereas privately negotiated derivative contracts are called OTC contracts. The OTC derivatives markets have the following features compared to exchange-traded derivatives: (i) The management of counter-party (credit) risk is decentralized and located within individual institutions, (ii) There are no formal centralized limits on individual positions, leverage, or margining, (iii) There are no formal rules for risk and burden-sharing, (iv) There are no formal rules or mechanisms for ensuring market stability and integrity, and for safeguarding the collective interests of market participants, and (iv) The OTC contracts are generally not regulated by a regulatory authority and the exchange's self-regulatory organization. They are however, affected indirectly by national legal systems, banking supervision and market surveillance.

1.2 History of Financial Derivatives Markets

Financial derivatives have emerged as one of the biggest markets of the world during the past two decades. A rapid change in technology has increased the processing power of computers and has made them a key vehicle for information processing in financial markets. Globalization of financial markets has forced several countries to change laws and introduce innovative financial contracts which have made it easier for the participants to undertake derivatives transactions.

Early forward contracts in the US addressed merchants' concerns about ensuring that there were buyers and sellers for commodities. 'Credit risk', however remained a serious problem. To deal with this problem, a group of Chicago businessmen formed the Chicago Board of Trade (CBOT) in 1848. The primary intention of the CBOT was to provide a centralized location (which would be known in advance) for buyers and sellers to negotiate forward contracts. In 1865, the CBOT went one step further and listed the first 'exchange traded" derivatives contract in the US. These contracts were called 'futures contracts". In 1919, Chicago Butter and Egg Board, a spin-off of CBOT, was reorganized to allow futures trading. Its name was changed to Chicago Mercantile Exchange (CME). The CBOT and the CME remain the two largest organized futures exchanges, indeed the two largest "financial" exchanges of any kind in the world today.

The first exchange-traded financial derivatives emerged in 1970's due to the collapse of fixed exchange rate system and adoption of floating exchange rate systems. As the system broke down currency volatility became a crucial problem for most countries. To help participants in foreign exchange markets hedge their risks under the new floating exchange rate system, foreign currency futures were introduced in 1972 at the Chicago Mercantile Exchange. In 1973, the Chicago Board of Trade (CBOT) created the Chicago Board Options Exchange (CBOE) to facilitate the trade of options on selected stocks. The first stock index futures contract was traded at Kansas City Board of Trade. Currently the most popular stock index futures contract in the world is based on S&P 500 index, traded on Chicago Mercantile Exchange. During the mid eighties, financial futures became the most active derivative instruments generating volumes many times more than the commodity futures. Index futures, futures on T-bills and Euro-Dollar futures are the three most popular futures contracts traded today. Other popular international exchanges that trade derivatives are LIFFE in England, DTB in Germany, SGX in Singapore, TIFFE in Japan, MATIF in France, Eurex etc.

Box 1.2: History of Derivative Trading at NSE

The derivatives trading on the NSE commenced on June 12, 2000 with futures trading on S&P CNX Nifty Index. Subsequent trading in index options and options on individual securities commenced on June 4, 2001 and July 2, 2001. Single stock futures were launched on November 9, 2001. Ever since the product base has increased to include trading in futures and options on CNX IT Index, Bank Nifty Index, Nifty Midcap 50 Indices etc. Today, both in terms of volume and turnover, NSE is the largest derivatives exchange in India. The derivatives contracts have a maximum of 3-month expiration cycles except for a long dated Nifty Options contract which has a maturity of 5 years. Three contracts are available for trading, with 1 month, 2 months and 3 months to expiry. A new contract is introduced on the next trading day following the expiry of the near month contract.

Futures contracts on interest-bearing government securities were introduced in mid-1970s. The option contracts on equity indices were introduced in the USA in early 1980's to help fund managers to hedge their risks in equity markets. Afterwards a large number of innovative products have been introduced in both exchange traded format and the Over the Counter (OTC) format. The OTC derivatives have grown faster than the exchange-traded contracts in the recent years. Table 1.1 gives a bird's eye view of these contracts as available worldwide on several exchanges.

Table 1.1: Spectrum of Derivative Contracts Worldwide

Underlying Asset	**Type of Derivative Contract**				
	Exchange-traded futures	**Exchange-traded options**	**OTC swap**	**OTC forward**	**OTC option**
Equity	Index future Stock future	Index option Stock option	Equity swap	Back to back repo agreement	Stock options Warrants
Interest rate	Interest rate futures linked to MIBOR	Options on futures	Interest rate swaps	Forward rate agreement	Interest rate caps, floors & collars. Swaptions
Credit	Bond future	Option on Bond future	Credit default swap Total return swap	Repurchase agreement	Credit default option
Foreign exchange	Currency future	Option on currency future	Currency swap	Currency forward	Currency option

The above list is not exhaustive. Several new and innovative contracts have been launched over the past decade around the world including option contracts on volatility indices.

1.3 Participants in a Derivative Market

The derivatives market is similar to any other financial market and has following three broad categories of participants:

- **Hedgers**: These are investors with a present or anticipated exposure to the underlying asset which is subject to price risks. Hedgers use the derivatives markets primarily for price risk management of assets and portfolios.
- **Speculators**: These are individuals who take a view on the future direction of the markets. They take a view whether prices would rise or fall in future and accordingly buy or sell futures and options to try and make a profit from the future price movements of the underlying asset.
- **Arbitrageurs**: They take positions in financial markets to earn riskless profits. The arbitrageurs take short and long positions in the same or different contracts at the same time to create a position which can generate a riskless profit.

1.4 Economic Function of the Derivative Market

The derivatives market performs a number of economic functions. In this section, we discuss some of them.

- Prices in an organized derivatives market reflect the perception of the market participants about the future and lead the prices of underlying to the perceived future level. The prices of derivatives converge with the prices of the underlying at the expiration of the derivative contract. Thus derivatives help in discovery of future as well as current prices.
- The derivatives market helps to transfer risks from those who have them but do not like them to those who have an appetite for them.
- Derivatives, due to their inherent nature, are linked to the underlying cash markets. With the introduction of derivatives, the underlying market witnesses higher trading volumes. This is because of participation by more players who would not otherwise participate for lack of an arrangement to transfer risk.
- Speculative trades shift to a more controlled environment in derivatives market. In the absence of an organized derivatives market, speculators trade in the underlying cash markets. Margining, monitoring and surveillance of the activities of various participants become extremely difficult in these kind of mixed markets.

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

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

CHAPTER 2: Understanding Interest Rates and Stock Indices

In this chapter we will discuss the interest rates and market index related issues, since it will help better understand the functioning of derivatives markets. We will also learn about derivative contracts on indices which have the index as underlying.

2.1 Understanding Interest rates

The interest rates can be discrete or continuous. When people invest in financial markets (such as equity shares), returns on assets change continuously and lead to the fact that continuous compounding should be used. On the other hand a fixed deposit is discretely compounded and the frequency could be from annual to quarterly to daily.

The interest rates are always quoted on per annum basis. However, they also indicate the frequency along with the per annum rates. For example the statement that interest rate on a given deposit is equal to 10% per annum implies that the deposit provides an interest rate of 10% on an annually compounded basis (using the formula $A=P(1+r/t)^t$) where P is the principal, r is the rate of interest and t is the time. Thus, if Rs 100 is deposited in a fixed deposit it would give a return of Rs 100(1+0.1) = Rs 110. However the final amount will be different if the compounding frequency changes. For instance, if the compounding frequency is changed to semi annual and the rate of interest on Rs.100 is 10% then the amount on maturity would be Rs. 110.250.

The table 2.1 below shows the change in amount when the same interest rate is compounded more frequently i.e. from annual to daily and finally continuous compounding.

Table 2.1: Interest Rate and Compounding Frequency

Principal (Rs)	Interest Rate (%)	Compounding Frequency	Calculation	Amount in one year (Rs)
100	10%	Annual	100(1+10%)	110.000
100	10%	Semi Annual	$100[1+(10\%/2)]^2$	110.250
100	10%	Quarterly	$100[1+(10\%/4)]^4$	110.381
100	10%	Monthly	$100[1+(10\%/12)]^{12}$	110.471
100	10%	Daily	$100[1+(10\%/365)]^{365}$	110.516
100	10%	Continuously	$100e^{[(0.1)(1)]}$	110.517

It should be noted that daily compounding is the new norm for calculating savings accounts balances by banks in India (starting from April 1, 2010). The continuous compounding is done

by multiplying the principal with e^{rt} where r is the rate of interest and t the time period. e is exponential function which is equal to 2.718.

Illustration 2.1

What is the equivalent rate for continuous compounding for an interest rate which is quoted:

(a) 8% per annum semi annual compounding?

(b) 8% per annum annual compounding?

Solution: (a) $2\ln(1+0.08/2)=0.078441=7.844\%$

(b) $\ln(1+.08) =0.07696=7.696\%$

Illustration 2.2

A bank quotes you an interest rate of 10% per annum with quarterly compounding. What is the equivalent rate when it is:

(a) Continuous compounding

(b) Annual compounding.

Solution: (a) $4\ln (1+0.10/4)=0.098770=9.877\%$

(b) $[(1+0.10/4)^4]-1= 10.38\%$

Part (b) of Illustration 2.2 is also called effective annual rate calculation. By this method any given interest rate or return can be converted to its effective annual interest rate or effective annual return.

2.2 Understanding the Stock Index

An index is a number which measures the change in a set of values over a period of time. A stock index represents the change in value of a set of stocks which constitute the index. More specifically, a stock index number is the current relative value of a weighted average of the prices of a pre-defined group of equities. A stock market index is created by selecting a group of stocks that are representative of the entire market or a specified sector or segment of the market. It is calculated with reference to a base period and a base index value. The beginning value or base of the index is usually set to a number such as 100 or 1000. For example, the base value of the Nifty was set to 1000 on the start date of November 3, 1995.

Stock market indices are meant to capture the overall behavior of equity markets. Stock market indices are useful for a variety of reasons. Some uses of them are:

1. As a barometer for market behaviour,
2. As a benchmark for portfolio performance,
3. As an underlying in derivative instruments like Index futures, Index options, and
4. In passive fund management by index funds/ETFs

2.3 Economic Significance of Index Movements

Index movements reflect the changing expectations of the stock market about future dividends of the corporate sector. The index goes up if the stock market perceives that the prospective dividends in the future will be better than previously thought. When the prospects of dividends in the future become pessimistic, the index drops. The ideal index gives us instant picture about how the stock market perceives the future of corporate sector.

Every stock price moves for two possible reasons:

1. News about the company- micro economic factors (e.g. a product launch, or the closure of a factory, other factors specific to a company)
2. News about the economy – macro economic factors (e.g. budget announcements, changes in tax structure and rates, political news such as change of national government, other factors common to all companies in a country)

The index captures the second part, the movements of the stock market as a whole (i.e. news about the macroeconomic factors related to entire economy). This is achieved by averaging. Each stock contains a mixture of two elements - stock news and index news. When we take an average of returns on many stocks, the individual stock news tends to cancel out and the only thing left is news that is common to all stocks. The news that is common to all stocks is news about the economy. The correct method of averaging is that of taking a weighted average, giving each stock a weight proportional to its market capitalization.

Example: Suppose an index contains two stocks, A and B. A has a market capitalization of Rs.1000 crore and B has a market capitalization of Rs.3000 crore. Then we attach a weight of 1/4 to movements in A and 3/4 to movements in B.

2.4 Index Construction Issues

A good index is a trade-off between diversification and liquidity. A well diversified index is more representative of the market/economy. There are however, diminishing returns to diversification. Going from 10 stocks to 20 stocks gives a sharp reduction in risk. Going from 50 stocks to 100 stocks gives very little reduction in risk. Going beyond 100 stocks gives almost zero reduction in risk. Hence, there is little to gain by diversifying beyond a point. The more serious problem lies in the stocks which are included into an index when it is broadened. If the stock is illiquid, the observed prices yield contaminated information and actually worsen an index.

The computational methodology followed for construction of stock market indices are (a) Free Float Market Capitalization Weighted Index, (b) Market Capitalization Weighted index and the (c) Price Weighted Index.

Free Float Market Capitalisation Weighted Index: The free float factor (Investible Weight Factor), for each company in the index is determined based on the public shareholding of the

companies as disclosed in the shareholding pattern submitted to the stock exchange by these companies[1]. The Free float market capitalization is calculated in the following manner:

Free Float Market Capitalisation = Issue Size * Price * Investible Weight Factor

The Index in this case is calculated as per the formulae given below:

$$\text{Index} = \frac{\text{Free float current market capitalization}}{\text{Free Float Base Market Capitalization}} \times \text{Base Value}$$

The India Index Services Limited (IISL), a joint venture between the NSE and CRISIL, introduced the free float market capitalization methodology for its main four indices, viz., S&P CNX Nifty, S&P CNX Defty, CNX Nifty Junior and CNX 100. With effect from May 4, 2009 CNX Nifty Junior and with effect from June 26, 2009, S&P CNX Nifty, CNX 100 and S&P CNX Defty are being calculated using free float market capitalisation.

Market Capitalisation Weighted Index: In this type of index calculation, each stock in the index affects the index value in proportion to the market value of all shares outstanding. In this the index would be calculated as per the formulae below:

$$\text{Index} = \frac{\text{Current market capitalization}}{\text{Base Market Capitalization}} \times \text{Base Value}$$

Where,

Current market capitalization = Sum of (current market price * Issue size) of all securities in the index.

Base market capitalization = Sum of (market price * issue size) of all securities as on base date.

Similarly, in a **price weighted index** each stock influences the index in proportion to its price per share. The value of the index is generated by adding the prices of each of the stocks in the index and dividing then by the total number of stocks. Stocks with a higher price will be given more weight and, therefore, will have a greater influence over the performance of the index.

2.5 Desirable Attributes of an Index

A good market index should have three attributes:

- It should capture the behaviour of a large variety of different portfolios in the market.
- The stocks included in the index should be highly liquid.
- It should be professionally maintained.

[1] The free float method excludes (i) Government holding in the capacity of strategic investor, (ii) Shares held by promoters through ADRs/GDRs, (iii) Strategic stakes by corporate bodies/Individuals /HUF, (iv) Investments under FDI Category, (V) Equity held by associate /group companies

In brief the level of diversification of a stock index should be monitored on a continuous basis. It should ensure that the index is not vulnerable to speculation. Stocks with low trading volume or with very tight bid ask spreads are illiquid and should not be a part of index. The index should be managed smoothly without any dramatic changes in its composition. Box 2.1 describes how S&P CNX Nifty addresses these issues.

Box 2.1: The S&P CNX Nifty

The S&P CNX Nifty is a float-adjusted market capitalization weighted index derived from economic research. It was designed not only as a barometer of market movement but also to be a foundation of the new world of financial products based on the index like index futures, index options and index funds. A trillion calculations were expended to evolve the rules inside the S&P CNX Nifty index. The results of this work are remarkably simple: (a) the correct size to use is 50, (b) stocks considered for the S&P CNX Nifty must be liquid by the 'impact cost' criterion, (c) the largest 50 stocks that meet the criterion go into the index.

The research that led up to S&P CNX Nifty is well-respected internationally as a pioneering effort in better understanding how to make a stock market index. The S&P CNX Nifty covers 21 sectors of the Indian economy and offers investment managers exposure to the Indian market in one efficient portfolio. It is used for a variety of purposes, such as benchmarking fund portfolios, index based derivatives and index funds.

The Nifty is uniquely equipped as an index for the index derivatives market owing to its (a) low market impact cost and (b) high hedging effectiveness. The good diversification of Nifty generates low initial margin requirement.

2.5.1 Impact cost

Market impact cost is a measure of the liquidity of the market. It reflects the costs faced when actually trading an index. Suppose a stock trades at bid 99 and ask 101. We say the "ideal" price is Rs. 100. Now, suppose a buy order for 1000 shares goes through at Rs.102. Then we say the market impact cost at 1000 shares is 2%. If a buy order for 2000 shares goes through at Rs.104, we say the market impact cost at 2000 shares is 4%. For a stock to qualify for possible inclusion into the S&P CNX Nifty, it has to have market impact cost of below 0.50% when doing S&P CNX Nifty trades of two crore rupees. This means that if S&P CNX Nifty is at 2000, a buy order goes through at 2001, i.e. 2000+(2000*0.0005) and a sell order gets 1999, i.e. 2000-(2000*0.0005).

2.6 Applications of Index

Besides serving as a barometer of the economy/market, the index also has other applications in finance. Various products have been designed based on the indices such as the index derivatives, index funds[2] and the exchange traded funds[3]. We here restrict our discussion to only index derivatives.

2.6.1 Index derivatives

Index derivatives are derivative contracts which have the index as the underlying. The most popular index derivative contracts the world over are index futures and index options. NSE's market index, the S&P CNX Nifty was scientifically designed to enable the launch of index-based products like index derivatives and index funds.

Following are the reasons of popularity of index derivatives:

- Institutional and large equity-holders need portfolio-hedging facility. Index-derivatives are more suited to them and more cost-effective than derivatives based on individual stocks. Pension funds in the US are known to use stock index futures for risk hedging purposes.
- Index derivatives offer ease of use for hedging any portfolio irrespective of its composition.
- Stock index is difficult to manipulate as compared to individual stock prices, more so in India, and the possibility of cornering is reduced. This is partly because an individual stock has a limited supply, which can be cornered.
- Stock index, being an average, is much less volatile than individual stock prices. This implies much lower capital adequacy and margin requirements.
- Index derivatives are cash settled, and hence do not suffer from settlement delays and problems related to bad delivery, forged/fake certificates.

[2] An index fund is a fund that tries to replicate the index returns. It does so by investing in index stocks in the proportions in which these stocks exist in the index.

[3] ETFs are just what their name implies: baskets of securities that are traded, like individual stocks, on an exchange. Unlike regular open-end mutual funds, ETFs can be bought and sold throughout the trading day like any stock.

CHAPTER 3: Futures Contracts, Mechanism and Pricing

In recent years, derivatives have become increasingly important in the field of finance. While futures and options are now actively traded on many exchanges, forward contracts are popular on the OTC market. We shall first discuss about forward contracts along with their advantages and limitations. We then introduce futures contracts and describe how they are different from forward contracts. The terminology of futures contracts along with their trading mechanism has been discussed next.

The key idea of this chapter however is the pricing of futures contracts. The concept of cost of carry for calculation of the forward price has been a very powerful concept. One would realize that it essentially works as a parity condition and any violation of this principle can lead to arbitrage opportunities. The chapter explains mechanism and pricing of both Index futures and futures contracts on individual stocks.

3.1 Forward Contracts

A forward contract is an agreement to buy or sell an asset on a specified date for a specified price. One of the parties to the contract assumes a long position and agrees to buy the underlying asset on a certain specified future date for a certain specified price. The other party assumes a short position and agrees to sell the asset on the same date for the same price. Other contract details like delivery date, price and quantity are negotiated bilaterally by the parties to the contract. The forward contracts are normally traded outside the exchanges.

The salient features of forward contracts are as given below:

- They are bilateral contracts and hence exposed to counter-party risk.
- Each contract is custom designed, and hence is unique in terms of contract size, expiration date and the asset type and quality.
- The contract price is generally not available in public domain.
- On the expiration date, the contract has to be settled by delivery of the asset.
- If the party wishes to reverse the contract, it has to compulsorily go to the same counter-party, which often results in high prices being charged.

3.2 Limitations of forward markets

Forward markets world-wide are posed by several problems:

- Lack of centralization of trading,
- Illiquidity and
- Counterparty risk

In the first two of these, the basic problem is that of too much flexibility and generality. The forward market is like a real estate market, in which any two consenting adults can form contracts against each other. This often makes them design the terms of the deal which are convenient in that specific situation, but makes the contracts non-tradable.

Counterparty risk arises from the possibility of default by any one party to the transaction. When one of the two sides to the transaction declares bankruptcy, the other suffers. When forward markets trade standardized contracts, though it avoids the problem of illiquidity, still the counterparty risk remains a very serious issue.

3.3 Introduction to Futures

A futures contract is an agreement between two parties to buy or sell an asset at a certain time in the future at a certain price. But unlike forward contracts, the futures contracts are standardized and exchange traded. To facilitate liquidity in the futures contracts, the exchange specifies certain standard features of the contract. It is a standardized contract with standard underlying instrument, a standard quantity and quality of the underlying instrument that can be delivered, (or which can be used for reference purposes in settlement) and a standard timing of such settlement. A futures contract may be offset prior to maturity by entering into an equal and opposite transaction. The standardized items in a futures contract are:

- Quantity of the underlying
- Quality of the underlying
- The date and the month of delivery
- The units of price quotation and minimum price change
- Location of settlement

3.4 Distinction between Futures and Forwards Contracts

Forward contracts are often confused with futures contracts. The confusion is primarily because both serve essentially the same economic functions of allocating risk in the presence of future price uncertainty. However futures are a significant improvement over the forward contracts as they eliminate counterparty risk and offer more liquidity. Table 3.1 lists the distinction between the forwards and futures contracts.

Table 3.1: Distinction between Futures and Forwards

Futures	Forwards
Trade on an organized exchange	OTC in nature
Standardized contract terms	Customised contract terms
More liquid	Less liquid
Requires margin payments	No margin payment
Follows daily settlement	Settlement happens at end of period

3.5 Futures Terminology

- ***Spot price:*** The price at which an underlying asset trades in the spot market.
- ***Futures price:*** The price that is agreed upon at the time of the contract for the delivery of an asset at a specific future date.
- ***Contract cycle:*** It is the period over which a contract trades. The index futures contracts on the NSE have one-month, two-month and three-month expiry cycles which expire on the last Thursday of the month. Thus a January expiration contract expires on the last Thursday of January and a February expiration contract ceases trading on the last Thursday of February. On the Friday following the last Thursday, a new contract having a three-month expiry is introduced for trading.
- ***Expiry date:*** is the date on which the final settlement of the contract takes place.
- ***Contract size****:* The amount of asset that has to be delivered under one contract. This is also called as the lot size.
- ***Basis:*** Basis is defined as the futures price minus the spot price. There will be a different basis for each delivery month for each contract. In a normal market, basis will be positive. This reflects that futures prices normally exceed spot prices.
- ***Cost of carry:*** Measures the storage cost plus the interest that is paid to finance the asset less the income earned on the asset.
- ***Initial margin:*** The amount that must be deposited in the margin account at the time a futures contract is first entered into is known as initial margin.
- ***Marking-to-market:*** In the futures market, at the end of each trading day, the margin account is adjusted to reflect the investor's gain or loss depending upon the futures closing price. This is called marking-to-market.

- ***Maintenance margin:*** Investors are required to place margins with their trading members before they are allowed to trade. If the balance in the margin account falls below the maintenance margin, the investor receives a margin call and is expected to top up the margin account to the initial margin level before trading commences on the next day.

3.6 Trading Underlying vs. Trading Single Stock Futures

The single stock futures market in India has been a great success story. One of the reasons for the success has been the ease of trading and settling these contracts.

To trade securities, one must open a security trading account with a securities broker and a demat account with a securities depository. Buying security involves putting up all the money upfront. With the purchase of shares of a company, the holder becomes a part owner of the company. The shareholder typically receives the rights and privileges associated with the security, which may include the receipt of dividends, invitation to the annual shareholders meeting and the power to vote.

Selling securities involves buying the security before selling it. Even in cases where short selling is permitted, it is assumed that the securities broker owns the security and then "lends" it to the trader so that he can sell it.

To trade in futures, one must open a futures trading account with a derivatives broker. Buying futures simply involves putting in the margin money. They enable the futures traders to take a position in the underlying security without having to open an account with a securities broker. With the purchase of futures on a security, the holder essentially makes a legally binding promise or obligation to buy the underlying security at some point in the future (the expiration date of the contract). Security futures do not represent ownership in a corporation and the holder is therefore not regarded as a shareholder.

3.7 Futures Payoffs

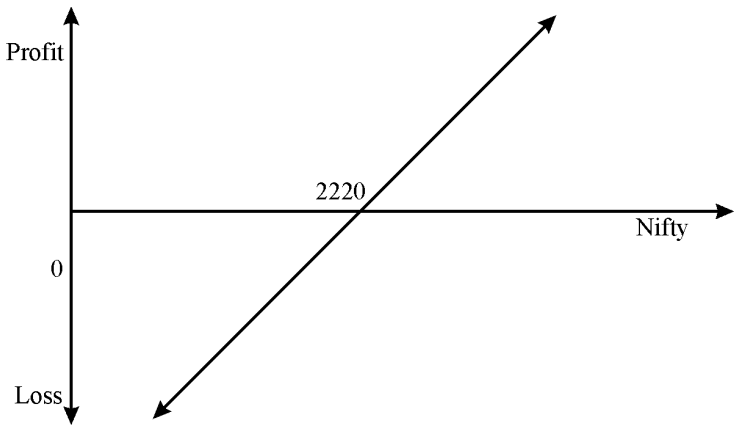
Futures contracts have linear or symmetrical payoffs. It implies that the losses as well as profits for the buyer and the seller of a futures contract are unlimited. These linear payoffs are fascinating as they can be combined with options and the underlying to generate various complex payoffs.

3.7.1 Payoff for buyer of futures: Long futures

The payoff for a person who buys a futures contract is similar to the payoff for a person who holds an asset. He has a potentially unlimited upside as well as a potentially unlimited downside. Take the case of a speculator who buys a two-month Nifty index futures contract when the Nifty stands at 2220.

The underlying asset in this case is the Nifty portfolio. When the index moves up, the long futures position starts making profits, and when the index moves down it starts making losses.

Figure 3.1: Payoff for a buyer of Nifty futures

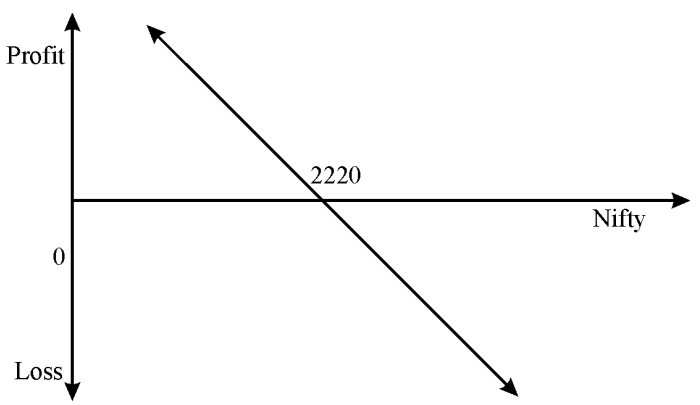


The figure 3.1 above shows the profits/losses for a long futures position. The investor bought futures when the index was at 2220. If the index goes up, his futures position starts making profit. If the index falls, his futures position starts showing losses.

3.7.2 Payoff for seller of futures: Short futures

The payoff for a person who sells a futures contract is similar to the payoff for a person who shorts an asset. He has a potentially unlimited upside as well as a potentially unlimited downside. Take the case of a speculator who sells a two-month Nifty index futures contract when the Nifty stands at 2220. The underlying asset in this case is the Nifty portfolio. When the index moves down, the short futures position starts making profits, and when the index moves up, it starts making losses.

Figure 3.2: Payoff for a seller of Nifty futures



The figure 3.2 shows the profits/losses for a short futures position. The investor sold futures when the index was at 2220. If the index goes down, his futures position starts making profit. If the index rises, his futures position starts showing losses.

3.8 Pricing Futures

Pricing of futures contract is very simple. Using the cost-of-carry logic, we calculate the fair value of a futures contract. Every time the observed price deviates from the fair value, arbitragers would enter into trades to capture the arbitrage profit. This in turn would push the futures price back to its fair value. The cost of carry model used for pricing futures is given below:

$$F = Se^{rT}$$

where:

r Cost of financing (using continuously compounded interest rate)

T Time till expiration in years

e 2.71828

Example: Security XYZ Ltd trades in the spot market at Rs. 1150. Money can be invested at 11% p.a. The fair value of a one-month futures contract on XYZ is calculated as follows:

$$\begin{aligned} F &= Se^{rT} \\ &= 1150 * e^{0.11 * \frac{1}{12}} \\ &= 1160 \end{aligned}$$

3.8.1 Pricing equity index futures

A futures contract on the stock market index gives its owner the right and obligation to buy or sell the portfolio of stocks characterized by the index. Stock index futures are cash settled; there is no delivery of the underlying stocks.

In their short history of trading, index futures have had a great impact on the world's securities markets. Its existence has revolutionized the art and science of institutional equity portfolio management.

The main differences between commodity and equity index futures are that:

- There are no costs of storage involved in holding equity.
- Equity comes with a dividend stream, which is a negative cost if you are long the stock and a positive cost if you are short the stock.

Therefore, Cost of carry = Financing cost - Dividends. Thus, a crucial aspect of dealing with equity futures as opposed to commodity futures is an accurate forecasting of dividends. The better the forecast of dividend offered by a security, the better is the estimate of the futures price.

3.8.2 Pricing index futures given expected dividend amount

The pricing of index futures is based on the cost-of-carry model, where the carrying cost is the cost of financing the purchase of the portfolio underlying the index, minus the present value of dividends obtained from the stocks in the index portfolio. This has been illustrated in the example below.

Nifty futures trade on NSE as one, two and three-month contracts. Money can be borrowed at a rate of 10% per annum. What will be the price of a new two-month futures contract on Nifty?

1. Let us assume that ABC Ltd. will be declaring a dividend of Rs.20 per share after 15 days of purchasing the contract.
2. Current value of Nifty is 4000 and Nifty trades with a multiplier of 100.
3. Since Nifty is traded in multiples of 100, value of the contract is 100*4000 = Rs.400,000.
4. If ABC Ltd. Has a weight of 7% in Nifty, its value in Nifty is Rs.28,000 i.e.(400,000 * 0.07).
5. If the market price of ABC Ltd. is Rs.140, then a traded unit of Nifty involves 200 shares of ABC Ltd. i.e. (28,000/140).
6. To calculate the futures price, we need to reduce the cost-of-carry to the extent of dividend received. The amount of dividend received is Rs.4000 i.e. (200*20). The dividend is received 15 days later and hence compounded only for the remainder of 45 days. To calculate the futures price we need to compute the amount of dividend received per unit of Nifty. Hence we divide the compounded dividend figure by 100.
7. Thus, the futures price is calculated as;

$$F = 4000e^{0.1\times\frac{60}{365}} - \left(\frac{200*20e^{0.1\times\frac{45}{365}}}{100}\right) = \text{Rs. } 4025.80$$

3.8.3 Pricing index futures given expected dividend yield

If the dividend flow throughout the year is generally uniform, i.e. if there are few historical cases of clustering of dividends in any particular month, it is useful to calculate the annual dividend yield.

$$F = Se^{(r-q)T}$$

where:

F futures price

S spot index value

r cost of financing

q expected dividend yield

T holding period

Example

A two-month futures contract trades on the NSE. The cost of financing is 10% and the dividend yield on Nifty is 2% annualized. The spot value of Nifty 4000. What is the fair value of the futures contract ?

Fair value = $4000e^{(0.1-0.02) \times (60 / 365)}$ = Rs. 4052.95

The cost-of-carry model explicitly defines the relationship between the futures price and the related spot price. As we know, the difference between the spot price and the futures price is called the basis.

Nuances:

- As the date of expiration comes near, the basis reduces - there is a *convergence* of the futures price towards the spot price. On the date of expiration, the basis is zero. If it is not, then there is an arbitrage opportunity. Arbitrage opportunities can also arise when the basis (difference between spot and futures price) or the spreads (difference between prices of two futures contracts) during the life of a contract are incorrect. At a later stage we shall look at how these arbitrage opportunities can be exploited.

Figure 3.3: Variation of basis over time

The figure 3.3 above shows how basis changes over time. As the time to expiration of a contract reduces, the basis reduces. Towards the close of trading on the day of settlement, the futures price and the spot price converge. The closing price for the June 28 futures contract is the closing value of Nifty on that day.

3.9 Pricing Stock Futures

A futures contract on a stock gives its owner the right and obligation to buy or sell the stocks. Like index futures, stock futures are also cash settled; there is no delivery of the underlying stocks. Just as in the case of index futures, the main differences between commodity and stock futures are that:

- There are no costs of storage involved in holding stock.
- Stocks come with a dividend stream, which is a negative cost if you are long the stock and a positive cost if you are short the stock.

Therefore, Cost of carry = Financing cost - Dividends. Thus, a crucial aspect of dealing with stock futures as opposed to commodity futures is an accurate forecasting of dividends. The better the forecast of dividend offered by a security, the better is the estimate of the futures price.

3.9.1 Pricing stock futures when no dividend expected

The pricing of stock futures is also based on the cost-of-carry model, where the carrying cost is the cost of financing the purchase of the stock, minus the present value of dividends obtained from the stock. If no dividends are expected during the life of the contract, pricing futures on that stock involves multiplying the spot price by the cost of carry. It has been illustrated in the example given below:

XYZ Ltd.'s futures trade on NSE as one, two and three-month contracts. Money can be borrowed at 10% per annum. What will be the price of a unit of new two-month futures contract on XYZ Ltd. if no dividends are expected during the two-month period?

1. Assume that the spot price of XYZ Ltd. is Rs. 228.

   Thus, futures price $F = 228e^{0.1*(60/365)}$

   = Rs. 231.90

3.9.2 Pricing stock futures when dividends are expected

When dividends are expected during the life of the futures contract, pricing involves reducing the cost of carry to the extent of the dividends. The net carrying cost is the cost of financing the purchase of the stock, minus the present value of dividends obtained from the stock. This is explained in the illustration below:

XYZ Ltd. futures trade on NSE as one, two and three-month contracts. What will be the price of a unit of new two-month futures contract on XYZ Ltd. if dividends are expected during the two-month period?

1. Let us assume that XYZ Ltd. will be declaring a dividend of Rs. 10 per share after 15 days of purchasing the contract.

2. Assume that the market price of XYZ Ltd. is Rs. 140.

3. To calculate the futures price, we need to reduce the cost-of-carry to the extent of dividend received. The amount of dividend received is Rs.10. The dividend is received 15 days later and hence compounded only for the remainder of 45 days.

4. Thus, futures price

$$F = 140e^{0.1\times (60/365)} - 10e^{0.1\times (45/365)}$$

$$= \text{Rs.}132.20$$

CHAPTER 4: Application of Futures Contracts

This chapter begins with a brief introduction of the concept of Beta (β) which indicates the sensitivity of an individual stock or portfolio's return to the returns on the market index. Thereafter hedging strategies using individual stock futures has been discussed in detail through numerical illustrations and payoff profiles.

4.1 Understanding Beta (β)

Beta measures the sensitivity of stocks responsiveness to market factors. Generally, it is seen that when markets rise, most stock prices rise and vice versa. Beta measures how much a stock would rise or fall if the market rises / falls. The market is indicated by the index, say Nifty 50.

The index has a beta of one. A stock with a beta of 1.5% will rise / fall by 1.5% when the Nifty 50 rises / falls by 1%. Which means for every 1% movement in the Nifty, the stock will move by 1.5% (β = 1.5%) in the same direction as the index. A stock with a beta of - 1.5% will rise / fall by 1.5% when the Nifty 50 falls / rises by 1%. Which means for every 1% movement in the Nifty, the stock will move by 1.5% (β = 1.5%) in the opposite direction as the index. Similarly, Beta of a portfolio, measures the portfolios responsiveness to market movements. In practice given individual stock betas, calculating portfolio beta is simple. It is nothing but the weighted average of the stock betas. If the index moves up by 10 percent, the portfolio value will increase by 10 percent. Similarly if the index drops by 5 percent, the portfolio value will drop by 5 percent. A portfolio with a beta of two, responds more sharply to index movements. If the index moves up by 10 percent, the value of a portfolio with a beta of two will move up by 20 percent. If the index drops by 10 percent, the value of a portfolio with a beta of two will fall by 20 percent. Similarly, if a portfolio has a beta of 0.75, a 10 percent movement in the index will cause a 7.5 percent movement in the value of the portfolio.

4.2 Numerical illustration of Applications of Stock Futures

4.2.1. Long security, sell futures

Futures can be used as a risk-management tool. For example, an investor who holds the shares of a company sees the value of his security falling from Rs. 450 to Rs.390. In the absence of stock futures, he would either suffer the discomfort of a price fall or sell the security in anticipation of a market upheaval. With security futures he can minimize his price risk. All he needs to do is enter into an offsetting stock futures position, in this case, take on a short futures position. Assume that the spot price of the security which he holds is Rs.390. Two-month futures cost him Rs.402. For this he pays an initial margin. Now if the price of the security falls any further, he will suffer losses on the security he holds. However, the losses he suffers on the security will be offset by the profits he makes on his short futures position. Take

for instance that the price of his security falls to Rs.350. The fall in the price of the security will result in a fall in the price of futures. Futures will now trade at a price lower than the price at which he entered into a short futures position. Hence his short futures position will start making profits. The loss of Rs.40 incurred on the security he holds, will be made up by the profits made on his short futures position.

4.2.2 Speculation: Bullish security, buy futures

Take the case of a speculator who has a view on the direction of the market. He would like to trade based on this view. He believes that a particular security that trades at Rs.1000 is undervalued and expect its price to go up in the next two-three months. How can he trade based on this belief? In the absence of a deferral product, he would have to buy the security and hold on to it. Assume that he buys 100 shares which cost him one lakh rupees. His hunch proves correct and two months later the security closes at Rs.1010. He makes a profit of Rs.1000 on an investment of Rs. 100,000 for a period of two months. This works out to an annual return of 6 percent.

Today a speculator can take exactly the same position on the security by using futures contracts. Let us see how this works. The security trades at Rs.1000 and the two-month futures trades at 1006. Just for the sake of comparison, assume that the minimum contract value is 100,000. He buys 100 security futures for which he pays a margin of Rs. 20,000. Two months later the security closes at 1010. On the day of expiration, the futures price converges to the spot price and he makes a profit of Rs. 400 on an investment of Rs. 20,000. This works out to an annual return of 12 percent. Because of the leverage they provide, security futures form an attractive option for speculators.

4.2.3 Speculation: Bearish security, sell futures

Stock futures can be used by a speculator who believes that a particular security is overvalued and is likely to see a fall in price. How can he trade based on his opinion? In the absence of a deferral product, there wasn't much he could do to profit from his opinion. Today all he needs to do is sell stock futures.

Let us understand how this works. Simple arbitrage ensures that futures on an individual securities move correspondingly with the underlying security, as long as there is sufficient liquidity in the market for the security. If the security price rises, so will the futures price. If the security price falls, so will the futures price. Now take the case of the trader who expects to see a fall in the price of ABC Ltd. He sells one two-month contract of futures on ABC at Rs.240 (each contact for 100 underlying shares). He pays a small margin on the same. Two months later, when the futures contract expires, ABC closes at 220. On the day of expiration, the spot and the futures price converges. He has made a clean profit of Rs.20 per share. For the one contract that he bought, this works out to be Rs. 2000.

4.2.4 Arbitrage: Overpriced futures: buy spot, sell futures

As we discussed earlier, the cost-of-carry ensures that the futures price stay in tune with the spot price. Whenever the futures price deviates substantially from its fair value, arbitrage opportunities arise.

If you notice that futures on a security that you have been observing seem overpriced, how can you cash in on this opportunity to earn riskless profits? Say for instance, ABC Ltd. trades at Rs.1000. One-month ABC futures trade at Rs.1025 and seem overpriced. As an arbitrageur, you can make riskless profit by entering into the following set of transactions.

1. On day one, borrow funds, buy the security on the cash/spot market at 1000.
2. Simultaneously, sell the futures on the security at 1025.
3. Take delivery of the security purchased and hold the security for a month.
4. On the futures expiration date, the spot and the futures price converge. Now unwind the position.
5. Say the security closes at Rs.1015. Sell the security.
6. Futures position expires with profit of Rs. 10.
7. The result is a riskless profit of Rs.15 on the spot position and Rs.10 on the futures position.
8. Return the borrowed funds.

If the cost of borrowing funds to buy the security is less than the arbitrage profit possible, it makes sense for you to arbitrage. In the real world, one has to build in the transactions costs into the arbitrage strategy.

4.2.5 Arbitrage: Underpriced futures: buy futures, sell spot

Whenever the futures price deviates substantially from its fair value, arbitrage opportunities arise. It could be the case that you notice the futures on a security you hold seem underpriced. How can you cash in on this opportunity to earn riskless profits? Say for instance, ABC Ltd. trades at Rs.1000. One-month ABC futures trade at Rs. 965 and seem underpriced. As an arbitrageur, you can make riskless profit by entering into the following set of transactions.

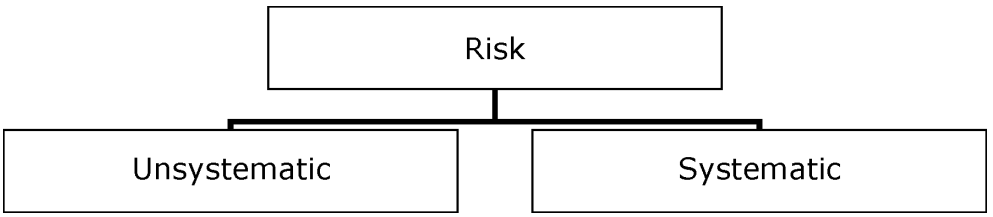
1. On day one, sell the security in the cash/spot market at 1000.
2. Make delivery of the security.
3. Simultaneously, buy the futures on the security at 965.
4. On the futures expiration date, the spot and the futures price converge. Now unwind the position.

   Say the security closes at Rs.975. Buy back the security.
6. The futures position expires with a profit of Rs.10.
7. The result is a riskless profit of Rs.25 on the spot position and Rs.10 on the futures position.

If the returns you get by investing in riskless instruments is more than the return from the arbitrage trades, it makes sense for you to arbitrage. This is termed as reverse-cash-and-carry arbitrage. It is this arbitrage activity that ensures that the spot and futures prices stay in line with the cost-of-carry. As we can see, exploiting arbitrage involves trading on the spot market. As more and more players in the market develop the knowledge and skills to do cash-and-carry and reverse cash-and-carry, we will see increased volumes and lower spreads in both the cash as well as the derivatives market.

4.3 Hedging Using Stock Index Futures

Broadly there are two types of risks (as shown in the figure below) and hedging is used to minimize these risks.



Unsystematic risk is also called as Company Specific Risk or Diversifiable Risk. Suppose, an investor holds shares of steel company and has no other investments. Any change in the government policy would affect the price of steel and the companies share price. This is considered as Unsystematic Risk. This risk can be reduced through appropriate diversification. The investor can buy more stocks of different industries to diversify his portfolio so that the price change of any one stock does not affect his portfolio. However, diversification does not reduce risk in the overall portfolio completely. Diversification reduces unsystematic risk. But there is a risk associated with the overall market returns, which is called as the Systematic Risk or Market Risk or Non-diversifiable Risk. It is that risk which cannot be reduced through diversification. Given the overall market movement (falling or rising), stock portfolio prices are affected. Generally, a falling overall market would see most stocks falling (and vice versa). This is the market specific risk. The market is denoted by the index. A fall in the index (say Nifty 50) in a day sees most of the stock prices fall. Therefore, even if the investor has a diversified portfolio of stocks, the portfolio value is likely to fall of the market falls. This is due to the inherent Market Risk or Unsystematic Risk in the portfolio. Hedging using Stock Index Futures or Single Stock Futures is one way to reduce the Unsystematic Risk.

Hedging can be done in two ways by an investor who has an exposure to the underlying stock(s):

4.3.1 By Selling Index Futures

On March 12 2010, an investor buys 3100 shares of Hindustan Lever Limited (HLL) @ Rs. 290 per share (approximate portfolio value of Rs. 9,00,000). However, the investor fears that the market will fall and thus needs to hedge. He uses Nifty March Futures to hedge.

- HLL trades as Rs. 290
- Nifty index is at 4100
- March Nifty futures is trading at Rs. 4110.
- The beta of HLL is 1.13.

To hedge, the investor needs to sell [Rs. 9,00,000 *1.13] = Rs. 10,17,000 worth of Nifty futures (10,17,000/4100 = 250 Nifty Futures)

On March 19 2010, the market falls.

- HLL trades at Rs. 275
- March Nifty futures is trading at Rs. 3915

Thus, the investor's loss in HLL is Rs. 46,500 (Rs. 15 × 3100). The investors portfolio value now drops to Rs. 8,53,500 from Rs. 9,00,000. However, March Nifty futures position gains by Rs. 48,750 (Rs. 195 × 250). Thus increasing the portfolio value to Rs. 9,02,250 (Rs. 8,53,500 + Rs. 48,750).

Therefore, the investor does not face any loss in the portfolio. Without an exposure to Nifty Futures, he would have faced a loss of Rs. 46,500.

Thus the example above shows that hedging:

- Prevents losses inspite of a fall in the value of the underlying shares
- Helps investor to continue to hold the shares while taking care of intermittent losses
- Can be done by anyone with an exposure to an underlying asset class

Warning: Hedging involves costs and the outcome may not always be favourable if prices move in the reverse direction.

4.3.2 By Selling Stock Futures and Buying in Spot market

An investor on March 12, 2010 buys 2000 shares of Infosys at the price of Rs. 390 per share. The portfolio value being Rs. 7,80,000 (Rs. 390x2000). The investor feels that the market will fall and thus needs to hedge by using Infosys Futures (stock futures).

- The Infosys futures (near month) trades at Rs. 402.
- To hedge, the investor will have to sell 2000 Infosys futures.

On futures expiry day:

- The Infosys spot price is Rs. 300.

Thus the investor's loss is Rs. 90 (Rs. 390-Rs. 300) and the portfolio value would reduce to Rs. 6,00,000 (Rs. 7,80,000–Rs. 1,80,000). On the other hand the investors profit in the futures market would be Rs. 102 (Rs. 402-Rs. 300). The portfolio value would now become Rs. 8,04,000 (Rs. 6,00,000+ Rs. 2,04,000).

CHAPTER 5: Options Contracts, Mechanism and Applications

Options are the most recent and evolved derivative contracts. They have non linear or asymmetrical profit profiles making them fundamentally very different from futures and forward contracts. Options have allowed both theoreticians as well as practitioner's to explore wide range of possibilities for engineering different and sometimes exotic pay off profiles. Option contracts help a hedger reduce his risk with a much wider variety of strategies.

An option gives the holder of the option the right to do something in future. The holder does not have to exercise this right. In contrast, in a forward or futures contract, the two parties have committed themselves or are obligated to meet their commitments as specified in the contract. Whereas it costs nothing (except margin requirements) to enter into a futures contract, the purchase of an option requires an up-front payment. This chapter first introduces key terms which will enable the reader understand option terminology. Afterwards futures have been compared with options and then payoff profiles of option contracts have been defined diagrammatically. Readers can create these payoff profiles using payoff tables. They can also use basic spreadsheet software such as MS-Excel to create these profiles.

5.1 Option Terminology

- ***Index options**:* Have the index as the underlying. They can be European or American. They are also cash settled.
- ***Stock options:*** They are options on individual stocks and give the holder the right to buy or sell shares at the specified price. They can be European or American.
- ***Buyer of an option:*** The buyer of an option is the one who by paying the option premium buys the right but not the obligation to exercise his option on the seller/ writer.
- ***Writer of an option:*** The writer of a call/put option is the one who receives the option premium and is thereby obliged to sell/buy the asset if the buyer exercises on him.

There are two basic types of options, call options and put options.

- ***Call option:*** It gives the holder the right but not the obligation to buy an asset by a certain date for a certain price.
- ***Put option:*** A It gives the holder the right but not the obligation to sell an asset by a certain date for a certain price.
- ***Option price/premium:*** It is the price which the option buyer pays to the option seller. It is also referred to as the option premium.

- ***Expiration date:*** The date specified in the options contract is known as the expiration date, the exercise date, the strike date or the maturity.
- ***Strike price:*** The price specified in the options contract is known as the strike price or the exercise price.
- ***American options:*** These can be exercised at any time upto the expiration date.
- ***European options:*** These can be exercised only on the expiration date itself. European options are easier to analyze than American options and properties of an American option are frequently deduced from those of its European counterpart.
- ***In-the-money option:*** An in-the-money (ITM) option would lead to a positive cash flow to the holder if it were exercised immediately. A call option on the index is said to be in-the-money when the current index stands at a level higher than the strike price (i.e. spot price > strike price). If the index is much higher than the strike price, the call is said to be deep ITM. In the case of a put, the put is ITM if the index is below the strike price.
- ***At-the-money option:*** An at-the-money (ATM) option would lead to zero cash flow if it were exercised immediately. An option on the index is at-the-money when the current index equals the strike price (i.e. spot price = strike price).
- ***Out-of-the-money option:*** An out-of-the-money (OTM) option would lead to a negative cash flow if it were exercised immediately. A call option on the index is out-of-the-money when the current index stands at a level which is less than the strike price (i.e. spot price < strike price). If the index is much lower than the strike price, the call is said to be deep OTM. In the case of a put, the put is OTM if the index is above the strike price.
- ***Intrinsic value of an option:*** The option premium has two components - intrinsic value and time value. Intrinsic value of an option at a given time is the amount the holder of the option will get if he exercises the option at that time. The intrinsic value of a call is $Max[0, (S_t - K)]$ which means that the intrinsic value of a call is the greater of 0 or $(S_t - K)$. Similarly, the intrinsic value of a put is $Max[0, K - S_t]$,i.e. the greater of 0 or $(K - S_t)$. K is the strike price and S_t is the spot price.
- ***Time value of an option:*** The time value of an option is the **difference between its premium and its intrinsic value**. Both calls and puts have time value. The longer the time to expiration, the greater is an option's time value, all else equal. At expiration, an option should have no time value.

5.2 Comparison between Futures and Options

Options are different from futures in several interesting senses. At a practical level, the option buyer faces an interesting situation. He pays for the option in full at the time it is purchased. After this, he only has an upside. There is no possibility of the options position generating any further losses to him (other than the funds already paid for the option). This is different from futures, which is free to enter into, but can generate very large losses. This characteristic makes options attractive to many occasional market participants, who cannot put in the time to closely monitor their futures positions. Table 5.1 presents the comparison between the futures and options.

Buying put options is buying insurance. To buy a put option on Nifty is to buy insurance which reimburses the full extent to which Nifty drops below the strike price of the put option. This is attractive to many people, and to mutual funds creating "guaranteed return products".

Table 5.1: Comparison between Futures and Options

Futures	Options
Exchange traded, with novation	Same as futures.
Exchange defines the product	Same as futures.
Price is zero, strike price moves	Strike price is fixed, price moves.
Price is zero	Price is always positive.
Linear payoff	Nonlinear payoff.
Both long and short at risk	Only short at risk.

More generally, options offer "nonlinear payoffs" whereas futures only have "linear payoffs". By combining futures and options, a wide variety of innovative and useful payoff structures can be created.

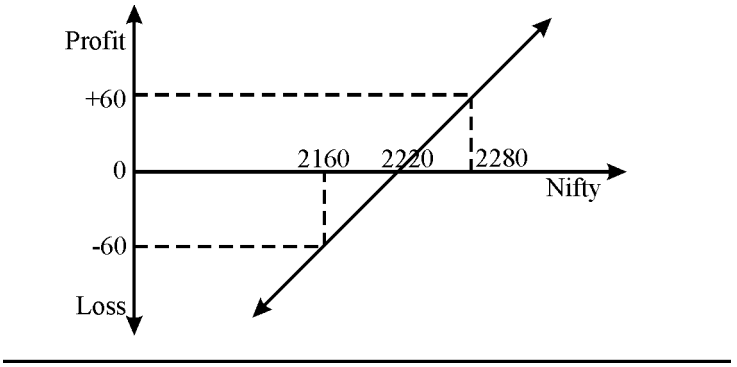
5.3 Options Payoffs

The optionality characteristic of options results in a non-linear payoff for options. It means that the losses for the buyer of an option are limited; however the profits are potentially unlimited. For a writer, the payoff is exactly the opposite. Profits are limited to the option premium; and losses are potentially unlimited. These non-linear payoffs are fascinating as they lend themselves to be used to generate various payoffs by using combinations of options and the underlying. We look here at the six basic payoffs.

5.3.1 Payoff profile of buyer of asset: Long asset

In this basic position, an investor buys the underlying asset, Nifty for instance, for 2220, and sells it at a future date at an unknown price, S_t. Once it is purchased, the investor is said to be "long" the asset. Figure 5.1 shows the payoff for a long position on the Nifty.

Figure 5.1: Payoff for investor who went Long Nifty at 2220

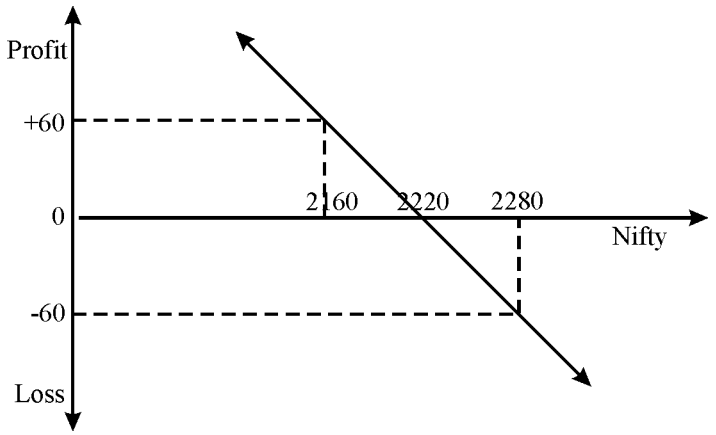


The figure 5.1 shows the profits/losses from a long position on the index. The investor bought the index at 2220. If the index goes up there is a profit else losses.

5.3.2 Payoff profile for seller of asset: Short asset

In this basic position, an investor shorts the underlying asset, Nifty for instance, for 2220, and buys it back at a future date at an unknown price, S_t. Once it is sold, the investor is said to be "short" the asset. Figure 5.2 shows the payoff for a short position on the Nifty.

Figure 5.2: Payoff for investor who went Short Nifty at 2220



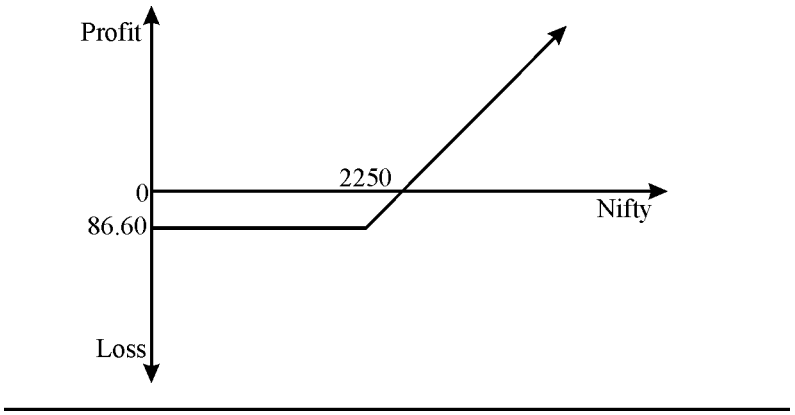
The figure 5.2 shows the profits/losses from a short position on the index. The investor sold the index at 2220. If the index falls, there are profits, else losses

5.3.3 Payoff profile for buyer of call options: Long call

A call option gives the buyer the right to buy the underlying asset at the strike price specified in the option. The profit/loss that the buyer makes on the option depends on the spot price of the underlying. If upon expiration, the spot price exceeds the strike price, he makes a profit. Higher the spot price, more is the profit. If the spot price of the underlying is less than the strike price, the option expires un-exercised. The loss in this case is the premium paid for

buying the option. Figure 5.3 gives the payoff for the buyer of a three month call option (often referred to as long call) with a strike of 2250 bought at a premium of 86.60.

Figure 5.3: Payoff for buyer of call option

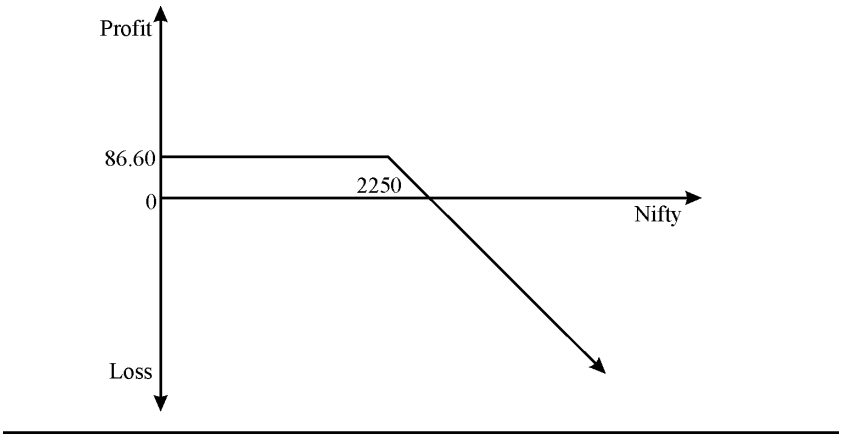


The figure 5.3 above shows the profits/losses for the buyer of a three-month Nifty 2250 call option. As can be seen, as the spot Nifty rises, the call option is in-the-money. If upon expiration, Nifty closes above the strike of 2250, the buyer would exercise his option and profit to the extent of the difference between the Nifty-close and the strike price. The profits possible on this option are potentially unlimited. However if Nifty falls below the strike of 2250, he lets the option expire. The losses are limited to the extent of the premium paid for buying the option.

5.3.4 Payoff profile for writer of call options: Short call

A call option gives the buyer the right to buy the underlying asset at the strike price specified in the option. For selling the option, the writer of the option charges a premium. The profit/loss that the buyer makes on the option depends on the spot price of the underlying. Whatever is the buyer's profit is the seller's loss. If upon expiration, the spot price exceeds the strike price, the buyer will exercise the option on the writer. Hence as the spot price increases the writer of the option starts making losses. Higher the spot price, more are the losses.. If upon expiration the spot price of the underlying is less than the strike price, the buyer lets his option expire unexercised and the writer gets to keep the premium. Figure 5.4 gives the payoff for the writer of a three month call option (often referred to as short call) with a strike of 2250 sold at a premium of 86.60.

Figure 5.4: Payoff for writer of call option

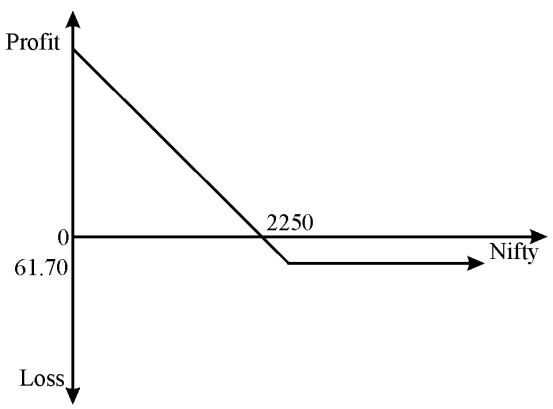


The figure 5.4 shows the profits/losses for the seller of a three-month Nifty 2250 call option. As the spot Nifty rises, the call option is in-the-money and the writer starts making losses. If upon expiration, Nifty closes above the strike of 2250, the buyer would exercise his option on the writer who would suffer a loss to the extent of the difference between the Nifty-close and the strike price. The loss that can be incurred by the writer of the option is potentially unlimited, whereas the maximum profit is limited to the extent of the up-front option premium of Rs.86.60 charged by him.

5.3.5 Payoff profile for buyer of put options: Long put

A put option gives the buyer the right to sell the underlying asset at the strike price specified in the option. The profit/loss that the buyer makes on the option depends on the spot price of the underlying. If upon expiration, the spot price is below the strike price, there is a profit. Lower the spot price more is the profit. If the spot price of the underlying is higher than the strike price, the option expires un-exercised. His loss in this case is the premium he paid for buying the option. Figure 5.5 gives the payoff for the buyer of a three month put option (often referred to as long put) with a strike of 2250 bought at a premium of 61.70.

Figure 5.5: Payoff for buyer of put option

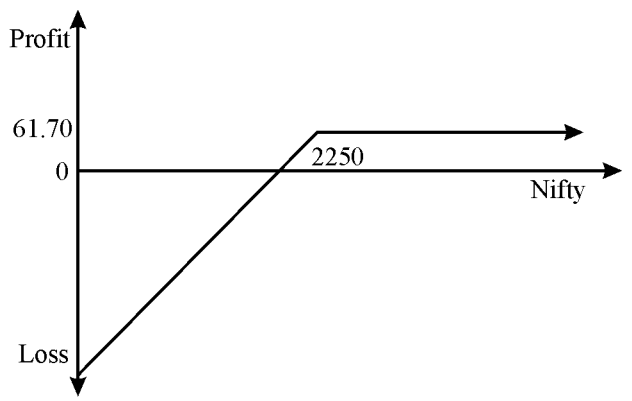


The figure 5.5 shows the profits/losses for the buyer of a three-month Nifty 2250 put option. As can be seen, as the spot Nifty falls, the put option is in-the-money. If upon expiration, Nifty closes below the strike of 2250, the buyer would exercise his option and profit to the extent of the difference between the strike price and Nifty-close. The profits possible on this option can be as high as the strike price. However if Nifty rises above the strike of 2250, the option expires worthless. The losses are limited to the extent of the premium paid for buying the option.

5.3.6 Payoff profile for writer of put options: Short put

A put option gives the buyer the right to sell the underlying asset at the strike price specified in the option. For selling the option, the writer of the option charges a premium. The profit/loss that the buyer makes on the option depends on the spot price of the underlying. Whatever is the buyer's profit is the seller's loss. If upon expiration, the spot price happens to be below the strike price, the buyer will exercise the option on the writer. If upon expiration the spot price of the underlying is more than the strike price, the buyer lets his option go un-exercised and the writer gets to keep the premium. Figure 5.6 gives the payoff for the writer of a three month put option (often referred to as short put) with a strike of 2250 sold at a premium of 61.70.

Figure 5.6: Payoff for writer of put option



The figure 5.6 shows the profits/losses for the seller of a three-month Nifty 2250 put option. As the spot Nifty falls, the put option is in-the-money and the writer starts making losses. If upon expiration, Nifty closes below the strike of 2250, the buyer would exercise his option on the writer who would suffer a loss to the extent of the difference between the strike price and Nifty-close. The loss that can be incurred by the writer of the option is a maximum extent of the strike price (Since the worst that can happen is that the asset price can fall to zero) whereas the maximum profit is limited to the extent of the up-front option premium of Rs.61.70 charged by him.

5.4 Application of Options

We look here at some applications of options contracts. We refer to single stock options here. However since the index is nothing but a security whose price or level is a weighted average of securities constituting the index, all strategies that can be implemented using stock futures can also be implemented using index options.

5.4.1 Hedging: Have underlying buy puts

Owners of stocks or equity portfolios often experience discomfort about the overall stock market movement. As an owner of stocks or an equity portfolio, sometimes one may have a view that stock prices will fall in the near future. At other times one may witness massive volatility. The union budget is a common and reliable source of such volatility: market volatility is always enhanced for one week before and two weeks after a budget. Many investors simply do not want the fluctuations of these three weeks. One way to protect your portfolio from potential downside due to a market drop is to buy insurance using put options.

Index and stock options are a cheap and can be easily implemented to seek insurance from the market ups and downs. The idea is simple. To protect the value of your portfolio from falling below a particular level, buy the right number of put options with the right strike price. If you are only concerned about the value of a particular stock that you hold, buy put options on that stock. If you are concerned about the overall portfolio, buy put options on the index. When the stock price falls your stock will lose value and the put options bought by you will gain, effectively ensuring that the total value of your stock plus put does not fall below a particular level. This level depends on the strike price of the stock options chosen by you. Similarly when the index falls, your portfolio will lose value and the put options bought by you will gain, effectively ensuring that the value of your portfolio does not fall below a particular level. This level depends on the strike price of the index options chosen by you.

Portfolio insurance using put options is of particular interest to mutual funds who already own well-diversified portfolios. By buying puts, the fund can limit its downside in case of a market fall.

5.4.2 Speculation: Bullish security, buy calls or sell puts

There are times when investors believe that security prices are going to rise. How does one implement a trading strategy to benefit from an upward movement in the underlying security? Using options there are two ways one can do this:

1. Buy call options; or
2. Sell put options

We have already seen the payoff of a call option. The downside to the buyer of the call option is limited to the option premium he pays for buying the option. His upside however is potentially unlimited. Suppose you have a hunch that the price of a particular security is going to

rise in a months time. Your hunch proves correct and the price does indeed rise, it is this upside that you cash in on. However, if your hunch proves to be wrong and the security price plunges down, what you lose is only the option premium.

Having decided to buy a call, which one should you buy? Illustration 5.1 gives the premia for one month calls and puts with different strikes. Given that there are a number of one-month calls trading, each with a different strike price, the obvious question is: which strike should you choose? Let us take a look at call options with different strike prices. Assume that the current price level is 1250, risk-free rate is 12% per year and volatility of the underlying security is 30%. The following options are available:

1. A one month call with a strike of 1200.
2. A one month call with a strike of 1225.
3. A one month call with a strike of 1250.
4. A one month call with a strike of 1275.
5. A one month call with a strike of 1300.

Which of these options you choose largely depends on how strongly you feel about the likelihood of the upward movement in the price, and how much you are willing to lose should this upward movement not come about. There are five one-month calls and five one-month puts trading in the market. The call with a strike of 1200 is deep in-the-money and hence trades at a higher premium. The call with a strike of 1275 is out-of-the-money and trades at a low premium. The call with a strike of 1300 is deep-out-of-money. Its execution depends on the unlikely event that the underlying will rise by more than 50 points on the expiration date. Hence buying this call is basically like buying a lottery. There is a small probability that it may be in-the-money by expiration, in which case the buyer will make profits. In the more likely event of the call expiring out-of-the-money, the buyer simply loses the small premium amount of Rs.27.50.

As a person who wants to speculate on the hunch that prices may rise, you can also do so by selling or writing puts. As the writer of puts, you face a limited upside and an unlimited downside. If prices do rise, the buyer of the put will let the option expire and you will earn the premium. If however your hunch about an upward movement proves to be wrong and prices actually fall, then your losses directly increase with the falling price level. If for instance the price of the underlying falls to 1230 and you've sold a put with an exercise of 1300, the buyer of the put will exercise the option and you'll end up losing Rs.70. Taking into account the premium earned by you when you sold the put, the net loss on the trade is Rs.5.20.

Having decided to write a put, which one should you write? Given that there are a number of one-month puts trading, each with a different strike price, the obvious question is: which strike should you choose? This largely depends on how strongly you feel about the likelihood

of the upward movement in the prices of the underlying. If you write an at-the-money put, the option premium earned by you will be higher than if you write an out-of-the-money put. However the chances of an at-the-money put being exercised on you are higher as well.

Illustration 5.1: One month calls and puts trading at different strikes

The spot price is 1250. There are five one-month calls and five one-month puts trading in the market. The call with a strike of 1200 is deep in-the-money and hence trades at a higher premium. The call with a strike of 1275 is out-of-the-money and trades at a low premium. The call with a strike of 1300 is deep-out-of-money. Its execution depends on the unlikely event that the price of underlying will rise by more than 50 points on the expiration date. Hence buying this call is basically like buying a lottery. There is a small probability that it may be in-the-money by expiration in which case the buyer will profit. In the more likely event of the call expiring out-of-the-money, the buyer simply loses the small premium amount of Rs. 27.50. Figure 5.7 shows the payoffs from buying calls at different strikes. Similarly, the put with a strike of 1300 is deep in-the-money and trades at a higher premium than the at-the-money put at a strike of 1250. The put with a strike of 1200 is deep out-of-the-money and will only be exercised in the unlikely event that underlying falls by 50 points on the expiration date. Figure 5.8 shows the payoffs from writing puts at different strikes.

Underlying	Strike price of option	Call Premium (Rs.)	Put Premium (Rs.)
1250	1200	80.10	18.15
1250	1225	63.65	26.50
1250	1250	49.45	37.00
1250	1275	37.50	49.80
1250	1300	27.50	64.80

In the example in Figure 5.8, at a price level of 1250, one option is in-the-money and one is out-of-the-money. As expected, the in-the-money option fetches the highest premium of Rs.64.80 whereas the out-of-the-money option has the lowest premium of Rs. 18.15.

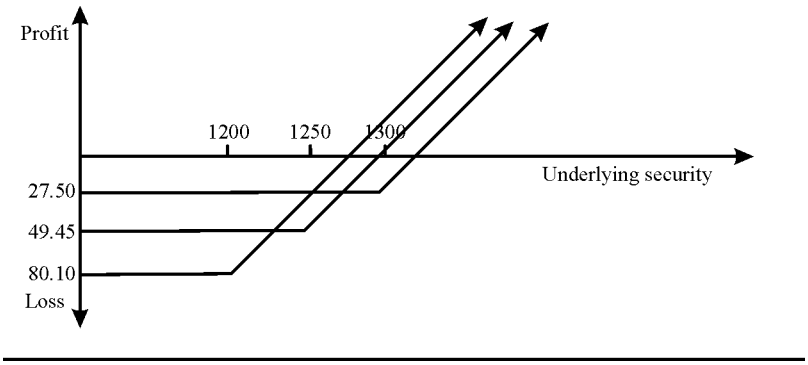
5.4.3 Speculation: Bearish security, sell calls or buy puts

Do you sometimes think that the market is going to drop? Could you make a profit by adopting a position on the market? Due to poor corporate results, or the instability of the government, many people feel that the stocks prices would go down. How does one implement a trading strategy to benefit from a downward movement in the market? Today, using options, you have two choices:

1. Sell call options; or
2. Buy put options

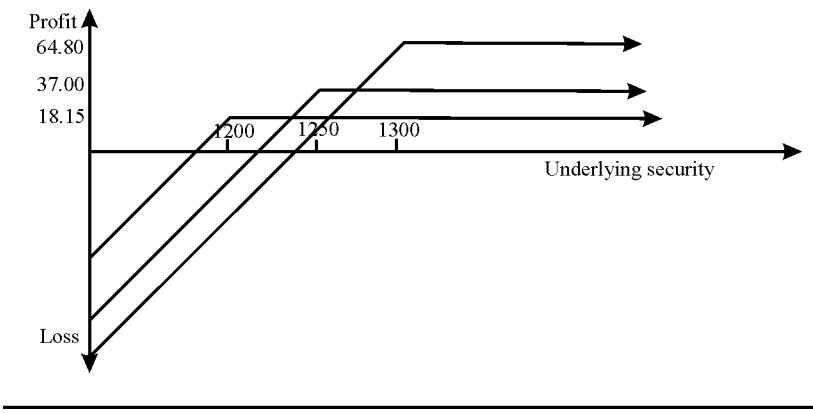
We have already seen the payoff of a call option. The upside to the writer of the call option is limited to the option premium he receives upright for writing the option. His downside however is potentially unlimited. Suppose you have a hunch that the price of a particular security is going to fall in a months time. Your hunch proves correct and it does indeed fall, it is this downside that you cash in on. When the price falls, the buyer of the call lets the call expire and you get to keep the premium. However, if your hunch proves to be wrong and the market soars up instead, what you lose is directly proportional to the rise in the price of the security.

Figure 5.7: Payoff for buyer of call options at various strikes



The figure 5.7 shows the profits/losses for a buyer of calls at various strikes. The in-the-money option with a strike of 1200 has the highest premium of Rs.80.10 whereas the out-of-the-money option with a strike of 1300 has the lowest premium of Rs. 27.50.

Figure 5.8: Payoff for writer of put options at various strikes



The figure 5.8 above shows the profits/losses for a writer of puts at various strikes. The in-the-money option with a strike of 1300 fetches the highest premium of Rs.64.80 whereas the out-of-the-money option with a strike of 1200 has the lowest premium of Rs. 18.15.

Having decided to write a call, which one should you write? Illustration 5.2 gives the premiums for one month calls and puts with different strikes. Given that there are a number of one-

month calls trading, each with a different strike price, the obvious question is: which strike should you choose? Let us take a look at call options with different strike prices. Assume that the current stock price is 1250, risk-free rate is 12% per year and stock volatility is 30%. You could write the following options:

1. A one month call with a strike of 1200.
2. A one month call with a strike of 1225.
3. A one month call with a strike of 1250.
4. A one month call with a strike of 1275.
5. A one month call with a strike of 1300.

Which of this options you write largely depends on how strongly you feel about the likelihood of the downward movement of prices and how much you are willing to lose should this downward movement not come about. There are five one-month calls and five one-month puts trading in the market. The call with a strike of 1200 is deep in-the-money and hence trades at a higher premium. The call with a strike of 1275 is out-of-the-money and trades at a low premium. The call with a strike of 1300 is deep-out-of-money. Its execution depends on the unlikely event that the stock will rise by more than 50 points on the expiration date. Hence writing this call is a fairly safe bet. There is a small probability that it may be in-the-money by expiration in which case the buyer exercises and the writer suffers losses to the extent that the price is above 1300. In the more likely event of the call expiring out-of-the-money, the writer earns the premium amount of Rs.27.50.

As a person who wants to speculate on the hunch that the market may fall, you can also buy puts. As the buyer of puts you face an unlimited upside but a limited downside. If the price does fall, you profit to the extent the price falls below the strike of the put purchased by you. If however your hunch about a downward movement in the market proves to be wrong and the price actually rises, all you lose is the option premium. If for instance the security price rises to 1300 and you've bought a put with an exercise of 1250, you simply let the put expire. If however the price does fall to say 1225 on expiration date, you make a neat profit of Rs.25.

Having decided to buy a put, which one should you buy? Given that there are a number of one-month puts trading, each with a different strike price, the obvious question is: which strike should you choose? This largely depends on how strongly you feel about the likelihood of the downward movement in the market. If you buy an at-the-money put, the option premium paid by you will by higher than if you buy an out-of-the-money put. However the chances of an at-the-money put expiring in-the-money are higher as well.

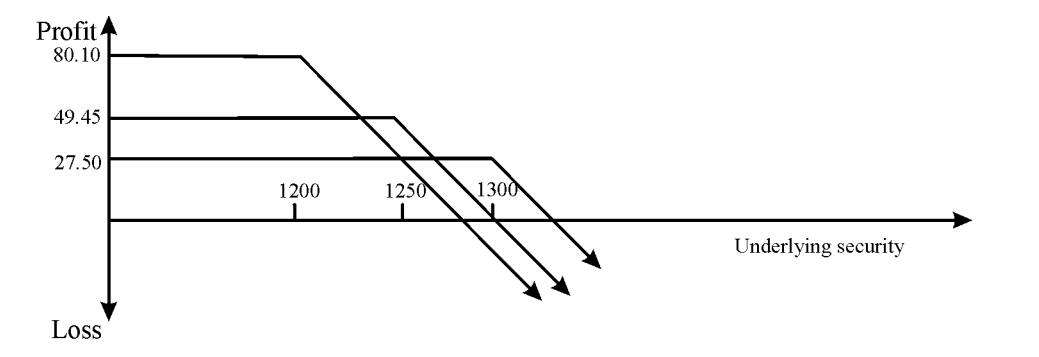
Illustration 5.2: One month calls and puts trading at different strikes

The spot price is 1250. There are five one-month calls and five one-month puts trading in the market. The call with a strike of 1200 is deep in-the-money and hence trades at a higher

premium. The call with a strike of 1275 is out-of-the-money and trades at a low premium. The call with a strike of 1300 is deep-out-of-money. Its execution depends on the unlikely event that the price will rise by more than 50 points on the expiration date. Hence writing this call is a fairly safe bet. There is a small probability that it may be in-the-money by expiration in which case the buyer exercises and the writer suffers losses to the extent that the price is above 1300. In the more likely event of the call expiring out-of-the-money, the writer earns the premium amount of Rs.27.50. Figure 5.9 shows the payoffs from writing calls at different strikes. Similarly, the put with a strike of 1300 is deep in-the-money and trades at a higher premium than the at-the-money put at a strike of 1250. The put with a strike of 1200 is deep out-of-the-money and will only be exercised in the unlikely event that the price falls by 50 points on the expiration date. The choice of which put to buy depends upon how much the speculator expects the market to fall. Figure 5.9 shows the payoffs from buying puts at different strikes.

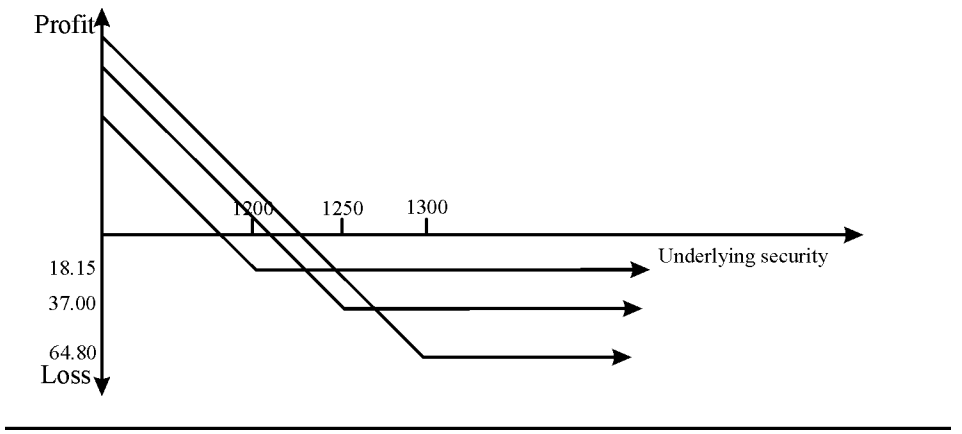
Price	Strike price of option	Call Premium(Rs.)	Put Premium(Rs.)
1250	1200	80.10	18.15
1250	1225	63.65	26.50
1250	1250	49.45	37.00
1250	1275	37.50	49.80
1250	1300	27.50	64.80

Figure 5.9: Payoff for seller of call option at various strikes



The figure 5.9 shows the profits/losses for a seller of calls at various strike prices. The in-the-money option has the highest premium of Rs.80.10 whereas the out-of-the-money option has the lowest premium of Rs. 27.50.

Figure 5.10: Payoff for buyer of put option at various strikes



The figure 5.10 shows the profits/losses for a buyer of puts at various strike prices. The in-the-money option has the highest premium of Rs.64.80 whereas the out-of-the-money option has the lowest premium of Rs. 18.50.

5.4.4 Bull spreads - Buy a call and sell another

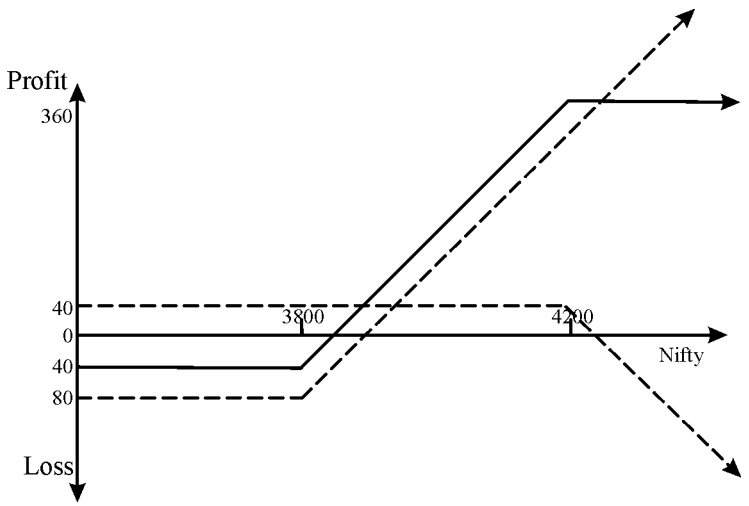
There are times when you think the market is going to rise over the next two months, however in the event that the market does not rise, you would like to limit your downside. One way you could do this is by entering into a spread. A spread trading strategy involves taking a position in two or more options of the same type, that is, two or more calls or two or more puts. A spread that is designed to profit if the price goes up is called a bull spread.

How does one go about doing this? This is basically done utilizing two call options having the same expiration date, but different exercise prices. The buyer of a bull spread buys a call with an exercise price below the current index level and sells a call option with an exercise price above the current index level. The spread is a bull spread because the trader hopes to profit from a rise in the index. The trade is a spread because it involves buying one option and selling a related option. Compared to buying the underlying asset itself, the bull spread with call options limits the trader's risk, but the bull spread also limits the profit potential.

Figure 5.11: Payoff for a bull spread created using call options

The figure 5.11 shows the profits/losses for a bull spread. As can be seen, the payoff obtained is the sum of the payoffs of the two calls, one sold at Rs.40 and the other bought at Rs.80. The cost of setting up the spread is Rs.40 which is the difference between the call premium paid and the call premium received. The downside on the position is limited to this amount. As the index moves above 3800, the position starts making profits (cutting losses) until the index reaches 4200. Beyond 4200, the profits made on the long call position get offset by the losses made on the short call position and hence the maximum profit on this spread is made if the index on the expiration day closes at 4200. Hence the payoff on this spread lies between -40

to 360. Somebody who thinks the index is going to rise, but not above 4200 would buy this spread. Hence he does not want to buy a call at 3800 and pay a premium of 80 for an upside he believes will not happen.



In short, it limits both the upside potential as well as the downside risk. The cost of the bull spread is the cost of the option that is purchased, less the cost of the option that is sold. Illustration 5.2 gives the profit/loss incurred on a spread position as the index changes. Figure 5.11 shows the payoff from the bull spread.

Broadly, we can have three types of bull spreads:

1. Both calls initially out-of-the-money.
2. One call initially in-the-money and one call initially out-of-the-money, and
3. Both calls initially in-the-money.

The decision about which of the three spreads to undertake depends upon how much risk the investor is willing to take. The most aggressive bull spreads are of type 1. They cost very little to set up, but have a very small probability of giving a high payoff.

Illustration 5.3: Expiration day cash flows for a Bull spread using two-month calls

The table shows possible expiration day profit for a bull spread created by buying calls at a strike of 3800 and selling calls at a strike of 4200. The cost of setting up the spread is the call premium paid (Rs.80) minus the call premium received (Rs.40), which is Rs.40. This is the maximum loss that the position will make. On the other hand, the maximum profit on the spread is limited to Rs.360. Beyond an index level of 4200, any profits made on the long call position will be cancelled by losses made on the short call position, effectively limiting the profit on the combination.

Nifty Jan 3800	Buy Call 4200 Call	Sell Jan	Cash Flow	Profit & Loss (Rs.)
3700	0	0	0	-40
3750	0	0	0	-40
3800	0	0	0	-40
3850	+50	0	50	+10
3900	+100	0	100	+60
3950	+150	0	150	+110
4000	+200	0	200	+160
4050	+250	0	250	+210
4100	+300	0	300	+260
4150	+350	0	350	+310
4200	+400	0	400	+360
4250	+450	-50	400	+360
4300	+500	-100	400	+360

5.4.5 Bear spreads - sell a call and buy another

There are times when you think the market is going to fall over the next two months. However in the event that the market does not fall, you would like to limit your downside. One way you could do this is by entering into a spread. A spread trading strategy involves taking a position in two or more options of the same type, that is, two or more calls or two or more puts. A spread that is designed to profit if the price goes down is called a bear spread.

This is basically done utilizing two call options having the same expiration date, but different exercise prices. In a bear spread, the strike price of the option purchased is greater than the strike price of the option sold. The buyer of a bear spread buys a call with an exercise price above the current index level and sells a call option with an exercise price below the current index level. The spread is a bear spread because the trader hopes to profit from a fall in the index. The trade is a spread because it involves buying one option and selling a related option. Compared to buying the index itself, the bear spread with call options limits the trader's risk, but it also limits the profit potential. In short, it limits both the upside potential as well as the downside risk.

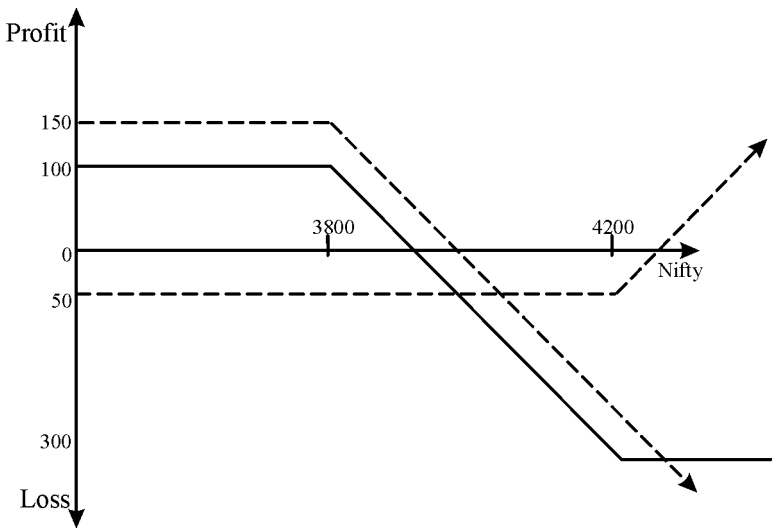
A bear spread created using calls involves initial cash inflow since the price of the call sold is greater than the price of the call purchased. Illustration 5.4 gives the profit/loss incurred on a spread position as the index changes. Figure 5.12 shows the payoff from the bear spread.

Broadly we can have three types of bear spreads:

1. Both calls initially out-of-the-money.
2. One call initially in-the-money and one call initially out-of-the-money, and
3. Both calls initially in-the-money.

The decision about which of the three spreads to undertake depends upon how much risk the investor is willing to take. The most aggressive bear spreads are of type 1. They cost very little to set up, but have a very small probability of giving a high payoff. As we move from type 1 to type 2 and from type 2 to type 3, the spreads become more conservative and cost higher to set up. Bear spreads can also be created by buying a put with a high strike price and selling a put with a low strike price.

Figure 5.12: Payoff for a bear spread created using call options



The figure 5.12 shows the profits/losses for a bear spread. As can be seen, the payoff obtained is the sum of the payoffs of the two calls, one sold at Rs. 150 and the other bought at Rs.50. The maximum gain from setting up the spread is Rs. 100 which is the difference between the call premium received and the call premium paid. The upside on the position is limited to this amount. As the index moves above 3800, the position starts making losses (cutting profits) until the spot reaches 4200. Beyond 4200, the profits made on the long call position get offset by the losses made on the short call position. The maximum loss on this spread is made if the index on the expiration day closes at 2350. At this point the loss made on the two call position together is Rs.400 i.e. (4200-3800). However the initial inflow on the spread being Rs.100, the net loss on the spread turns out to be 300. The downside on this spread position is limited to this amount. Hence the payoff on this spread lies between +100 to -300.

Illustration 5.4: Expiration day cash flows for a Bear spread using two-month calls

The table shows possible expiration day profit for a bear spread created by selling one market lot of calls at a strike of 3800 and buying a market lot of calls at a strike of 4200. The maximum profit obtained from setting up the spread is the difference between the premium received for the call sold (Rs. 150) and the premium paid for the call bought (Rs.50) which is Rs. 100.

In this case the maximum loss obtained is limited to Rs.300. Beyond an index level of 4200, any profits made on the long call position will be canceled by losses made on the short call position, effectively limiting the profit on the combination.

Nifty	Buy Jan Call 4200	Sell Jan 3800 Call	Cash Flow	Profit & Loss (Rs.)
3700	0	0	0	+100
3750	0	0	0	+100
3800	0	0	0	+100
3850	0	-50	-50	+50
3900	0	-100	-100	0
3950	0	-150	-150	-50
4000	0	-200	-200	-100
4050	0	-250	-250	-150
4100	0	-300	-300	-200
4150	0	-350	-350	-250
4200	0	-400	-400	-300
4250	+50	-450	-400	-300
4300	+100	-500	-400	-300

CHAPTER 6: Pricing of Options Contracts and Greek Letters

An option buyer has the right but not the obligation to exercise on the seller. The worst that can happen to a buyer is the loss of the premium paid by him. His downside is limited to this premium, but his upside is potentially unlimited. This optionality is precious and has a value, which is expressed in terms of the option price. Just like in other free markets, it is the supply and demand in the secondary market that drives the price of an option.

There are various models which help us get close to the true price of an option. Most popular among them are the binomial option pricing model and the much celebrated Black-Scholes model. Today most calculators and spread-sheets come with a built-in Black-Scholes options pricing formula so to price options we don't really need to memorize the formula. All we need to know is the variables that go into the model.

This chapter first looks at the key variable affecting an option's price. Afterwards we describe the limit of pricing of call and put options. Thereafter we discuss the Black-Scholes Option pricing model[4]. The chapter ends with an overview of option Greeks used for hedging portfolios with option contracts.

6.1 Variables affecting Option Pricing

Option prices are affected by six factors. These are Spot Price (S), Strike Price (X), Volatility (σ) of spot price, Time for expiration of contract (T) risk free rate of return (r) and Dividend on the asset (D). The price of a call option rises with rise in spot price as due to rise in prices the option becomes more likely to exercise. It however falls with the rise in strike price as the payoff (S-X) falls. The opposite is true for the price of put options. The rise in volatility levels of the stock price however leads to increase in price of both call and put options. The option price is higher for an option which has a longer period to expire. Option prices tend to fall as contracts are close to expiry. This is because longer the term of an option higher is the likelihood or probability that it would be exercised. It should be noted that the time factor is applicable only for American options and not European types. The rise in risk free rate tends to increase the value of call options and decrease the value of put options. Similarly price of a call option is negatively related with size of anticipated dividends. Price of put option positively related with size of anticipated dividends.

[4] The Black-Scholes Option Pricing Model was developed in 1973

All option contracts have price limits. This implies that one would pay a definite maximum or a definite minimum price for acquiring an option. The limits can be defined as follows:

(i) The maximum price of a call option can be the price of underlying asset. In case of stocks a call option on it can never be larger than its spot price. This is true for both European and American call options.

(ii) The minimum price for a European call option would always be the difference in the spot price (S) and present value of the strike price (x). Symbolically it can be written as equal to $S - Xe^{-rt}$. Here X has been discounted at the risk free rate. This is true only for European options.

(iii) The maximun price for a put option can never be more than the present value of the strike price X (discounted at risk free rate r). This is true for both types of options European and American.

(iv) The minimum price of the European put option would always be equal to difference between present value of strike price and the spot price of the asset. This can be symbolically expressed as $Xe^{-rt} - S$.

For the sake of simplicity the above relationships have been written for options on non dividend paying stocks. In practice a minor adjustment is done is the formulae to calculate the price limits for options on dividend paying stocks.

6.2 The Black Scholes Merton Model for Option Pricing (BSO)

This model of option pricing was first mentioned in articles "The Pricing of Options and Corporate Liabilities" by F. Black and M. Scholes published in the *Journal of Political Economy* and "Theory of Rational Option Pricing" by R. C. Merton in *Bell Journal of Economics and Management Science.* It was later considered a major breakthrough in the area of option pricing and had a tremendous influence on the way traders price and hedge the options. Although F. Black died in 1995, Merton and The model is based on the premise that stock price changes are random in nature but log normally distributed and that technical analysis does not matter. According to the BSO model he option price and the stock price depend on the same underlying source of uncertainty and we can form a portfolio consisting of the stock and the option which eliminates this source of uncertainty.

Such a portfolio is instantaneously riskless and must instantaneously earn the risk-free rate. The result of this analysis was the Black-Scholes differential equation which is given as (without proof).

$$\frac{\partial f}{\partial t} + rS\,\frac{\partial f}{\partial S} + \tfrac{1}{2}\,\sigma^2 S^2\,\frac{\partial f}{\partial S^2} = rf \qquad \text{..... 6.1}$$

Here S is stock price t is term of the option (time to maturity) r the risk free rate and ó the volatility of stock price.

The Black-Scholes formulas for the prices of European calls and puts with strike price X on a non-dividend paying stock are the roots of the differential equation 6.5 (without proof):

$$C = SN(d_1) - X_e^{-rT} N(d_2)$$

$$P = Xe^{-rT} N(-d_2) - SN(-d_1)$$

$$\text{where } d_1 = \frac{1n\frac{S}{X} + (r + \sigma^2/2)T}{\sigma\sqrt{T}}$$

$$\text{and } d_2 = d_1 - \sigma\sqrt{T}$$

- $N(x)$ is the cumulative distribution function for a standardized normal distribution.
- The expression $N(d_2)$ is the probability that the option will be exercised in a risk neutral world, so that $N(d_2)$ is the strike price times the probability that the strike price will be paid.
- The expression $S_0N(d_1)e^{rt}$ is the expected value of a variable that equals S_T if S_T>X and is 0 otherwise in a risk neutral world. Here S_T is the spot price at time T and X is the strike price.
- σ is a measure of volatility, is the annualized standard deviation of continuously compounded returns on the underlying. When daily *sigma* is given, they need to be converted into annualized *sigma.*
- *Sigma $_{annual}$ = sigma $_{daily}$ × vNumber of trading days per year. On an average there are 250 trading days in a year.*
- *X is the exercise price, S the spot price and T the time to expiration measured in years.*
- When S becomes very large a call option is almost certain to be exercised.
- It also becomes similar to a forward contract with a delivery price K. Thus the call option price will be $c = S - Xe^{-r\,T}$
- As S becomes very large both $N(d_1)$ and $N(d_2)$ are both close to 1.0.
- Similarly the put option price will be 0 as $N(-d_1)$ and $N(-d_2)$ will be close to 0.
- Similarly when ó approaches zero d_1 and d_2 tend to infinity so that $N(d_1)$ and $N(d_2)$ tend to 1.0 and the value of call option is:

  $c = S - X\,e^{-r\,T}$

Thus the call price will always be the max($S - X\,e^{-r\,T}$,0).

The Black Scholes model uses continuous compounding as discussed in Chapter 2. One need not remember the formulae or equation as several option price calculators are available freely (in spreadsheet formats also).

6.3 The Greeks

Each Greek letter measures a different dimension to the risk in an option position. These are used by traders who have sold options in the market. Aim of traders is to manage the Greeks in order to manage their overall portfolio. There are five Greeks used for hedging portfolios of options with underlying assets (index or individual stocks). These are denoted by delta, theta, gamma, vega and rho each represented by Greek letters $\triangle, \ominus, \Gamma, \nu$ and ρ.

6.3.1 Delta ($\triangle$)

In general delta ($\triangle$) of a portfolio is change in value of portfolio with respect to change in price of underlying asset. Delta of an option on the other hand is rate of change of the option price with respect to price of the underlying asset.

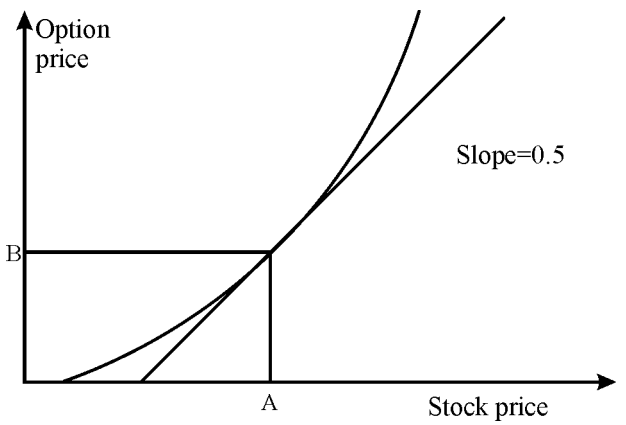
$\triangle$ is the rate of change of option price with respect to the price of the underlying asset. For example, the delta of a stock is 1. It is the slope of the curve that relates the option price to the price of the underlying asset. Suppose the $\triangle$ of a call option on a stock is 0.5. This means that when the stock price changes by one, the option price changes by about 0.5, or 50% of the change in the stock price. Figure 5.13 shows the delta of a stock option.

Expressed differently, $\triangle$ is the change in the price of call option per unit change in the spot price of the underlying asset. $\triangle = \partial C/\partial S$. The delta of a European call on a stock paying dividends at rate q is $N(d_1)e^{-qT}$ .The delta of a European put is

$e^{-qT}[N(d_1) - 1]$

The $\triangle$ of a call is always positive and the $\triangle$ of a put is always negative. As the stock price (underlying asset) changes delta of the option also changes. In order to maintain delta at the same level a given number of stocks (underlying asset) need to be bought or sold in the market. Maintaining delta at the same level is known as delta neutrality or delta hedging.

Figure 6.1 $\triangle$ as slope



6.3.2 Gamma (Γ)

Γ is the rate of change of the option's Delta $\triangle$ with respect to the price of the underlying asset. In other words, it is the second derivative of the option price with respect to price of the underlying asset.

6.3.3 Theta (Θ)

Θ of a portfolio of options, is the rate of change of the value of the portfolio with respect to the passage of time with all else remaining the same. Θ is also referred to as the *time decay* of the portfolio. Θ is the change in the portfolio value when one day passes with all else remaining the same. We can either measure Θ "per calendar day" or "per trading day". To obtain the per calendar day, the formula for *Theta* must be divided by 365; to obtain *Theta* per trading day, it must be divided by 250.

6.3.4 Vega (ν)

The vega of a portfolio of derivatives is the rate of change in the value of the portfolio with respect to volatility of the underlying asset. If ν is high in absolute terms, the portfolio's value is very sensitive to small changes in volatility. If ν is low in absolute terms, volatility changes have relatively little impact on the value of the portfolio.

6.3.5 Rho (ρ)

The ρ of a portfolio of options is the rate of change of the value of the portfolio with respect to the interest rate. It measures the sensitivity of the value of a portfolio to interest rates.

Chapter 7: Trading of Derivatives Contracts

This chapter provides an overview of the trading system for NSE's futures and options market. First section describes entities in the trading system; basis of trading, Client-broker relationship in derivative segment and order types and conditions. The second section describes the trader workstation using screenshots from trading screens at NSE. This section also describes how to place orders.

The best way to get a feel of the trading system, however, is to actually watch the screen and observe trading.

7.1 Futures and Options Trading System

The futures & options trading system of NSE, called NEAT-F&O trading system, provides a fully automated screen-based trading for Index futures & options and Stock futures & options on a nationwide basis as well as an online monitoring and surveillance mechanism. It supports an order driven market and provides complete transparency of trading operations. It is similar to that of trading of equities in the cash market segment.

The software for the F&O market has been developed to facilitate efficient and transparent trading in futures and options instruments. Keeping in view the familiarity of trading members with the current capital market trading system, modifications have been performed in the existing capital market trading system so as to make it suitable for trading futures and options.

7.1.1 Entities in the trading system

Following are the four entities in the trading system:

- ***Trading members:*** Trading members are members of NSE. They can trade either on their own account or on behalf of their clients including participants. The exchange assigns a trading member ID to each trading member. Each trading member can have more than one user. The number of users allowed for each trading member is notified by the exchange from time to time. Each user of a trading member must be registered with the exchange and is assigned an unique user ID. The unique trading member ID functions as a reference for all orders/trades of different users. This ID is common for all users of a particular trading member. It is the responsibility of the trading member to maintain adequate control over persons having access to the firm's User IDs.
- ***Clearing members:*** Clearing members are members of NSCCL. They carry out risk management activities and confirmation/inquiry of trades through the trading system.
- ***Professional clearing members:*** A professional clearing member is a clearing member who is not a trading member. Typically, banks and custodians become professional clearing members and clear and settle for their trading members.

- ***Participants:*** A participant is a client of trading members like financial institutions. These clients may trade through multiple trading members but settle through a single clearing member.

7.1.2 Basis of trading

The NEAT F&O system supports an order driven market, wherein orders match automatically. Order matching is essentially on the basis of security, its price, time and quantity. All quantity fields are in units and price in rupees. The exchange notifies the regular lot size and tick size for each of the contracts traded on this segment from time to time. When any order enters the trading system, it is an active order. It tries to find a match on the other side of the book. If it finds a match, a trade is generated. If it does not find a match, the order becomes passive and goes and sits in the respective outstanding order book in the system.

7.1.3 Corporate hierarchy

In the F&O trading software, a trading member has the facility of defining a hierarchy amongst users of the system. This hierarchy comprises corporate manager, branch manager dealer and admin.

- ***Corporate manager:*** The term is assigned to a user placed at the highest level in a trading firm. Such a user can perform all the functions such as order and trade related activities of all users, view net position of all dealers and at all clients level, can receive end of day consolidated trade and order reports dealer wise for all branches of the trading member firm and also all dealers of the firm. Only a corporate manager can sign off any user and also define exposure limits for the branches of the firm and its dealers.
- ***Branch manager:*** This term is assigned to a user who is placed under the corporate manager. Such a user can perform and view order and trade related activities for all dealers under that branch.
- ***Dealer:*** Dealers are users at the bottom of the hierarchy. A Dealer can perform view order and trade related activities only for oneself and does not have access to information on other dealers under either the same branch or other branches.
- ***Admin:*** Another user type, 'Admin' is provided to every trading member along with the corporate manager user. This user type facilitates the trading members and the clearing members to receive and capture on a real-time basis all the trades, exercise requests and give up requests of all the users under him. The clearing members can receive and capture all the above information on a real time basis for the members and participants linked to him. All this information is written to comma separated files which can be accessed by any other program on a real time basis in a read only mode. This however does not affect the online data capture process. Besides this the admin users can take online backup, view and upload net position, view previous trades,

view give-up screens and exercise request for all the users (corporate managers, branch managers and dealers) belonging to or linked to the member. The 'Admin' user can also view the relevant messages for trades, exercise and give up requests in the message area. However, 'Admin' user cannot put any orders or modify & cancel them.

A brief description of the activities of each member is given below:

- ***Clearing member corporate manager:*** Can view outstanding orders, previous trades and net position of his client trading members by putting the TM ID (Trading member identification) and leaving the branch ID and dealer ID blank.
- ***Clearing member and trading member corporate manager:*** Can view:
  (a) Outstanding orders, previous trades and net position of his client trading members by putting the TM ID and leaving the branch ID and the dealer ID blank.
  (b) Outstanding orders, previous trades and net positions entered for himself by entering his own TM ID, branch ID and user ID. This is his default screen.
  (c) Outstanding orders, previous trades and net position entered for his branch by entering his TM ID and branch ID fields.
  (d) Outstanding orders, previous trades, and net positions entered for any of his users/dealers by entering his TM ID, branch ID and user ID fields.
- ***Clearing member and trading member dealer:*** Can only view requests entered by him.
- ***Trading member corporate manager:*** Can view:
  (a) Outstanding requests and activity log for requests entered by him by entering his own branch and user IDs. This is his default screen.
  (b) Outstanding requests entered by his dealers and/or branch managers by either entering the branch and/or user IDs or leaving them blank.
- ***Trading member branch manager:*** He can view:
  (a) Outstanding requests and activity log for requests entered by him by entering his own branch and user IDs. This is his default screen.
  (b) Outstanding requests entered by his users either by filling the user ID field with a specific user or leaving the user ID field blank.
- ***Trading member dealer:*** He can only view requests entered by him.

7.1.4 Client Broker Relationship in Derivative Segment

A trading member must ensure compliance particularly with relation to the following while dealing with clients:

- Filling of 'Know Your Client' form
- Execution of Client Broker agreement
- Bring risk factors to the knowledge of client by getting acknowledgement of client on risk disclosure document
- Timely execution of orders as per the instruction of clients in respective client codes.
- Collection of adequate margins from the client
- Maintaining separate client bank account for the segregation of client money.
- Timely issue of contract notes as per the prescribed format to the client
- Ensuring timely pay-in and pay-out of funds to and from the clients
- Resolving complaint of clients if any at the earliest.
- Avoiding receipt and payment of cash and deal only through account payee cheques
- Sending the periodical statement of accounts to clients
- Not charging excess brokerage
- Maintaining unique client code as per the regulations.

7.1.5 Order types and conditions

The system allows the trading members to enter orders with various conditions attached to them as per their requirements. These conditions are broadly divided into the following categories:

- Time conditions
- Price conditions
- Other conditions

    - **Time conditions**

        - ***Day order:*** A day order, as the name suggests is an order which is valid for the day on which it is entered. If the order is not executed during the day, the system cancels the order automatically at the end of the day.
        - ***Immediate or Cancel (IOC):*** An IOC order allows the user to buy or sell a contract as soon as the order is released into the system, failing which the order is cancelled from the system. Partial match is possible for the order, and the unmatched portion of the order is cancelled immediately.

- **Price condition**

  - ***Stop-loss:*** This facility allows the user to release an order into the system, after the market price of the security reaches or crosses a threshold price e.g. if for stop-loss buy order, the trigger is 1027.00, the limit price is 1030.00 and the market (last traded) price is 1023.00, then this order is released into the system once the market price reaches or exceeds 1027.00. This order is added to the regular lot book with time of triggering as the time stamp, as a limit order of 1030.00. For the stop-loss sell order, the trigger price has to be greater than the limit price.

- **Other conditions**

  - ***Market price:*** Market orders are orders for which no price is specified at the time the order is entered (i.e. price is market price). For such orders, the system determines the price.

  - ***Trigger price:*** Price at which an order gets triggered from the stop-loss book.

  - ***Limit price:*** Price of the orders after triggering from stop-loss book.

  - ***Pro:*** Pro means that the orders are entered on the trading member's own account.

  - ***Cli:*** Cli means that the trading member enters the orders on behalf of a client.

7.2 The Trader Workstation

7.2.1 The Market Watch Window

The following windows are displayed on the trader workstation screen:

- Title bar
- Ticker window of futures and options market
- Ticker window of underlying (capital) market
- Toolbar
- Market watch window
- Inquiry window
- Snap quote
- Order/trade window
- System message window

As mentioned earlier, the best way to familiarize oneself with the screen and its various segments is to actually spend some time studying a live screen. In this section we shall restrict ourselves to understanding just two segments of the workstation screen, the market watch window and the inquiry window.

The market watch window is the third window from the top of the screen which is always visible to the user. The purpose of market watch is to allow continuous monitoring of contracts or securities that are of specific interest to the user. It displays trading information for contracts selected by the user. The user also gets a broadcast of all the cash market securities on the screen. This function also will be available if the user selects the relevant securities for display on the market watch screen. Display of trading information related to cash market securities will be on "Read only" format, i.e. the dealer can only view the information on cash market but, cannot trade in them through the system. This is the main window from the dealer's perspective.

7.2.2 Inquiry window

The inquiry window enables the user to view information such as Market by Price (MBP), Previous Trades (PT), Outstanding Orders (OO), Activity log (AL), Snap Quote (SQ), Order Status (OS), Market Movement (MM), Market Inquiry (MI), Net Position, On line backup, Multiple index inquiry, Most active security and so on. Relevant information for the selected contract/security can be viewed. We shall look in detail at the Market by Price (MBP) and the Market Inquiry (MI) screens.

Market by price (MBP): The purpose of the MBP is to enable the user to view passive orders in the market aggregated at each price and are displayed in order of best prices. The window can be invoked by pressing the [F6] key. If a particular contract or security is selected, the details of the selected contract or security can be seen on this screen. Figure 7.1 gives the screen shot of the Market by Price window in the NEAT F&O.

Market inquiry (MI): The market inquiry screen can be invoked by using the [F11] key. If a particular contract or security is selected, the details of the selected contract or selected security defaults in the selection screen or else the current position in the market watch defaults. The first line of the screen gives the Instrument type, symbol, expiry, contract status, total traded quantity, life time high and life time low. The second line displays the closing price, open price, high price, low price, last traded price and indicator for net change from closing price. The third line displays the last traded quantity, last traded time and the last traded date. The fourth line displays the closing open interest, the opening open interest, day high open interest, day low open interest, current open interest, life time high open interest, life time low open interest and net change from closing open interest. The fifth line display very important information, namely the carrying cost in percentage terms. Figure 7.2 shows the Market Inquiry screen of the NEAT F&O.

Figure 7.1: Market by price in NEAT F&O

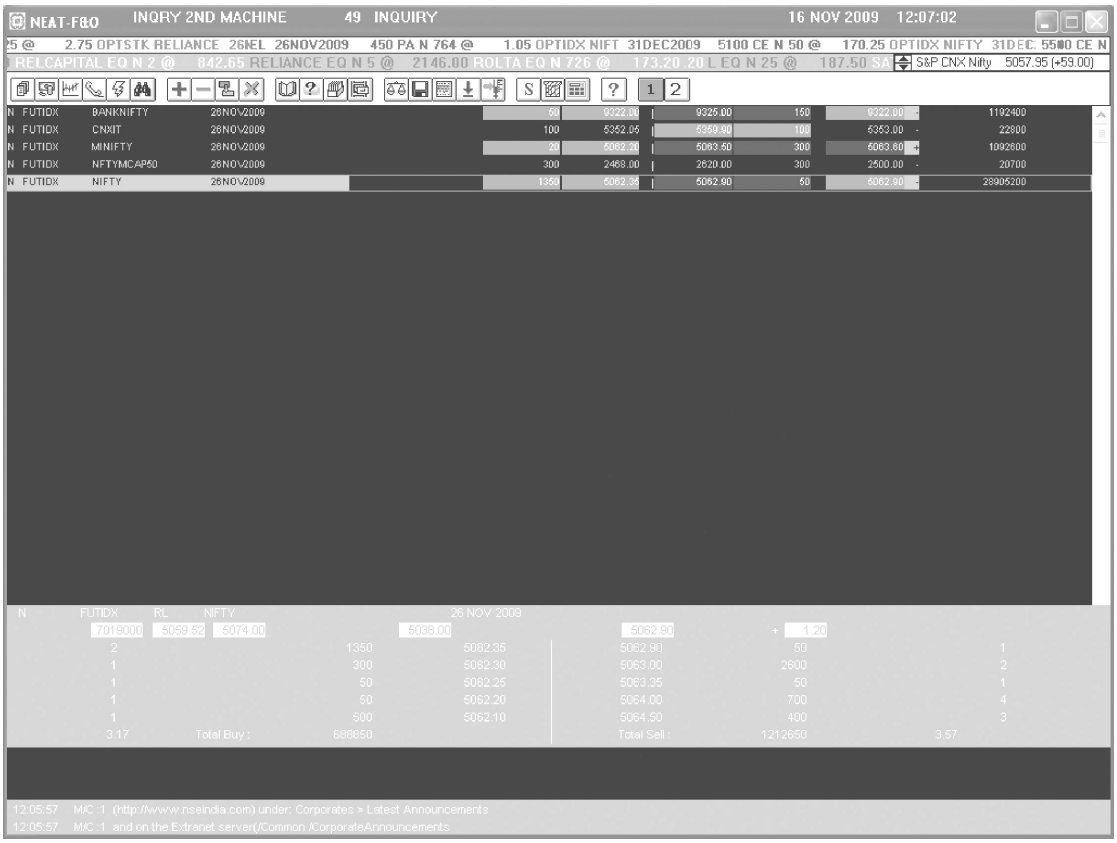
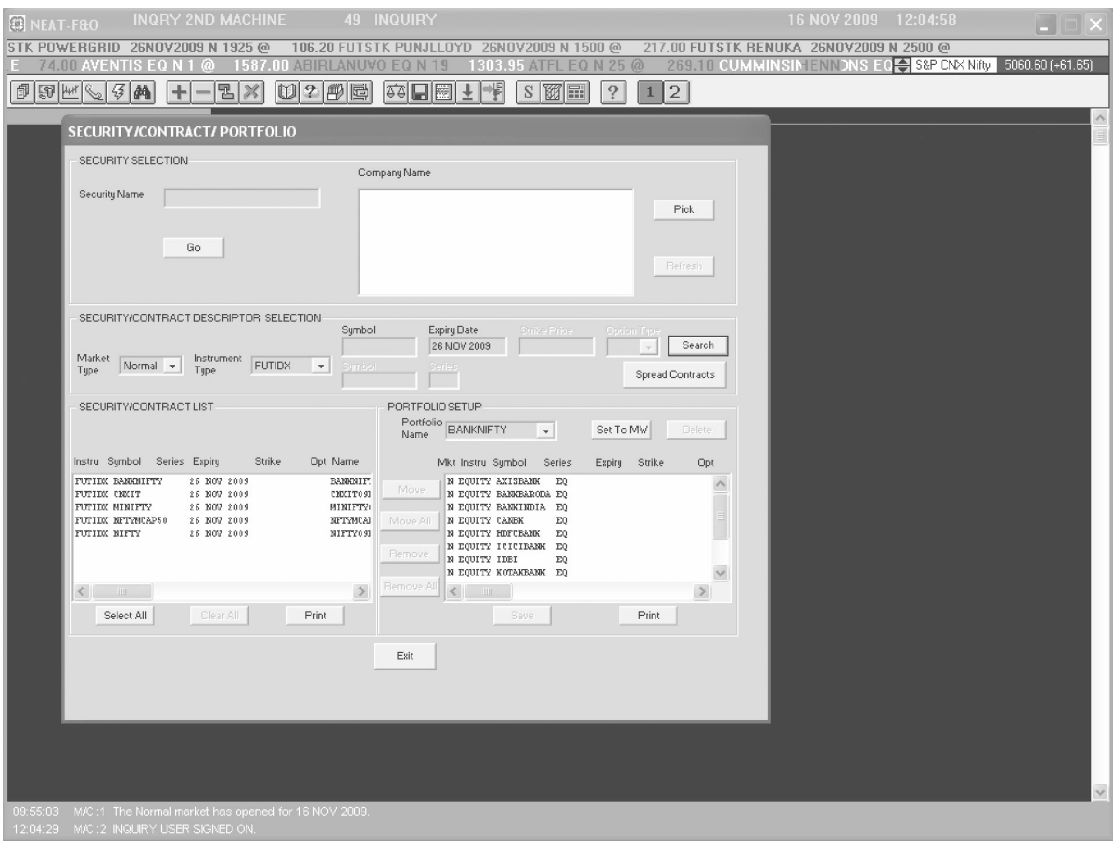


Figure 7.2: Security/contract/portfolio entry screen in NEAT F&O



7.2.3 Placing orders on the trading system

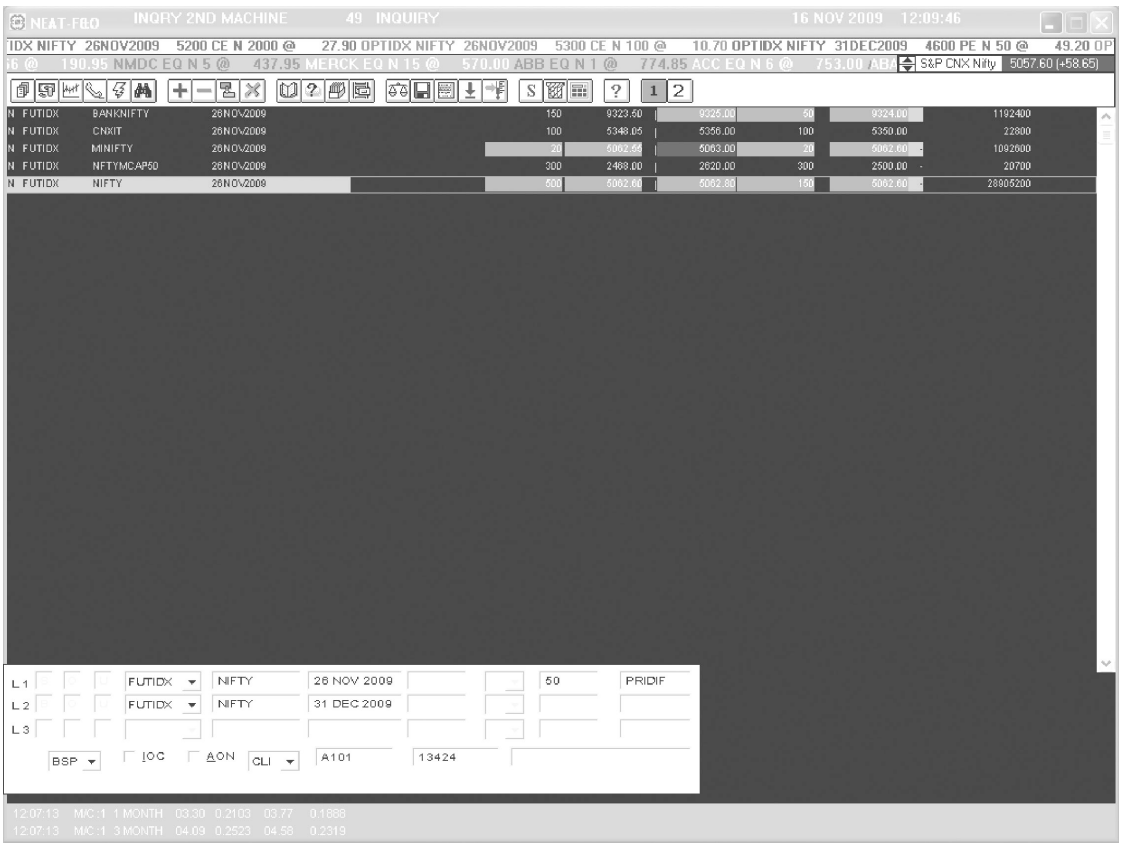
For both the futures and the options market, while entering orders on the trading system, members are required to identify orders as being proprietary or client orders. Proprietary orders should be identified as 'Pro' and those of clients should be identified as 'Cli'. Apart from this, in the case of 'Cli' trades, the client account number should also be provided.

The futures market is a zero sum game i.e. the total number of long in any contract always equals the total number of short in any contract. The total number of outstanding contracts (long/short) at any point in time is called the "Open interest". This Open interest figure is a good indicator of the liquidity in every contract. Based on studies carried out in international exchanges, it is found that open interest is maximum in near month expiry contracts.

7.2.4 Market spread/combination order entry

The NEAT F&O trading system also enables to enter spread/combination trades. Figure 7.3 shows the spread/combination screen. This enables the user to input two or three orders simultaneously into the market. These orders will have the condition attached to it that unless and until the whole batch of orders finds a countermatch, they shall not be traded. This facilitates spread and combination trading strategies with minimum price risk. The combinations orders are traded with an IOC attribute whereas spread orders are traded with 'day' order attribute.

Figure 7.3: Market spread/combination order entry



7.3 Futures and Options Market Instruments

The F&O segment of NSE provides trading facilities for the following derivative instruments:

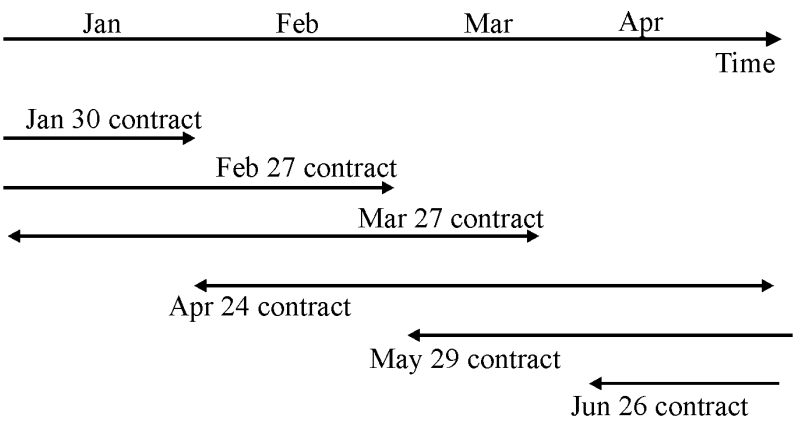
1. Index based futures
2. Index based options
3. Individual stock options
4. Individual stock futures

7.3.1 Contract specifications for index futures

On NSE's platform one can trade in Nifty, CNX IT, BANK Nifty, Mini Nifty etc. futures contracts having one-month, two-month and three-month expiry cycles. All contracts expire on the last Thursday of every month. Thus, a January expiration contract would expire on the last Thursday of January and a February expiry contract would cease trading on the last Thursday of February. On the Friday following the last Thursday, a new contract having a three-month expiry would be introduced for trading. Thus, as shown in Figure 7.4 at any point in time, three contracts would be available for trading with the first contract expiring on the last Thursday of that month. On the recommendations given by the SEBI, Derivatives Market Review Committee, NSE also introduced the 'Long Term Options Contracts' on S&P CNX Nifty for trading in the F&O segment. There would be 3 quarterly expiries, (March, June, September and December) and after these, 5 following semi-annual months of the cycle June/December would be available. Now option contracts with 3 year tenure are also available. Depending on the time period for which you want to take an exposure in index futures contracts, you can place buy and sell orders in the respective contracts. The Instrument type refers to "Futures contract on index" and Contract symbol - NIFTY denotes a "Futures contract on Nifty index" and the Expiry date represents the last date on which the contract will be available for trading. Each futures contract has a separate limit order book. All passive orders are stacked in the system in terms of price-time priority and trades take place at the passive order price (similar to the existing capital market trading system). The best buy order for a given futures contract will be the order to buy the index at the highest index level whereas the best sell order will be the order to sell the index at the lowest index level. Table 7.1 gives the contract specifications for index futures trading on the NSE.

Example: If trading is for a minimum lot size of 50 units and the index level is around 5000, then the appropriate value of a single index futures contract would be Rs.250,000. The minimum tick size for an index future contract is 0.05 units. Thus a single move in the index value would imply a resultant gain or loss of Rs.2.50 (i.e. 0.05*50 units) on an open position of 50 units.

Figure 7.4: Contract cycle



The figure 7.4 shows the contract cycle for futures contracts on NSE's derivatives market. As can be seen, at any given point of time, three contracts are available for trading - a near-month, a middle-month and a far-month. As the January contract expires on the last Thursday of the month, a new three-month contract starts trading from the following day, once more making available three index futures contracts for trading.

7.3.2 Contract specification for index options

On NSE's index options market, there are one-month, two-month and three-month expiry contracts with minimum nine different strikes available for trading. Hence, if there are three serial month contracts available and the scheme of strikes is 6-1-6, then there are minimum 3 x 13 x 2 (call and put options) i.e. 78 options contracts available on an index. Option contracts are specified as follows: DATE-EXPIRYMONTH-YEAR-CALL/PUT-AMERICAN/ EUROPEAN-STRIKE. For example the European style call option contract on the Nifty index with a strike price of 5000 expiring on the 26th November 2009 is specified as '26NOV2009 5000 CE'.

Just as in the case of futures contracts, each option product (for instance, the 26 NOV 2009 5000 CE) has it's own order book and it's own prices. All index options contracts are cash settled and expire on the last Thursday of the month. The clearing corporation does the novation. The minimum tick for an index options contract is 0.05 paise. Table 5.2 gives the contract specifications for index options trading on the NSE.

Table 7.1: Contract specification of S&P CNX Nifty Futures

Underlying index	S&P CNX Nifty
Exchange of trading	National Stock Exchange of India Limited
Security descriptor	FUTIDX
Contract size	Permitted lot size shall be 50 (minimum value Rs.2 lakh)
Price steps	Re. 0.05
Price bands	Operating range of 10% of the base price
Trading cycle	The futures contracts will have a maximum of three month trading cycle - the near month (one), the next month (two) and the far month (three). New contract will be introduced on the next trading day following the expiry of near month contract.
Expiry day	The last Thursday of the expiry month or the previous trading day if the last Thursday is a trading holiday.
Settlement basis	Mark to market and final settlement will be cash settled on T+1 basis.
Settlement price	Daily settlement price will be the closing price of the futures contracts for the trading day and the final settlement price shall be the closing value of the underlying index on the last trading day of such futures contract.

Table 7.2: Contract specification of S&P CNX Nifty Options

Underlying index	S&P CNX Nifty
Exchange of trading	National Stock Exchange of India Limited
Security descriptor	OPTIDX
Contract size	Permitted lot size shall be 50 (minimum value Rs. 2 lakh)
Price steps	Re. 0.05
Price bands	A contract specific price range based on its delta value and is computed and updated on a daily basis.
Trading cycle	The options contracts will have a maximum of three month trading cycle - the near month (one), the next month (two) and the far month (three). New contract will be introduced on the next trading day following the expiry of near month contract. Also, long term options have 3 quarterly and 5 half yearly expiries
Expiry day	The last Thursday of the expiry month or the previous trading day if the last Thursday is a trading holiday.
Settlement basis	Cash settlement on T+1 basis.
Style of option	European.
Strike price interval	Depending on the index level
Daily settlement price	Not applicable
Final settlement price	Closing value of the index on the last trading day.

Generation of strikes

The exchange has a policy for introducing strike prices and determining the strike price intervals. Table 7.3 and Table 7.4 summarises the policy for introducing strike prices and determining the strike price interval for stocks and index.

Let us look at an example of how the various option strikes are generated by the exchange.

- Suppose the Nifty options with strikes 5600, 5500, 5400, 5300, 5200, 5100, 5000, 4900, 4800, 4700, 4600, 4500, 4400 are available.
- It is to be noted that when the Nifty index level is between 4001 and 6000, the exchange commits itself to an inter-strike distance of say 100 and the scheme of strikes of 6-1-6.

- If the Nifty closes at around 5051 to ensure strike scheme of 6-1-6, one more strike would be required at 5700.
- Conversely, if Nifty closes at around 4949 to ensure strike scheme of 6-1-6, one more strike would be required at 4300.

Table 7.3: Generation of strikes for stock options

Price of underlying	Strike Price interval	Scheme of strikes to be introduced (ITM-ATM-OTM)
Less than or equal to Rs.50	2.5	5-1-5
> Rs.50 = Rs.100	5	5-1-5
> Rs. 100= Rs. 250	10	5-1-5
> Rs.250 = Rs.500	20	5-1-5
> Rs.500 = Rs.1000	20	10-1-10
> Rs.1000	50	10-1-10

Table 7.4: Generation of strikes for Index options

Index Level	Strike Interval	Scheme of strikes to be introduced (ITM-ATM-OTM)
Upto 2000	50	4-1-4
From 2001 to 4000	100	6-1-6
From 4001 to 6000	100	6-1-6
> 6000	100	7-1-7

7.3.3 Contract specifications for stock futures

Trading in stock futures commenced on the NSE from November 2001. These contracts are cash settled on a T+1 basis. The expiration cycle for stock futures is the same as for index futures, index options and stock options. A new contract is introduced on the trading day following the expiry of the near month contract. Table 7.5 gives the contract specifications for stock futures.

Table 7.5: Contract specification of Stock futures

Underlying	Individual securities
Exchange of trading	National Stock Exchange of India Limited
Security descriptor	FUTSTK
Contract size	As specified by the exchange (minimum value of Rs.2 lakh)
Price steps	Re. 0.05
Price bands	Operating range of 20% of the base price
Trading cycle	The futures contracts will have a maximum of three month trading cycle - the near month (one), the next month (two) and the far month (three). New contract will be introduced on the next trading day following the expiry of near month contract.
Expiry day	The last Thursday of the expiry month or the previous trading day if the last Thursday is a trading holiday.
Settlement basis	Mark to market and final settlement will be cash settled on T+1 basis.
Settlement price	Daily settlement price will be the closing price of the futures contracts for the trading day and the final settlement price shall be the closing price of the underlying security on the last trading day.

7.3.4 Contract specifications for stock options

Trading in stock options commenced on the NSE from July 2001. Currently these contracts are European style and are settled in cash. The expiration cycle for stock options is the same as for index futures and index options. A new contract is introduced on the trading day following the expiry of the near month contract. NSE provides a minimum of eleven strike prices for every option type (i.e. call and put) during the trading month. There are at least five in-the-money contracts, five out-of-the-money contracts and one at-the-money contract available for trading. Table 7.6 gives the contract specifications for stock options.

Table 7.6: Contract specification of Stock options

Underlying	Individual securities available for trading in cash market
Exchange of trading	National Stock Exchange of India Limited
Security descriptor	OPTSTK
Style of option	European
Strike price interval	As specified by the exchange
Contract size	As specified by the exchange (minimum value of Rs.2 lakh)
Price steps	Re. 0.05
Price bands	Not applicable
Trading cycle	The options contracts will have a maximum of three month trading cycle - the near month (one), the next month (two) and the far month (three). New contract will be introduced on the next trading day following the expiry of near month contract.
Expiry day	The last Thursday of the expiry month or the previous trading day if the last Thursday is a trading holiday.
Settlement basis	Daily settlement on T+1 basis and final option exercise settlement on T+1 basis
Daily settlement price	Premium value (net)
Final settlement price	Closing price of underlying on exercise day or expiry day
Settlement day	Last trading day

Other Products in the F&O Segment

The year 2008 witnessed the launch of new products in the F&O Segment of NSE. The Mini derivative (Futures and Options) contracts on S&P CNX Nifty were introduced for trading on January 1, 2008. The mini contracts have smaller contract size than the normal Nifty contract and extend greater affordability to individual investors and helps the individual investor to hedge risks of a smaller portfolio. The Long Term Options Contracts on S&P CNX Nifty were launched on March 3, 2008. The long term options have a life cycle of maximum 5 years duration and offer long term investors to take a view on prolonged price changes over a longer duration, without needing to use a combination of shorter term option contracts.

7.4 Criteria for Stocks and Index Eligibility for Trading

7.4.1 Eligibility criteria of stocks

- The stock is chosen from amongst the top 500 stocks in terms of average daily market capitalisation and average daily traded value in the previous six months on a rolling basis.
- The stock's median quarter-sigma order size over the last six months should be not less than Rs. 5 lakhs. For this purpose, a stock's quarter-sigma order size should mean the order size (in value terms) required to cause a change in the stock price equal to one-quarter of a standard deviation.
- The market wide position limit in the stock should not be less than Rs.100 crores. The market wide position limit (number of shares) is valued taking the closing prices of stocks in the underlying cash market on the date of expiry of contract in the month. The market wide position limit of open position (in terms of the number of underlying stock) on futures and option contracts on a particular underlying stock shall be 20% of the number of shares held by non-promoters in the relevant underlying security i.e. free-float holding.

For an existing F&O stock, the continued eligibility criteria is that market wide position limit in the stock shall not be less than Rs. 60 crores and stock's median quarter-sigma order size over the last six months shall be not less than Rs. 2 lakh. If an existing security fails to meet the eligibility criteria for three months consecutively, then no fresh month contract will be issued on that security. However, the existing unexpired contracts can be permitted to trade till expiry and new strikes can also be introduced in the existing contract months.

Further, once the stock is excluded from the F&O list, it shall not be considered for re-inclusion for a period of one year.

Futures & Options contracts may be introduced on (new) securities which meet the above mentioned eligibility criteria, subject to approval by SEBI.

7.4.2 Eligibility criteria of indices

The exchange may consider introducing derivative contracts on an index if the stocks contributing to 80% weightage of the index are individually eligible for derivative trading. However, no single ineligible stocks in the index should have a weightage of more than 5% in the index. The above criteria is applied every month, if the index fails to meet the eligibility criteria for three months consecutively, then no fresh month contract would be issued on that index, However, the existing unexpired contacts will be permitted to trade till expiry and new strikes can also be introduced in the existing contracts.

7.4.3 Eligibility criteria of stocks for derivatives trading on account of corporate restructuring

The eligibility criteria for stocks for derivatives trading on account of corporate restructuring is as under:

I. All the following conditions shall be met in the case of shares of a company undergoing restructuring through any means for eligibility to reintroduce derivative contracts on that company from the first day of listing of the post restructured company/(s) (as the case may be) stock (herein referred to as post restructured company) in the underlying market,

   a) the Futures and options contracts on the stock of the original (pre restructure) company were traded on any exchange prior to its restructuring;

   b) the pre restructured company had a market capitalisation of at least Rs.1000 crores prior to its restructuring;

   c) the post restructured company would be treated like a new stock and if it is, in the opinion of the exchange, likely to be at least one-third the size of the pre restructuring company in terms of revenues, or assets, or (where appropriate) analyst valuations; and

   d) in the opinion of the exchange, the scheme of restructuring does not suggest that the post restructured company would have any characteristic (for example extremely low free float) that would render the company ineligible for derivatives trading.

II. If the above conditions are satisfied, then the exchange takes the following course of action in dealing with the existing derivative contracts on the pre-restructured company and introduction of fresh contracts on the post restructured company

   a) In the contract month in which the post restructured company begins to trade, the Exchange introduce near month, middle month and far month derivative contracts on the stock of the restructured company.

   b) In subsequent contract months, the normal rules for entry and exit of stocks in terms of eligibility requirements would apply. If these tests are not met, the exchange shall not permit further derivative contracts on this stock and future month series shall not be introduced.

7.5 Charges

The maximum brokerage chargeable by a trading member in relation to trades effected in the contracts admitted to dealing on the F&O Segment of NSE is fixed at 2.5% of the contract value exclusive of statutory levies. However, NSE has been periodically reviewing and reduc-

ing the transaction charges being levied by it on its trading members. With effect from October 1st, 2009, the transaction charges for trades executed on the futures segment is as per the table given below:

Total traded value in a month	**Transaction Charges (Rs. Per lakh of traded value)**
Up to First Rs. 2500 cores	Rs. 1.90 each side
More than Rs. 2500 crores up to Rs. 7500 crores	Rs. 1.85 each side
More than Rs. 7500 crores up to Rs. 15000 crores	Rs. 1.80 each side
Exceeding Rs.15000 crores	Rs. 1.75 each side

However for the transactions in the options sub-segment the transaction charges are levied on the premium value at the rate of 0.05% (each side) instead of on the strike price as levied earlier. Further to this, trading members have been advised to charge brokerage from their clients on the Premium price (traded price) rather than Strike price. The trading members contribute to Investor Protection Fund of F&O segment at the rate of Re. 1/- per Rs. 100 crores of the traded value (each side).

CHAPTER 8: Clearing and Settlement

National Securities Clearing Corporation Limited (NSCCL) undertakes clearing and settlement of all trades executed on the futures and options (F&O) segment of the NSE. It also acts as legal counterparty to all trades on the F&O segment and guarantees their financial settlement. This chapter gives a detailed account of clearing mechanism, settlement procedure and risk management systems at the NSE for trading of derivatives contracts.

8.1 Clearing Entities

Clearing and settlement activities in the F&O segment are undertaken by NSCCL with the help of the following entities:

8.1.1 Clearing Members

In the F&O segment, some members, called self clearing members, clear and settle their trades executed by them only either on their own account or on account of their clients. Some others called trading member-cum-clearing member, clear and settle their own trades as well as trades of other trading members (TMs). Besides, there is a special category of members, called professional clearing members (PCM) who clear and settle trades executed by TMs. The members clearing their own trades and trades of others, and the PCMs are required to bring in additional security deposits in respect of every TM whose trades they undertake to clear and settle.

8.1.2 Clearing Banks

Funds settlement takes place through clearing banks. For the purpose of settlement all clearing members are required to open a separate bank account with NSCCL designated clearing bank for F&O segment. The Clearing and Settlement process comprises of the following three main activities:

1) Clearing

2) Settlement

3) Risk Management

8.2 Clearing Mechanism

The clearing mechanism essentially involves working out open positions and obligations of clearing (self-clearing/trading-cum-clearing/professional clearing) members. This position is considered for exposure and daily margin purposes. The open positions of CMs are arrived at by aggregating the open positions of all the TMs and all custodial participants clearing through him, in contracts in which they have traded. A TM's open position is arrived at as the summation of his proprietary open position and clients' open positions, in the contracts in which he has

traded. While entering orders on the trading system, TMs are required to identify the orders. These orders can be proprietary (if they are their own trades) or client (if entered on behalf of clients) through 'Pro/ Cli' indicator provided in the order entry screen. Proprietary positions are calculated on net basis (buy - sell) for each contract. Clients' positions are arrived at by summing together net (buy - sell) positions of each individual client. A TM's open position is the sum of proprietary open position, client open long position and client open short position (as shown in the example below).

Consider the following example given from Table 8.1 to Table 8.4. The proprietary open position on day 1 is simply = Buy - Sell = 200 - 400 = 200 short. The open position for client A = Buy (O) – Sell (C) = 400 - 200 = 200 long, i.e. he has a long position of 200 units. The open position for Client B = Sell (O) – Buy (C) = 600 - 200 = 400 short, i.e. he has a short position of 400 units. Now the total open position of the trading member Madanbhai at end of day 1 is 800, where 200 is his proprietary open position on net basis plus 600 which is the client open positions on gross basis.

The proprietary open position at end of day 1 is 200 short. We assume here that the position on day 1 is carried forward to the next trading day i.e. Day 2. On Day 2, the proprietary position of trading member for trades executed on that day is 200 (buy) – 400 (sell) = 200 short (see table 8.3). Hence the net open proprietary position at the end of day 2 is 400 short. Similarly, Client A's open position at the end of day 1 is 200 long (table 8.2). The end of day open position for trades done by Client A on day 2 is 200 long (table 8.4). Hence the net open position for Client A at the end of day 2 is 400 long. Client B's open position at the end of day 1 is 400 short (table 8.2). The end of day open position for trades done by Client B on day 2 is 200 short (table 8.4). Hence the net open position for Client B at the end of day 2 is 600 short. Therefore the net open position for the trading member at the end of day 2 is sum of the proprietary open position and client open positions. It works out to be 400 + 400 + 600, i.e. 1400.

Table 8.1: Proprietary position of trading member Madanbhai on Day 1

Trading member Madanbhai trades in the futures and options segment for himself and two of his clients. The table shows his proprietary position. Note: A buy position '200@ 1000"means 200 units bought at the rate of Rs. 1000.

Trading member Madanbhai		
Proprietary position	Buy 200@1000	Sell 400@1010

Table 8.2: Client position of trading member Madanbhai on Day 1

Trading member Madanbhai trades in the futures and options segment for himself and two of his clients. The table shows his client position.

Trading member Madanbhai				
Client position	Buy Open	Sell Close	Sell Open	Buy Close
Client A	400@1109	200@1000		
Client B			600@1100	200@1099

Table 8.3: Proprietary position of trading member Madanbhai on Day 2

Assume that the position on Day 1 is carried forward to the next trading day and the following trades are also executed.

Trading member Madanbhai		
	Buy	Sell
Proprietary position	200@1000	400@1010

Table 8.4: Client position of trading member Madanbhai on Day 2

Trading member Madanbhai trades in the futures and options segment for himself and two of his clients. The table shows his client position on Day 2.

Trading member Madanbhai				
Client position	Buy Open	Sell Close	Sell Open	Buy Close
Client A	400@1109	200@1000		
Client B			600@1100	200@1099

The following table 8.5 illustrates determination of open position of a CM, who clears for two TMs having two clients.

Table 8.5: Determination of open position of a clearing member

TMs clearing through CM	Proprietary trades			Trades: Client 1			Trades: Client 2			Open position	
	Buy	Sell	Net	Buy	Sell	Net	Buy	Sell	Net	Long	Short
ABC	4000	2000	2000	3000	1000	2000	4000	2000	2000	6000	-
PQR	2000	3000	(1000)	2000	1000	1000	1000	2000	(1000)	1000	2000
Total	6000	5000	+2000	5000	2000	+3000	5000	4000	+2000	7000	2000
			-1000						-1000		

8.3 Settlement Procedure

All futures and options contracts are cash settled, i.e. through exchange of cash. The underlying for index futures/options of the Nifty index cannot be delivered. These contracts, therefore, have to be settled in cash. Futures and options on individual securities can be delivered as in the spot market. However, it has been currently mandated that stock options and futures would also be cash settled. The settlement amount for a CM is netted across all their TMs/ clients, with respect to their obligations on MTM, premium and exercise settlement.

8.3.1 Settlement of Futures Contracts

Futures contracts have two types of settlements, the Mark-to-Market (MTM) settlement which happens on a continuous basis at the end of each day, and the final settlement which happens on the last trading day of the futures contract.

MTM settlement:

All futures contracts for each member are marked-to-market (MTM) to the daily settlement price of the relevant futures contract at the end of each day. The profits/losses are computed as the difference between:

1. The trade price and the day's settlement price for contracts executed during the day but not squared up.
2. The previous day's settlement price and the current day's settlement price for brought forward contracts.
3. The buy price and the sell price for contracts executed during the day and squared up.

Table 8.6 explains the MTM calculation for a member. The settlement price for the contract for today is assumed to be 105.

Table 8.6: Computation of MTM at the end of the day

Trade details	Quantity bought/sold	Settlement price	MTM
Brought forward from previous day	100@100	105	500
Traded during day Bought Sold	200@100 100@102	102	200
Open position (not squared up)	100@100	105	500
Total			**1200**

The table 8.6 above gives the MTM on various positions. The MTM on the brought forward contract is the difference between the previous day's settlement price of Rs.100 and today's settlement price of Rs.105. Hence on account of the position brought forward, the MTM shows a profit of Rs.500. For contracts executed during the day, the difference between the buy price and the sell price determines the MTM. In this example, 200 units are bought @ Rs. 100 and

100 units sold @ Rs. 102 during the day. Hence the MTM for the position closed during the day shows a profit of Rs.200. Finally, the open position of contracts traded during the day, is margined at the day's settlement price and the profit of Rs.500 credited to the MTM account. So the MTM account shows a profit of Rs. 1200.

The CMs who have a loss are required to pay the mark-to-market (MTM) loss amount in cash which is in turn passed on to the CMs who have made a MTM profit. This is known as daily mark-to-market settlement. CMs are responsible to collect and settle the daily MTM profits/ losses incurred by the TMs and their clients clearing and settling through them. Similarly, TMs are responsible to collect/pay losses/profits from/to their clients by the next day. The pay-in and pay-out of the mark-to-market settlement are effected on the day following the trade day. In case a futures contract is not traded on a day, or not traded during the last half hour, a 'theoretical settlement price' is computed as per the following formula:

$$F = Se^{rT}$$

This formula has been discussed in chapter 3.

After completion of daily settlement computation, all the open positions are reset to the daily settlement price. Such positions become the open positions for the next day.

Final settlement for futures:

On the expiry day of the futures contracts, after the close of trading hours, NSCCL marks all positions of a CM to the final settlement price and the resulting profit/loss is settled in cash. Final settlement loss/profit amount is debited/ credited to the relevant CM's clearing bank account on the day following expiry day of the contract.

Settlement prices for futures

Daily settlement price on a trading day is the closing price of the respective futures contracts on such day. The closing price for a futures contract is currently calculated as the last half an hour weighted average price of the contract in the F&O Segment of NSE. Final settlement price is the closing price of the relevant underlying index/security in the capital market segment of NSE, on the last trading day of the contract.

8.3.2 Settlement of options contracts

Options contracts have two types of settlements, daily premium settlement and final exercise settlement.

Daily premium settlement

Buyer of an option is obligated to pay the premium towards the options purchased by him. Similarly, the seller of an option is entitled to receive the premium for the option sold by him. The premium payable amount and the premium receivable amount are netted to compute the net premium payable or receivable amount for each client for each option contract.

Final exercise settlement

Final exercise settlement is effected for all open long in-the-money strike price options existing at the close of trading hours, on the expiration day of an option contract. All such long positions are exercised and automatically assigned to short positions in option contracts with the same series, on a random basis. The investor who has long in-the-money options on the expiry date will receive the exercise settlement value per unit of the option from the investor who is short on the option.

Exercise process

The period during which an option is exercisable depends on the style of the option. On NSE, index options and options on securities are European style, i.e. options are only subject to automatic exercise on the expiration day, if they are in-the-money. Automatic exercise means that all in-the-money options would be exercised by NSCCL on the expiration day of the contract. The buyer of such options need not give an exercise notice in such cases.

Exercise settlement computation

In case of option contracts, all open long positions at in-the-money strike prices are automatically exercised on the expiration day and assigned to short positions in option contracts with the same series on a random basis. Final exercise is automatically effected by NSCCL for all open long in-the-money positions in the expiring month option contract, on the expiry day of the option contract. The exercise settlement price is the closing price of the underlying (index or security) on the expiry day of the relevant option contract. The exercise settlement value is the difference between the strike price and the final settlement price of the relevant option contract. For call options, the exercise settlement value receivable by a buyer is the difference between the final settlement price and the strike price for each unit of the underlying conveyed by the option contract, while for put options it is difference between the strike price and the final settlement price for each unit of the underlying conveyed by the option contract. Settlement of exercises of options is currently by payment in cash and not by delivery of securities.

The exercise settlement value for each unit of the exercised contract is computed as follows:

Call options = Closing price of the security on the day of exercise — Strike price

Put options = Strike price — Closing price of the security on the day of exercise

The closing price of the underlying security is taken on the expiration day. The exercise settlement value is debited / credited to the relevant CMs clearing bank account on T + 1 day (T = exercise date).

Special facility for settlement of institutional deals

NSCCL provides a special facility to Institutions/Foreign Institutional Investors (FIIs)/Mutual Funds etc. to execute trades through any TM, which may be cleared and settled by their own CM. Such entities are called custodial participants (CPs). To avail of this facility, a CP is required

to register with NSCCL through his CM. A unique CP code is allotted to the CP by NSCCL. All trades executed by a CP through any TM are required to have the CP code in the relevant field on the trading system at the time of order entry. Such trades executed on behalf of a CP are confirmed by their own CM (and not the CM of the TM through whom the order is entered), within the time specified by NSE on the trade day though the on-line confirmation facility. Till such time the trade is confirmed by CM of concerned CP, the same is considered as a trade of the TM and the responsibility of settlement of such trade vests with CM of the TM. Once confirmed by CM of concerned CP, such CM is responsible for clearing and settlement of deals of such custodial clients. FIIs have been permitted to trade subject to compliance of the position limits prescribed for them and their sub-accounts, and compliance with the prescribed procedure for settlement and reporting. A FII/a sub-account of the FII, as the case may be, intending to trade in the F&O segment of the exchange, is required to obtain a unique Custodial Participant (CP) code allotted from the NSCCL. FII/sub-accounts of FIIs which have been allotted a unique CP code by NSCCL are only permitted to trade on the F&O segment.

8.4 Risk Management

NSCCL has developed a comprehensive risk containment mechanism for the F&O segment. Risk containment measures include capital adequacy requirements of members, monitoring of member performance and track record, stringent margin requirements, position limits based on capital, online monitoring of member positions and automatic disablement from trading when limits are breached. The salient features of risk containment mechanism on the F&O segment are:

There are stringent requirements for members in terms of capital adequacy measured in terms of net worth and security deposits.

1. NSCCL charges an upfront initial margin for all the open positions of a CM. It specifies the initial margin requirements for each futures/options contract on a daily basis. The CM in turn collects the initial margin from the TMs and their respective clients.

2. Client margins: NSCCL intimates all members of the margin liability of each of their client. Additionally members are also required to report details of margins collected from clients to NSCCL, which holds in trust client margin monies to the extent reported by the member as having been collected form their respective clients.

3. The open positions of the members are marked to market based on contract settlement price for each contract. The difference is settled in cash on a T+1 basis.

4. NSCCL's on-line position monitoring system monitors a CM's open positions on a real-time basis. Limits are set for each CM based on his capital deposits. The on-line position monitoring system generates alerts whenever a CM reaches a position limit set up by NSCCL. At 100% the clearing facility provided to the CM shall be withdrawn. Withdrawal of clearing facility of a CM in case of a violation will lead to withdrawal of trading facility

for all TMs and/ or custodial participants clearing and settling through the CM

5. CMs are provided a trading terminal for the purpose of monitoring the open positions of all the TMs clearing and settling through him. A CM may set exposure limits for a TM clearing and settling through him. NSCCL assists the CM to monitor the intra-day exposure limits set up by a CM and whenever a TM exceed the limits, it stops that particular TM from further trading. Further trading members are monitored based on positions limits. Trading facility is withdrawn when the open positions of the trading member exceeds the position limit.

6. A member is alerted of his position to enable him to adjust his exposure or bring in additional capital..

7. A separate settlement guarantee fund for this segment has been created out of the capital of members.

The most critical component of risk containment mechanism for F&O segment is the margining system and on-line position monitoring. The actual position monitoring and margining is carried out on-line through Parallel Risk Management System (PRISM). PRISM uses SPAN(r) (Standard Portfolio Analysis of Risk) system for the purpose of computation of on-line margins, based on the parameters defined by SEBI.

8.4.1 NSCCL-SPAN

The objective of NSCCL-SPAN is to identify overall risk in a portfolio of all futures and options contracts for each member. The system treats futures and options contracts uniformly, while at the same time recognizing the unique exposures associated with options portfolios, like extremely deep out-of-the-money short positions and inter-month risk. Its over-riding objective is to determine the largest loss that a portfolio might reasonably be expected to suffer from one day to the next day based on 99% VaR methodology.

8.4.2 Types of margins

The margining system for F&O segment is explained below:

- Initial margin: Margin in the F&O segment is computed by NSCCL upto client level for open positions of CMs/TMs. These are required to be paid up-front on gross basis at individual client level for client positions and on net basis for proprietary positions. NSCCL collects initial margin for all the open positions of a CM based on the margins computed by NSE-SPAN. A CM is required to ensure collection of adequate initial margin from his TMs and his respective clients. The TM is required to collect adequate initial margins up-front from his clients.
- Premium margin: In addition to initial margin, premium margin is charged at client level. This margin is required to be paid by a buyer of an option till the premium settlement is complete.

- Assignment margin: Assignment margin is levied in addition to initial margin and premium margin. It is required to be paid on assigned positions of CMs towards exercise settlement obligations for option contracts, till such obligations are fulfilled. The margin is charged on the net exercise settlement value payable by a CM.

8.5 Margining System

NSCCL has developed a comprehensive risk containment mechanism for the Futures & Options segment. The most critical component of a risk containment mechanism is the online position monitoring and margining system. The actual margining and position monitoring is done on-line, on an intra-day basis using PRISM (Parallel Risk Management System) which is the real-time position monitoring and risk management system. The risk of each trading and clearing member is monitored on a real-time basis and alerts/disablement messages are generated if the member crosses the set limits.

8.5.1 SPAN approach of computing initial margins

The objective of SPAN is to identify overall risk in a portfolio of futures and options contracts for each member. The system treats futures and options contracts uniformly, while at the same time recognizing the unique exposures associated with options portfolios like extremely deep out-of-the-money short positions, inter-month risk and inter-commodity risk.

Because SPAN is used to determine performance bond requirements (margin requirements), its overriding objective is to determine the largest loss that a portfolio might reasonably be expected to suffer from one day to the next day.

In standard pricing models, three factors most directly affect the value of an option at a given point in time:

1. Underlying market price
2. Volatility (variability) of underlying instrument
3. Time to expiration

As these factors change, so too will the value of futures and options maintained within a portfolio. SPAN constructs sixteen scenarios of probable changes in underlying prices and volatilities in order to identify the largest loss a portfolio might suffer from one day to the next. It then sets the margin requirement at a level sufficient to cover this one-day loss.

The computation of worst scenario loss has two components. The first is the valuation of each contract under sixteen scenarios. The second is the application of these scenario contract values to the actual positions in a portfolio to compute the portfolio values and the worst scenario loss. The scenario contract values are updated at least 5 times in the day, which may be carried out by taking prices at the start of trading, at 11:00 a.m., at 12:30 p.m., at 2:00 p.m., and at the end of the trading session.

8.5.2 Mechanics of SPAN

The results of complex calculations (e.g. the pricing of options) in SPAN are called *risk arrays.* Risk arrays, and other necessary data inputs for margin calculation are then provided to members on a daily basis in a file called the SPAN Risk Parameter file. Members can apply the data contained in the risk parameter files, to their specific portfolios of futures and options contracts, to determine their SPAN margin requirements. SPAN has the ability to estimate risk for combined futures and options portfolios, and re-value the same under various scenarios of changing market conditions.

Risk arrays

The SPAN risk array represents how a specific derivative instrument (for example, an option on NIFTY index at a specific strike price) will gain or lose value, from the current point in time to a specific point in time in the near future, for a specific set of market conditions which may occur over this time duration.

The results of the calculation for each risk scenario i.e. the amount by which the futures and options contracts will gain or lose value over the look-ahead time under that risk scenario - is called the risk array value for that scenario. The set of risk array values for each futures and options contract under the full set of risk scenarios, constitutes the risk array for that contract.

In the risk array, losses are represented as positive values, and gains as negative values. Risk array values are represented in Indian Rupees, the currency in which the futures or options contract is denominated.

Risk scenarios

The specific set of market conditions evaluated by SPAN, are called the *risk scenarios,* and these are defined in terms of:

1. How much the price of the underlying instrument is expected to change over one trading day, and
2. How much the volatility of that underlying price is expected to change over one trading day.

SPAN further uses a standardized definition of the risk scenarios, defined in terms of:

1. The underlying *price scan range* or probable price change over a one day period, and
2. The underlying price *volatility scan range* or probable volatility change of the underlying over a one day period.

Table 8.7 gives the sixteen risk scenarios. +1 refers to increase in volatility and -1 refers to decrease in volatility.

Table 8.7: Worst scenario loss

Risk scenario number	Price move in multiples of price scan range	Volatility move multiples of volatility range	Fraction of loss considered (%)
1	0	+1	100
2	0	-1	100
3	+1/3	+1	100
4	+1/3	-1	100
5	-1/3	+1	100
6	-1/3	-1	100
7	+2/3	+1	100
8	+2/3	-1	100
9	-2/3	+1	100
10	-2/3	-1	100
11	+1	+1	100
12	+1	-1	100
13	-1	+1	100
14	-1	-1	100
15	+2	0	35
16	-2	0	35

Method of computation of volatility

The exponential moving average method is used to obtain the volatility estimate every day. The estimate at the end of day t, σ_t is estimated using the previous day's volatility estimate σ_{t-1} (as at the end of day t-1), and the return r_t observed in the futures market on day t.

$$\left(\sigma_t^2\right) = \lambda(\sigma_{t-1})^2 + (1-\lambda)\,(r_t)^2$$

whereis λ a parameter which determines how rapidly volatility estimates change. A value of 0.94 is used for λ

SPAN uses the risk arrays to scan probable underlying market price changes and probable volatility changes for all contracts in a portfolio, in order to determine value gains and losses at the portfolio level. This is the single most important calculation executed by the system.

Scanning risk charge

As shown in the table giving the sixteen standard risk scenarios, SPAN starts at the last underlying market settlement price and scans up and down three even intervals of price changes (price scan range). At each price scan point, the program also scans up and down a range of probable volatility from the underlying market's current volatility (volatility scan range). SPAN calculates the probable premium value at each price scan point for volatility up and volatility down scenario. It then compares this probable premium value to the theoretical premium value (based on last closing value of the underlying) to determine profit or loss.

Deep-out-of-the-money short options positions pose a special risk identification problem. As they move towards expiration, they may not be significantly exposed to "normal" price moves in the underlying. However, unusually large underlying price changes may cause these options to move into-the-money, thus creating large losses to the holders of short option positions. In order to account for this possibility, two of the standard risk scenarios in the risk array, Number 15 and 16, reflect an "extreme" underlying price movement, currently defined as double the maximum price scan range for a given underlying. However, because price changes of these magnitudes are rare, the system only covers 35% of the resulting losses.

After SPAN has scanned the 16 different scenarios of underlying market price and volatility changes, it selects the largest loss from among these 16 observations. This "largest reasonable loss" is the *scanning risk charge* for the portfolio.

Calendar spread margin

A calendar spread is a position in an underlying with one maturity which is hedged by an offsetting position in the same underlying with a different maturity: for example, a short position in a July futures contract on Reliance and a long position in the August futures contract on Reliance is a calendar spread. Calendar spreads attract lower margins because they are not exposed to market risk of the underlying. If the underlying rises, the July contract would make a loss while the August contract would make a profit.

As SPAN scans futures prices within a single underlying instrument, it assumes that price moves correlate perfectly across contract months. Since price moves across contract months do not generally exhibit perfect correlation, SPAN adds an *calendar spread charge* (also called the inter-month spread charge) to the scanning risk charge associated with each futures and options contract. To put it in a different way, the calendar spread charge covers the calendar basis risk that may exist for portfolios containing futures and options with different expirations.

For each futures and options contract, SPAN identifies the delta associated each futures and option position, for a contract month. It then forms spreads using these deltas across contract months. For each spread formed, SPAN assesses a specific charge per spread which constitutes the calendar spread charge.

The margin for calendar spread is calculated on the basis of delta of the portfolio in each month. Thus a portfolio consisting of a near month option with a delta of 100 and a far month option with a delta of 100 would bear a spread charge equivalent to the calendar spread charge for a portfolio which is long 100 near month futures contract and short 100 far month futures contract. A calendar spread position on Exchange traded equity derivatives may be granted calendar spread treatment till the expiry of the near month contract.

Margin on calendar spreads is levied at 0.5% per month of spread on the far month contract of the spread subject to a minimum margin of 1% and a maximum margin of 3% on the far month contract of the spread.

Short option minimum margin

Short options positions in extremely deep-out-of-the-money strikes may appear to have little or no risk across the entire scanning range. However, in the event that underlying market conditions change sufficiently, these options may move into-the-money, thereby generating large losses for the short positions in these options. To cover the risks associated with deep-out-of-the-money short options positions, SPAN assesses a minimum margin for each short option position in the portfolio called the *short option minimum charge,* which is set by the NSCCL. The short option minimum charge serves as a minimum charge towards margin requirements for each short position in an option contract.

For example, suppose that the short option minimum charge is Rs.50 per short position. A portfolio containing 20 short options will have a margin requirement of at least Rs. 1,000, even if the scanning risk charge plus the calendar spread charge on the position is only Rs. 500.

The short option minimum margin equal to 3% of the notional value of all short index options is charged if sum of the worst scenario loss and the calendar spread margin is lower than the short option minimum margin. For stock options it is equal to 7.5% of the notional value based on the previous days closing value of the underlying stock. Notional value of option positions is calculated on the short option positions by applying the last closing price of the relevant underlying.

Net option value

The net option value is calculated as the current market value of the option times the number of option units (positive for long options and negative for short options) in the portfolio.

Net option value is added to the liquid net worth of the clearing member. This means that the current market value of short options are deducted from the liquid net worth and the market value of long options are added thereto. Thus mark to market gains and losses on option positions get adjusted against the available liquid net worth.

Net buy premium

To cover the one day risk on long option positions (for which premium shall be payable on T+1 day), net buy premium to the extent of the net long options position value is deducted from the Liquid Networth of the member on a real time basis. This would be applicable only for trades done on a given day. The net buy premium margin shall be released towards the Liquid Networth of the member on T+1 day after the completion of pay-in towards premium settlement.

8.5.3 Overall portfolio margin requirement

The total margin requirements for a member for a portfolio of futures and options contract would be computed by SPAN as follows:

1. Adds up the scanning risk charges and the calendar spread charges.
2. Compares this figure to the short option minimum charge and selects the larger of the two. This is the SPAN risk requirement.
3. Total SPAN margin requirement is equal to SPAN risk requirement less the net option value, which is mark to market value of difference in long option positions and short option positions.
4. Initial margin requirement = Total SPAN margin requirement + Net Buy Premium.

8.5.4 Cross Margining

Cross margining benefit is provided for off-setting positions at an individual client level in equity and equity derivatives segment. The cross margin benefit is provided on following offsetting positions-

a. Index Futures and constituent Stock Futures positions in F&O segment

b. Index futures position in F&O segment and constituent stock positions in CM segment

c. Stock futures position in F&O segment and stock positions in CM segment

1. In order to extend the cross margining benefit as per (a) and (b) above, the basket of constituent stock futures/ stock positions needs to be a complete replica of the index futures.
3. The positions in F&O segment for stock futures and index futures of the same expiry month are eligible for cross margining benefit.
4. The position in a security is considered only once for providing cross margining benefit. E.g. Positions in Stock Futures of security A used to set-off against index futures positions is not considered again if there is a off-setting positions in the security A in Cash segment.
5. Positions in option contracts are not considered for cross margining benefit.
   The positions which are eligible for offset are subjected to spread margins. The spread margins shall be 25% of the applicable upfront margins on the offsetting positions.

Prior to the implementation of a cross margining mechanism positions in the equity and equity derivatives segment were been treated separately, despite being traded on the common underlying securities in both the segments. For example, Mr. X bought 100 shares of a security A in the capital market segment and sold 100 shares of the same security in single stock futures of the F&O segment. Margins were payable in the capital market and F&O segments separately. If the margins payable in the capital market segment is Rs.100 and in the F&O segment is Rs. 140, the total margin payable by MR. X is Rs.240. The risk arising out of the open position of Mr. X in the capital market segment is significantly mitigated by the corresponding off-setting position in the F&O segment. Cross margining mechanism reduces the margin for Mr. X from Rs. 240 to only Rs. 60.

CHAPTER 9: Regulatory Framework

The trading of derivatives is governed by the provisions contained in the SC(R)A, the SEBI Act, the rules and regulations framed under that and the rules and bye–laws of the stock exchanges. This Chapter takes a look at the legal and regulatory framework for derivatives trading in India. It also, discusses in detail the recommendation of the LC Gupta Committee for trading of derivatives in India.

9.1 Securities Contracts (Regulation) Act, 1956

SC(R)A regulates transactions in securities markets along with derivatives markets. The original act was introduced in 1956. It was subsequently amended in 1996, 1999, 2004, 2007 and 2010. It now governs the trading of securities in India. The term "securities" has been defined in the amended SC(R)A under the Section 2(h) to include:

- Shares, scrips, stocks, bonds, debentures, debenture stock or other marketable securities of a like nature in or of any incorporated company or other body corporate.
- Derivative.
- Units or any other instrument issued by any collective investment scheme to the investors in such schemes.
- Security receipt as defined in clause (zg) of section 2 of the Securitisation and Reconstruction of Financial Assets and Enforcement of Security Interest Act, 2002
- Units or any other such instrument issued to the investor under any mutual fund scheme[1].
- Any certificate or instrument (by whatever name called), issued to an investor by an issuer being a special purpose distinct entity which possesses any debt or receivable, including mortgage debt, assigned to such entity, and acknowledging beneficial interest of such investor in such debt or receivable, including mortgage debt as the case may be.
- Government securities
- Such other instruments as may be declared by the Central Government to be securities.
- Rights or interests in securities.

"Derivative" is defined to include:

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

[1] Securities shall not include any unit linked insurance policy or scrips or any such instrument or unit, by whatever name called, which provides a combined benefit risk on the life of the persons and investments by such persons and issued by an insurer referred to in clause (9) of section 2 of the insurance Act, 1938 (4 of 1938)

Section 18A of the SC(R)A provides that notwithstanding anything contained in any other law for the time being in force, contracts in derivative shall be legal and valid if such contracts are:

- Traded on a recognized stock exchange
- Settled on the clearing house of the recognized stock exchange, in accordance with the rules and bye–laws of such stock exchanges.

9.2 Securities and Exchange Board of India Act, 1992

SEBI Act, 1992 provides for establishment of Securities and Exchange Board of India (SEBI) with statutory powers for (a) protecting the interests of investors in securities (b) promoting the development of the securities market and (c) regulating the securities market. Its regulatory jurisdiction extends over corporates in the issuance of capital and transfer of securities, in addition to all intermediaries and persons associated with securities market.

SEBI has been obligated to perform the aforesaid functions by such measures as it thinks fit. In particular, it has powers for:

- regulating the business in stock exchanges and any other securities markets.
- registering and regulating the working of stock brokers, sub–brokers etc.
- promoting and regulating self-regulatory organizations.
- prohibiting fraudulent and unfair trade practices relating to securities markets.
- calling for information from, undertaking inspection, conducting inquiries and audits of the stock exchanges, mutual funds and other persons associated with the securities market and other intermediaries and self–regulatory organizations in the securities market.
- performing such functions and exercising according to Securities Contracts (Regulation) Act, 1956, as may be delegated to it by the Central Government.

9.3 Regulation for Derivatives Trading

SEBI set up a 24-member committee under the Chairmanship of Dr. L. C. Gupta to develop the appropriate regulatory framework for derivatives trading in India. On May 11, 1998 SEBI accepted the recommendations of the committee and approved the phased introduction of derivatives trading in India beginning with stock index futures.

According to this framework:

- Any Exchange fulfilling the eligibility criteria can apply to SEBI for grant of recognition under Section 4 of the SC(R)A, 1956 to start trading derivatives. The derivatives exchange/segment should have a separate governing council and representation of trading/clearing members shall be limited to maximum of 40% of the total members of the governing council. The exchange would have to regulate the sales practices of

its members and would have to obtain prior approval of SEBI before start of trading in any derivative contract.

- The Exchange should have minimum 50 members.

  The members of an existing segment of the exchange would not automatically become the members of derivative segment. The members seeking admission in the derivative segment of the exchange would need to fulfill the eligibility conditions.

- The clearing and settlement of derivatives trades would be through a SEBI approved clearing corporation/house. Clearing corporations/houses complying with the eligibility conditions as laid down by the committee have to apply to SEBI for approval.

- Derivative brokers/dealers and clearing members are required to seek registration from SEBI. This is in addition to their registration as brokers of existing stock exchanges. The minimum networth for clearing members of the derivatives clearing corporation/ house shall be Rs.300 Lakh. The networth of the member shall be computed as follows:

  - Capital + Free reserves
  - Less non-allowable assets viz.,
    - (a) Fixed assets
    - (b) Pledged securities
    - (c) Member's card
    - (d) Non-allowable securities (unlisted securities)
    - (e) Bad deliveries
    - (f) Doubtful debts and advances
    - (g) Prepaid expenses
    - (h) Intangible assets
    - (i) 30% marketable securities

- The minimum contract value shall not be less than Rs.2 Lakh. Exchanges have to submit details of the futures contract they propose to introduce.

- The initial margin requirement, exposure limits linked to capital adequacy and margin demands related to the risk of loss on the position will be prescribed by SEBI/Exchange from time to time.

- There will be strict enforcement of "Know your customer" rule and requires that every client shall be registered with the derivatives broker. The members of the derivatives segment are also required to make their clients aware of the risks involved in derivatives trading by issuing to the client the Risk Disclosure Document and obtain a copy of the same duly signed by the client.

- The trading members are required to have qualified approved user and sales person who should have passed a certification programme approved by SEBI.

9.3.1 Forms of collateral's acceptable at NSCCL

Members and authorized dealers have to fulfill certain requirements and provide collateral deposits to become members of the F&O segment. All collateral deposits are segregated into cash component and non-cash component. Cash component means cash, bank guarantee, fixed deposit receipts, T-bills and dated government securities. Non-cash component mean all other forms of collateral deposits like deposit of approved demat securities.

9.3.2 Requirements to become F&O segment member

The eligibility criteria for membership on the F&O segment is as given in table 9.1. Requirements for professional clearing membership are provided in table 9.2. Anybody interested in taking membership of F&O segment is required to take membership of "CM and F&O segment" or "CM, WDM and F&O segment". An existing member of CM segment can also take membership of F&O segment. A trading member can also be a clearing member by meeting additional requirements. There can also be only clearing members.

Table 9.1: Eligibility criteria for membership on F&O segment (corporates)

Particulars (all values in Rs. Lakh)	**CM and F&O segment**	**CM, WDM and F&O segment**
Net worth[1]	100 (Membership in CM segment and Trading/Trading and self-clearing membership in F&O segment)	200 (Membership in WDM segment, CM segment and trading/trading and self clearing membership in F&O segment)
	300 (Membership in CM segment and trading and clearing membership in F&O Segment)	300 (Membership in WDM segment, CM segment and Trading and clearing membership in F&O segment)
Interest free security deposit (IFSD) with NSEIL	110	260
Interest free security deposit (IFSD) with NSCCL	15*	15*
Collateral security deposit (CSD)[3]	25**	25**
Annual subscription	1	2

Notes for Table 9.1:

1 No additional networth is required for self clearing members. However, a networth of Rs. 300 Lakh is required for TM-CM and PCM.

* Additional IFSD of 25 lakhs with NSCCL is required for Trading and Clearing (TM-CM) and for Trading and Self clearing member (TM/SCM).

** Additional Collateral Security Deposit (CSD) of 25 lakhs with NSCCL is required for Trading and Clearing (TM-CM) and for Trading and Self clearing member (TM/SCM).

In addition, a member clearing for others is required to bring in IFSD of Rs. 2 lakh and CSD of Rs. 8 lakh per trading member he undertakes to clear in the F&O segment.

Table 9.2: Requirements for Professional Clearing Membership

(Amount in Rs. lakh)

Particulars	CM Segment	F&O Segment
Eligibility	Trading Member of NSE/SEBI Registered Custodians/Recognised Banks	
Net Worth	300	300
Interest Free Security Deposit (IFSD)*	25	25
Collateral Security Deposit (CSD)	25	25
Annual Subscription	2.5	Nil

*The Professional Clearing Member (PCM) is required to bring in IFSD of Rs. 2 lakh and CSD of Rs. 8 lakh per trading member whose trades he undertakes to clear in the F&O segment and IFSD of Rs. 6 lakh and CSD of Rs. 17.5 lakh (Rs. 9 lakh and Rs. 25 lakh respectively for corporate Members) per trading member in the CM segment.

9.3.3 Requirements to become authorized / approved user

Trading members and participants are allowed to appoint, with the approval of the F&O segment of the exchange, authorized persons and approved users to operate the trading workstation(s). These authorized users can be individuals, registered partnership firms or corporate bodies as defined under the Companies Act, 1956.

Authorized persons cannot collect any commission or any amount directly from the clients he introduces to the trading member who appointed him. However he can receive a commission or any such amount from the trading member who appointed him as provided under regulation.

Approved users on the F&O segment have to pass a certification program which has been approved by SEBI. Each approved user is given a unique identification number through which he will have access to the NEAT system. The approved user can access the NEAT system

through a password and can change such password from time to time.

9.3.4 Position limits

Position limits have been specified by SEBI at trading member, client, market and FII levels respectively.

Trading member position limits

Trading member position limits are specified as given below:

1. *Trading member position limits in equity index option contracts*: The trading member position limits in equity index option contracts is higher of Rs.500 crore or 15% of the total open interest in the market in equity index option contracts. This limit is applicable on open positions in all option contracts on a particular underlying index.

2. *Trading member position limits in equity index futures contracts*: The trading member position limits in equity index futures contracts is higher of Rs.500 crore or 15% of the total open interest in the market in equity index futures contracts. This limit is applicable on open positions in all futures contracts on a particular underlying index.

3. *Trading member position limits for combined futures and options position*:

   - For stocks having applicable market-wise position limit (MWPL) of Rs.500 crores or more, the combined futures and options position limit is 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 is 20% of applicable MWPL and futures position cannot exceed 20% of applicable MWPL or Rs.50 crore which ever is lower. The Clearing Corporation shall specify the trading member-wise position limits on the last trading day month which shall be reckoned for the purpose during the next month.

Client level position limits

The gross open position for each client, across all the derivative contracts on an 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.

Market wide position limits

The market wide limit of open position (in terms of the number of underlying stock) on futures and option contracts on a particular underlying stock is 20% of the number of shares held by non-promoters in the relevant underlying security i.e. 20% of the free–float in terms of no. of

shares of a company. This limit is applicable on all open positions in all futures and option contracts on a particular underlying stock. The enforcement of the market wide limits is done in the following manner:

- At end of the day the exchange tests whether the market wide open interest for any scrip exceeds 95% of the market wide position limit for that scrip. In case it does so, the exchange takes note of open position of all client/TMs as at end of that day for that scrip and from next day onwards they can trade only to decrease their positions through offsetting positions.
- At the end of each day during which the ban on fresh positions is in force for any scrip, the exchange tests whether any member or client has increased his existing positions or has created a new position in that scrip. If so, that client is subject to a penalty equal to a specified percentage (or basis points) of the increase in the position (in terms of notional value). The penalty is recovered before trading begins next day. The exchange specifies the percentage or basis points, which is set high enough to deter violations of the ban on increasing positions.
- The normal trading in the scrip is resumed after the open outstanding position comes down to 80% or below of the market wide position limit. Further, the exchange also checks on a monthly basis, whether a stock has remained subject to the ban on new position for a significant part of the month consistently for three months. If so, then the exchange phases out derivative contracts on that underlying.

FII / MFs position limits

FII and MFs position limits are specified as given below:

1. The FII and MF position limits in all index options contracts on a particular underlying index are Rs. 500 crores or 15% of the total open interest of the market in index options, whichever is higher, per exchange. This limit is applicable on open positions in all option contracts on a particular underlying index.
2. FII and MF position limits in all index futures contracts on a particular underlying index is the same as mentioned above for FII and MF position limits in index option contracts. This limit is applicable on open positions in all futures contracts on a particular underlying index.

   In addition to the above, FIIs and MF's can take exposure in equity index derivatives subject to the following limits:

   a. Short positions in index derivatives (short futures, short calls and long puts) not exceeding (in notional value) the FIIs/MF's holding of stocks.

   b. Long positions in index derivatives (long futures, long calls and short puts) not

exceeding (in notional value) the FIIs/MF's holding of cash, government securities, T-bills and similar instruments.

In this regards, if the open positions of the FII/MF exceeds the limits as stated in point no. (a) and (b) above, such surplus is deemed to comprise of short and long positions in the same proportion of the total open positions individually. Such short and long positions in excess of the said limits are compared with the FIIs/MFs holding in stocks, cash etc in a specified format.

3. For stocks having applicable market-wide position limit (MWPL) of Rs. 500 crores or more, the combined futures and options position limit is 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-wide position limit of less than Rs. 500 crores, the combined futures and options position limit is 20% of applicable MWPL and futures position cannot exceed 20% of the applicable MWPL or Rs. 50 crore whichever is lower.

The FIIs should report to the clearing member (custodian) the extent of the FIIs holding of stocks, cash, government securities, T-bills and similar instruments before the end of the day. The clearing member (custodian) in turn should report the same to the exchange. The exchange monitors the FII position limits. The position limit for sub-account is same as that of client level position limits.

At the level of the FII sub-account /MF scheme

Mutual Funds are allowed to participate in the derivatives market at par with Foreign Institutional Investors (FII). Accordingly, mutual funds shall be treated at par with a registered FII in respect of position limits in index futures, index options, stock options and stock futures contracts. Mutual funds will be considered as trading members like registered FIIs and the schemes of mutual funds will be treated as clients like sub-accounts of FIIs.

The position limits for Mutual Funds and its schemes shall be as under:

1. Position limit for MFs in index futures and options contracts

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 on the Exchange. Failing to do so, is a violation of the rules and regulations and attracts penalty and disciplinary action.

2. Position limit for MFs in 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, / MF scheme should not exceed the higher of:

- 1% of the free float market capitalisation (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 are applicable on the combined position in all futures and options contracts on an underlying security on the Exchange.

9.3.5 Reporting of client margin

Clearing Members (CMs) and Trading Members (TMs) are required to collect upfront initial margins from all their Trading Members/ Constituents.

CMs are required to compulsorily report, on a daily basis, details in respect of such margin amount due and collected, from the TMs/ Constituents clearing and settling through them, with respect to the trades executed/ open positions of the TMs/ Constituents, which the CMs have paid to NSCCL, for the purpose of meeting margin requirements.

Similarly, TMs are required to report on a daily basis details in respect of such margin amount due and collected from the constituents clearing and settling through them, with respect to the trades executed/ open positions of the constituents, which the trading members have paid to the CMs, and on which the CMs have allowed initial margin limit to the TMs.

9.4 Adjustments for Corporate Actions

Adjustments for corporate actions for stock options would be as follows:

- The basis for any adjustment for corporate action shall be such that the value of the position of the market participants on cum and ex-date for corporate action shall continue to remain the same as far as possible. This will facilitate in retaining the relative status of positions namely in-the-money, at-the-money and out-of-money. This will also address issues related to exercise and assignments.
- Adjustment for corporate actions shall be carried out on the last day on which a security is traded on a cum basis in the underlying cash market.
- Adjustments shall mean modifications to positions and/or contract specifications namely strike price, position, market lot, multiplier. These adjustments shall be carried out on all open, exercised as well as assigned positions.
- The corporate actions may be broadly classified under stock benefits and cash benefits. The various stock benefits declared by the issuer of capital are bonus, rights, merger/ de–merger, amalgamation, splits, consolidations, hive–off, warrants and secured premium notes and dividends.
- The methodology for adjustment of corporate actions such as bonus, stock splits and consolidations is as follows:
  - Strike price: The new strike price shall be arrived at by dividing the old strike

price by the adjustment factor as under.

- Market lot/multiplier: The new market lot/multiplier shall be arrived at by multiplying the old market lot by the adjustment factor as under.
- Position: The new position shall be arrived at by multiplying the old position by the adjustment factor, which will be computed using the pre-specified methodology.

The adjustment factor for bonus, stock splits and consolidations is arrived at as follows:

- Bonus: Ratio - A:B; Adjustment factor: (A+B)/B
- Stock splits and consolidations: Ratio - A:B ; Adjustment factor: B/A
- Right: Ratio - A:B
  - Premium: C
  - Face value: D
  - Existing strike price: X
  - New strike price: ((B * X) + A * (C + D))/(A+B)
- Existing market lot / multiplier / position: Y ; New issue size : Y * (A+B)/B

The above methodology may result in fractions due to the corporate action e.g. a bonus ratio of 3:7. With a view to minimizing fraction settlements, the following methodology is proposed to be adopted:

1. Compute value of the position before adjustment.
2. Compute value of the position taking into account the exact adjustment factor.
3. Carry out rounding off for the Strike Price and Market Lot.
4. Compute value of the position based on the revised strike price and market lot.

The difference between 1 and 4 above, if any, shall be decided in the manner laid down by the group by adjusting strike price or market lot, so that no forced closure of open position is mandated.

- Dividends which are below 10% of the market value of the underlying stock, would be deemed to be ordinary dividends and no adjustment in the strike price would be made for ordinary dividends. For extra-ordinary dividends, above 10% of the market value of the underlying stock, the strike price would be adjusted.
- The exchange will on a case to case basis carry out adjustments for other corporate actions as decided by the group in conformity with the above guidelines.

CHAPTER 10: Accounting for Derivatives

This chapter gives a brief overview of the process of accounting of derivative contracts namely, index futures, stock futures, index options and stock options. The chapter takes a quick relook at the terms used in derivatives markets and discusses the principles of taxation for these contracts. It would however be pertinent to keep oneself updated with the changes in accounting norms for derivatives by regularly cross checking the website of the Institute of Chartered Accountants of India (www.icai.org.).

10.1 Accounting for futures

The Institute of Chartered Accountants of India (ICAI) has issued guidance notes on accounting of index futures contracts from the view point of parties who enter into such futures contracts as buyers or sellers. For other parties involved in the trading process, like brokers, trading members, clearing members and clearing corporations, a trade in equity index futures is similar to a trade in, say shares, and does not pose any peculiar accounting problems. Hence in this section we shall largely focus on the accounting treatment of equity index futures in the books of the client.

Accounting at the inception of a contract

Every client is required to pay to the trading member/clearing member, the initial margin determined by the clearing corporation as per the bye-laws/regulations of the exchange for entering into equity index futures contracts. Initial margin paid/payable should be debited to "Initial margin - Equity index futures account". Additional margins, if any, should also be accounted for in the same manner. It may be mentioned that at the time when the contract is entered into for purchase/sale of equity index futures, no entry is passed for recording the contract because no payment is made at that time except for the initial margin. On the balance sheet date, the balance in the 'Initial margin - Equity index futures account' should be shown separately under the head 'current assets'. In those cases where any amount has been paid in excess of the initial/additional margin, the excess should be disclosed separately as a deposit under the head 'current assets'. In cases where instead of paying initial margin in cash, the client provides bank guarantees or lodges securities with the member, a disclosure should be made in the notes to the financial statements of the client.

Accounting at the time of daily settlement

Payments made or received on account of daily settlement by the client would be credited/ debited to the bank account and the corresponding debit or credit for the same should be made to an account titled as "Mark-to-market margin - Equity index futures account".

The client may also deposit a lump sum amount with the broker/trading member in respect of mark-to-market margin money instead of receiving/paying mark-to-market margin money on

daily basis. The amount so paid is in the nature of a deposit and should be debited to an appropriate account, say, "Deposit for mark-to-market margin account". The amount of "mark-to-market margin" received/paid from such account should be credited/debited to "Mark-to-market margin - Equity index futures account" with a corresponding debit/credit to "Deposit for mark-to-market margin account". At the year-end, any balance in the "Deposit for mark-to-market margin account" should be shown as a deposit under the head "current assets".

Accounting for open positions

Position left open on the balance sheet date must be accounted for. Debit/credit balance in the "mark-to-market margin - Equity index futures account", represents the net amount paid/ received on the basis of movement in the prices of index futures up to the balance sheet date. Keeping in view 'prudence' as a consideration for preparation of financial statements, provision for anticipated loss, which may be equivalent to the net payment made to the broker (represented by the debit balance in the "mark-to-market margin - Equity index futures account") should be created by debiting the profit and loss account. Net amount received (represented by credit balance in the "mark-to-market margin - Equity index futures account") being anticipated profit should be ignored and no credit for the same should be taken in the profit and loss account. The debit balance in the said "mark-to-market margin - Equity index futures account", i.e., net payment made to the broker, may be shown under the head "current assets, loans and advances" in the balance sheet and the provision created there-against should be shown as a deduction therefrom. On the other hand, the credit balance in the said account, i.e., the net amount received from the broker, should be shown as a current liability under the head "current liabilities and provisions in the balance sheet".

Accounting at the time of final settlement

At the expiry of a series of equity index futures, the profit/loss, on final settlement of the contracts in the series, should be calculated as the difference between final settlement price and contract prices of all the contracts in the series. The profit/loss, so computed, should be recognized in the profit and loss account by corresponding debit/credit to "mark-to-market margin - Equity index futures account". However, where a balance exists in the provision account created for anticipated loss, any loss arising on such settlement should be first charged to such provision account, to the extent of the balance available in the provision account, and the balance of loss, if any, should be charged to the profit and loss account. Same accounting treatment should be made when a contract is squared-up by entering into a reverse contract. It appears that, at present, it is not feasible to identify the equity index futures contracts. Accordingly, if more than one contract in respect of the series of equity index futures contracts to which the squared-up contract pertains is outstanding at the time of the squaring of the contract, the contract price of the contract so squared-up should be determined using First-In, First-Out (FIFO) method for calculating profit/loss on squaring-up.

On the settlement of equity index futures contract, the initial margin paid in respect of the contract is released which should be credited to "Initial margin - Equity index futures account", and a corresponding debit should be given to the bank account or the deposit account (where the amount is not received).

Accounting in case of a default

When a client defaults in making payment in respect of a daily settlement, the contract is closed out. The amount not paid by the Client is adjusted against the initial margin. In the books of the Client, the amount so adjusted should be debited to "mark-to-market - Equity index futures account" with a corresponding credit to "Initial margin - Equity index futures account". The amount of initial margin on the contract, in excess of the amount adjusted against the mark-to-market margin not paid, will be released. The accounting treatment in this regard will be the same as explained above. In case, the amount to be paid on daily settlement exceeds the initial margin the excess is a liability and should be shown as such under the head 'current liabilities and provisions', if it continues to exist on the balance sheet date. The amount of profit or loss on the contract so closed out should be calculated and recognized in the profit and loss account in the manner dealt with above.

Disclosure requirements

The amount of bank guarantee and book value as also the market value of securities lodged should be disclosed in respect of contracts having open positions at the year end, where initial margin money has been paid by way of bank guarantee and/or lodging of securities.

Total number of contracts entered and gross number of units of equity index futures traded (separately for buy/sell) should be disclosed in respect of each series of equity index futures.

The number of equity index futures contracts having open position, number of units of equity index futures pertaining to those contracts and the daily settlement price as of the balance sheet date should be disclosed separately for long and short positions, in respect of each series of equity index futures.

10.2 Accounting for options

The Institute of Chartered Accountants of India issued guidance note on accounting for index options and stock options from the view point of the parties who enter into such contracts as buyers/holder or sellers/writers. Following are the guidelines for accounting treatment in case of cash settled index options and stock options:

Accounting at the inception of a contract

The seller/writer of the option is required to pay initial margin for entering into the option contract. Such initial margin paid would be debited to 'Equity Index Option Margin Account' or to 'Equity Stock Option Margin Account', as the case may be. In the balance sheet, such account should be shown separately under the head 'Current Assets'. The buyer/holder of the

option is not required to pay any margin. He is required to pay the premium. In his books, such premium would be debited to 'Equity Index Option Premium Account' or 'Equity Stock Option Premium Account', as the case may be. In the books of the seller/writer, such premium received should be credited to 'Equity Index Option Premium Account' or 'Equity Stock Option Premium Account' as the case may be.

Accounting at the time of payment/receipt of margin

Payments made or received by the seller/writer for the margin should be credited/debited to the bank account and the corresponding debit/credit for the same should also be made to 'Equity Index Option Margin Account' or to 'Equity Stock Option Margin Account', as the case may be. Sometimes, the client deposit a lump sum amount with the trading/clearing member in respect of the margin instead of paying/receiving margin on daily basis. In such case, the amount of margin paid/received from/into such accounts should be debited/credited to the 'Deposit for Margin Account'. At the end of the year the balance in this account would be shown as deposit under 'Current Assets'.

Accounting for open positions as on balance sheet dates

The 'Equity Index Option Premium Account' and the 'Equity Stock Option Premium Account' should be shown under the head 'Current Assets' or 'Current Liabilities', as the case may be.

In the books of the buyer/holder, a provision should be made for the amount by which the premium paid for the option exceeds the premium prevailing on the balance sheet date. The provision so created should be credited to 'Provision for Loss on Equity Index Option Account' to the 'Provision for Loss on Equity Stock Options Account', as the case may be. The provision made as above should be shown as deduction from 'Equity Index Option Premium' or 'Equity Stock Option Premium' which is shown under 'Current Assets'.

In the books of the seller/writer, the provision should be made for the amount by which premium prevailing on the balance sheet date exceeds the premium received for that option. This provision should be credited to 'Provision for Loss on Equity Index Option Account' or to the 'Provision for Loss on Equity Stock Option Account', as the case may be, with a corresponding debit to profit and loss account. 'Equity Index Options Premium Account' or 'Equity Stock Options Premium Account' and 'Provision for Loss on Equity Index Options Account' or 'Provision for Loss on Equity Stock Options Account' should be shown under 'Current Liabilities and Provisions'.

In case of any opening balance in the 'Provision for Loss on Equity Stock Options Account' or the 'Provision for Loss on Equity Index Options Account', the same should be adjusted against the provision required in the current year and the profit and loss account be debited/credited with the balance provision required to be made/excess provision written back.

Accounting at the time of final settlement

On exercise of the option, the buyer/holder will recognize premium as an expense and debit the profit and loss account by crediting 'Equity Index Option Premium Account' or 'Equity Stock Option Premium Account'. Apart from the above, the buyer/holder will receive favorable difference, if any, between the final settlement price as on the exercise/expiry date and the strike price, which will be recognized as income. On exercise of the option, the seller/writer will recognize premium as an income and credit the profit and loss account by debiting 'Equity Index Option Premium Account' or 'Equity Stock Option Premium Account'. Apart from the above, the seller/writer will pay the adverse difference, if any, between the final settlement price as on the exercise/expiry date and the strike price. Such payment will be recognized as a loss.

As soon as an option gets exercised, margin paid towards such option would be released by the exchange, which should be credited to 'Equity Index Option Margin Account' or to 'Equity Stock Option Margin Account', as the case may be, and the bank account will be debited.

Accounting at the time of squaring off an option contract

The difference between the premium paid and received on the squared off transactions should be transferred to the profit and loss account. Following are the guidelines for accounting treatment in case of delivery settled index options and stock options: The accounting entries at the time of inception, payment/receipt of margin and open options at the balance sheet date will be the same as those in case of cash settled options. At the time of final settlement, if an option expires un-exercised then the accounting entries will be the same as those in case of cash settled options. If the option is exercised then shares will be transferred in consideration for cash at the strike price. For a call option the buyer/holder will receive equity shares for which the call option was entered into. The buyer/holder should debit the relevant equity shares account and credit cash/bank. For a put option, the buyer/holder will deliver equity shares for which the put option was entered into. The buyer/holder should credit the relevant equity shares account and debit cash/bank. Similarly, for a call option the seller/writer will deliver equity shares for which the call option was entered into. The seller/writer should credit the relevant equity shares account and debit cash/bank. For a put option the seller/writer will receive equity shares for which the put option was entered into. The seller/writer should debit the relevant equity shares account and credit cash/bank. In addition to this entry, the premium paid/received will be transferred to the profit and loss account, the accounting entries for which should be the same as those in case of cash settled options.

10.3 Taxation of Derivative Transaction in Securities

10.3.1 Taxation of Profit/Loss on derivative transaction in securities

Prior to Financial Year 2005–06, transaction in derivatives were considered as speculative transactions for the purpose of determination of tax liability under the Income-tax Act. This is in view of section 43(5) of the Income-tax Act which defined speculative transaction as a transaction in which a contract for purchase or sale of any commodity, including stocks and shares, is periodically or ultimately settled otherwise than by the actual delivery or transfer of the commodity or scrips. However, such transactions entered into by hedgers and stock exchange members in course of jobbing or arbitrage activity were specifically excluded from the purview of definition of speculative transaction.

In view of the above provisions, most of the transactions entered into in derivatives by investors and speculators were considered as speculative transactions. The tax provisions provided for differential treatment with respect to set off and carry forward of loss on such transactions. Loss on derivative transactions could be set off only against other speculative income and the same could not be set off against any other income. This resulted in payment of higher taxes by an assessee.

Finance Act, 2005 has amended section 43(5) so as to exclude transactions in derivatives carried out in a "recognized stock exchange" for this purpose. This implies that income or loss on derivative transactions which are carried out in a "recognized stock exchange" is not taxed as speculative income or loss. Thus, loss on derivative transactions can be set off against any other income during the year. In case the same cannot be set off, it can be carried forward to subsequent assessment year and set off against any other income of the subsequent year. Such losses can be carried forward for a period of 8 assessment years. It may also be noted that securities transaction tax paid on such transactions is eligible as deduction under Income-tax Act, 1961.

10.3.2 Securities transaction tax on derivatives transactions

As per Chapter VII of the Finance (No. 2) Act, 2004, Securities Transaction Tax (STT) is levied on all transactions of sale and/or purchase of equity shares and units of equity oriented fund and sale of derivatives entered into in a recognized stock exchange.

As per Finance Act 2008, the following STT rates are applicable w.e.f. 1st June, 2008 in relation to sale of a derivative, where the transaction of such sale in entered into in a recognized stock exchange.

Sl. No.	Taxable securities transaction	Rate	Payable by
1	Sale of an option in securities	0.017%	Seller
2.	Sale of an option in securities, where option is exercised	0.125%	Purchaser
3.	Sale of a futures in securities	0.017%	Seller

Consider an example. Mr. A. sells a futures contract of M/s. XYZ Ltd. (Lot Size: 1000) expiring on 29-Sep-2005 for Rs. 300. The spot price of the share is Rs. 290. The securities transaction tax thereon would be calculated as follows:

1. Total futures contract value = 1000 x 300 = Rs. 3,00,000

2. Securities transaction tax payable thereon 0.017% = 3,00,000 x 0.017% = Rs. 51

Note: No tax on such a transaction is payable by the buyer of the futures contract.

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MODEL TEST PAPER
DERIVATIVES MARKET DEALERS MODULE

Q.1 Theta is also referred to as the _____ of the portfolio [1 Mark]

(a) time decay
(b) risk delay
(c) risk decay
(d) time delay

Q.2 All of the following are true regarding futures contracts except [2 Marks]

(a) they are regulated by RBI
(b) they require payment of a performance bond
(c) they are a legally enforceable promise
(d) they are market to market

Q.3 Clearing Members (CMs) and Trading Members (TMs) are required to collect upfront initial margins from all their Trading Members/Constituents. [2 Marks]

(a) FALSE
(b) TRUE

Q.4 All open positions in the index futures contracts are daily settled at the [3 Marks]

(a) mark-to-market settlement price
(b) net settlement price
(c) opening price
(d) closing price

Q.5. An American style call option contract on the Nifty index with a strike price of 3040 expiring on the 30th June 2008 is specified as '30 JUN 2008 3040 CA'. [2 Marks]

(a) FALSE
(b) TRUE

Q.6 Usually, open interest is maximum in the _____ contract. [2 Marks]

(a) more liquid contracts
(b) far month
(c) middle month
(d) near month

Q.7 An equity index comprises of _____. [1 Mark]

(a) basket of stocks
(b) basket of bonds and stocks
(c) basket of tradeable debentures
(d) None of the above

Q.8 Position limits have been specified by _____ at trading member, client, market and FII levels respectively. [2 Marks]

(a) Sub brokers
(b) Brokers
(c) SEBI
(d) RBI

Q.9 An order which is activated when a price crosses a limit is _____ in F&O segment of NSEIL. [1 Mark]

(a) stop loss order
(b) market order
(c) fill or kill order
(d) None of the above

Q.10 Which of the following is not a derivative transaction? [1 Mark]

(a) An investor buying index futures in the hope that the index will go up.
(b) A copper fabricator entering into futures contracts to buy his annual requirements of copper.
(c) A farmer selling his crop at a future date
(d) An exporter selling dollars in the spot market

Q.11 An investor is bearish about ABC Ltd. and sells ten one-month ABC Ltd. futures contracts at Rs.5,00,000. On the last Thursday of the month, ABC Ltd. closes at Rs.510. He makes a _____. (assume one lot = 100) [2 Marks]

(a) Profit of Rs. 10,000
(b) loss of Rs. 10,000
(c) loss of Rs. 5,100
(d) profit of Rs. 5,100

Q.12 The interest rates are usually quoted on : [2 Marks]

(a) Per annum basis
(b) Per day basis
(c) Per week basis
(d) Per month basis

Q.13 After SPAN has scanned the 16 different scenarios of underlying market price and volatility changes, it selects the _____ loss from among these 16 observations [2 Marks]

(a) largest
(b) 8th smallest
(c) smallest
(d) average

Q.14 Mr. Ram buys 100 calls on a stock with a strike of Rs.1,200. He pays a premium of Rs.50/call. A month later the stock trades in the market at Rs.1,300. Upon exercise he will receive _____. [2 Marks]

(a) Rs.10,000
(b) Rs.1,200
(c) Rs.6,000
(d) Rs.1,150

Q.15 There are no Position Limits prescribed for Foreign Institutional Investors (FIIs) in the F&O Segment. [1 Mark]

(a) TRUE
(b) FALSE

Q.16 In the Black-Scholes Option Pricing Model, when S becomes very large a call option is almost certain to be exercised [2 Marks]

(a) FALSE
(b) TRUE

Q.17 Suppose Nifty options trade for 1, 2 and 3 months expiry with strike prices of 1850, 1860, 1870, 1880, 1890, 1900, 1910. How many different options contracts will be tradable? [2 Marks]

(a) 27
(b) 42
(c) 18
(d) 24

Q.18 Prior to Financial Year 2005 - 06, transaction in derivatives were considered as speculative transactions for the purpose of determination of tax liability under the Income-tax Act [1 Mark]

(a) TRUE
(b) FALSE

Q.19 _____ is allotted to the Custodial Participant (CP) by NSCCL. [3 Marks]

(a) A unique CP code
(b) An order identifier
(c) A PIN number
(d) A trade identifier

Q.20 An interest rate is 15% per annum when expressed with annual compounding. What is the equivalent rate with continuous compounding? [2 Marks]

(a) 14%
(b) 14.50%
(c) 13.98%
(d) 14.75%

Q.21 The favorable difference received by buyer/holder on the exercise/expiry date, between the final settlement price as and the strike price, will be recognized as _____ [2 Marks]

(a) Income
(b) Expense
(c) Cannot say
(d) None

Q.22 The F&O segment of NSE provides trading facilities for the following derivative instruments, except [2 Marks]

(a) Individual warrant options
(b) Index based futures
(c) Index based options
(d) Individual stock options

Q.23 Derivative is defined under SC(R)A to include : A contract which derives its value from the prices, or index of prices, of underlying securities. [1 Mark]

(a) TRUE
(b) FALSE

Q.24 The risk management activities and confirmation of trades through the trading system of NSE is carried out by _____. [2 Marks]

(a) users
(b) trading members
(c) clearing members
(d) participants

Q.25 A dealer sold one January Nifty futures contract for Rs.250,000 on 15th January. Each Nifty futures contract is for delivery of 50 Nifties. On 25th January, the index closed at 5100. How much profit/loss did he make ? [2 Marks]

(a) Profit of Rs. 9000
(b) Loss of Rs. 8000
(c) Loss of Rs. 9500
(d) Loss of Rs. 5000

Q.26 Manoj owns five hundred shares of ABC Ltd. Around budget time, he gets uncomfortable with the price movements. Which of the following will give him the hedge he desires (assuming that one futures contract = 100 shares) ? [1 Mark]

(a) Buy 5 ABC Ltd.futures contracts
(b) Sell 5 ABC Ltd.futures contracts
(c) Sell 10 ABC Ltd.futures contracts
(d) Buy 10 ABC Ltd.futures contracts

Q.27 An investor is bearish about Tata Motors and sells ten one-month ABC Ltd. futures contracts at Rs.6,06,000. On the last Thursday of the month, Tata Motors closes at Rs.600. He makes a _____. (assume one lot = 100) [2 Marks]

(a) Profit of Rs. 6,000
(b) Loss of Rs. 6,000
(c) Profit of Rs. 8,000
(d) Loss of Rs. 8,000

Q.28 The beta of Jet Airways is 1.3. A person has a long Jet Airways position of Rs. 200,000 coupled with a short Nifty position of Rs.100,000. Which of the following is TRUE? [2 Marks]

(a) He is bullish on Nifty and bearish on Jet Airways
(b) He has a partial hedge against fluctuations of Nifty
(c) He is bearish on Nifty as well as on Jet Airways
(d) He has a complete hedge against fluctuations of Nifty

Q.29 Suppose a stock option contract trades for 1, 2 and 3 months expiry with strike prices of 85, 90, 95, 100, 105, 110, 115. How many different options contracts will be tradable? [2 Marks]

(a) 18
(b) 32
(c) 21
(d) 42

Q.30 The bull spread can be created by only buying and selling [2 Marks]

(a) basket option
(b) futures
(c) warrant
(d) options

Q.31 A stock broker means a member of_____. [1 Mark]

(a) SEBI
(b) any exchange
(c) a recognized stock exchange
(d) any stock exchange

Q.32 Ashish is bullish about HLL which trades in the spot market at Rs.210. He buys 10 three-month call option contracts on HLL with a strike of 230 at a premium of Rs.1.05 per call. Three months later, HLL closes at Rs. 250. Assuming 1 contract = 100 shares, his profit on the position is _____. [1 Mark]

(a) Rs.18,950
(b) Rs.19,500
(c) Rs.10,000
(d) Rs.20,000

Q.33 A January month Nifty Futures contract will expire on the last _____ of January [2 Marks]

(a) Monday
(b) Thursday
(c) Tuesday
(d) Wednesday

Q.34 Which of the following are the most liquid stocks? [2 Marks]

(a) All Infotech stocks
(b) Stocks listed/permitted to trade at the NSE
(c) Stocks in the Nifty Index
(d) Stocks in the CNX Nifty Junior Index

Q.35 In the books of the buyer/holder of the option, the premium paid would be _____ to 'Equity Index Option Premium Account' or 'Equity Stock Option Premium Account', as the case may be [2 Marks]

(a) Debited
(b) Credited
(c) Depends
(d) None

Q.36 Greek letter measures a dimension to_____ in an option position [1 Mark]

(a) the risk
(b) the premium
(c) the relationship
(d) None

Q.37 An option which gives the holder the right to sell a stock at a specified price at some time in the future is called a [1 Mark]

(a) Naked option
(b) Call option
(c) Out-of-the-money option
(d) Put option

Q.38 Trading member Shantilal took proprietary purchase in a March 2000 contract. He bought 1500 units @Rs.1200 and sold 1400 @ Rs. 1220. The end of day settlement price was Rs. 1221. What is the outstanding position on which initial margin will be calculated? [1 Mark]

(a) 300 units
(b) 200 units
(c) 100 units
(d) 500 units

Q.39 In which year, foreign currency futures based on new floating exchange rate system were introduced at the Chicago Mercantile Exchange [1 Mark]

(a) 1970
(b) 1975
(c) 1972
(d) 1974

Q.40 The units of price quotation and minimum price change are not standardised item in a Futures Contract. [1 Mark]

(a) TRUE
(b) FALSE

Q.41 With the introduction of derivatives the underlying cash market witnesses _____ [1 Mark]

(a) lower volumes
(b) sometimes higher, sometimes lower
(c) higher volumes
(d) volumes same as before

Q.42 Clearing members need not collect initial margins from the trading members [1 Mark]

(a) FALSE
(b) TRUE

Q.43 Which risk estimation methodology is used for measuring initial margins for futures/ options market? [2 Marks]

(a) Value At Risk
(b) Law of probability
(c) Standard Deviation
(d) None of the above

Q.44 The value of a call option _____ with a decrease in the spot price. [2 Marks]

(a) increases
(b) does not change
(c) decreases
(d) increases or decreases

Q.45 Any person or persons acting in concert who together own _____% or more of the open interest in index derivatives are required to disclose the same to the clearing corporation. [1 Mark]

(a) 35
(b) 15
(c) 5
(d) 1

Q.46 NSE trades Nifty, CNX IT, BANK Nifty, Nifty Midcap 50 and Mini Nifty futures contracts having all the expiry cycles, except. [2 Marks]

(a) Two-month expiry cycles
(b) Four month expiry cycles
(c) Three-month expiry cycles
(d) One-month expiry cycles

Q.47 An investor owns one thousand shares of Reliance. Around budget time, he gets uncomfortable with the price movements. One contract on Reliance is equivalent to 100 shares. Which of the following will give him the hedge he desires? [2 Marks]

(a) Buy 5 Reliance futures contracts
(b) Sell 10 Reliance futures contracts
(c) Sell 5 Reliance futures contracts
(d) Buy 10 Reliance futures contracts

Q.48 Spot Price = Rs. 100. Call Option Strike Price = Rs. 98. Premium = Rs. 4. An investor buys the Option contract. On Expiry of the Option the Spot price is Rs. 108. Net profit for the Buyer of the Option is ___. [1 Mark]

(a) Rs. 6
(b) Rs. 5
(c) Rs. 2
(d) Rs. 4

Q.49 In the NEAT F&O system, the hierarchy amongst users comprises of _____. [2 Marks]

(a) branch manager, dealer, corporate manager
(b) corporate manager, branch manager, dealer
(c) dealer, corporate manager, branch manager
(d) corporate manager, dealer, branch manager

Q.50 The open position for the proprietary trades will be on a _____ [3 Marks]

(a) net basis
(b) gross basis

Q.51 The minimum networth for clearing members of the derivatives clearing corporation/ house shall be _____ [2 Marks]

(a) Rs.300 Lakh
(b) Rs.250 Lakh
(c) Rs.500 Lakh
(d) None of the above

Q.52 The Black-Scholes option pricing model was developed in _____. [2 Marks]

(a) 1923
(b) 1973
(c) 1887
(d) 1987

Q.53 In the case of index futures contracts, the daily settlement price is the _____. [3 Marks]

(a) closing price of futures contract
(b) opening price of futures contract
(c) closing spot index value
(d) opening spot index value

Q.54 Premium Margin is levied at _____ level. [1 Mark]

(a) client
(b) clearing member
(c) broker
(d) trading member

Q.55 In the Black-Scholes Option Pricing Model, as S becomes very large, both N(d1) and N(d2) are both close to 1.0. [2 Marks]

(a) FALSE
(b) TRUE

Q.56 To operate in the derivative segment of NSE, the dealer/broker and sales persons are required to pass _____ examination. [1 Mark]

(a) Certified Financial Analyst
(b) MBA (Finance)
(c) NCFM
(d) Chartered Accountancy
(e) Not Attempted

Q.57 The NEAT F&O trading system _____. [1 Mark]

(a) allows one to enter spread trades
(b) does not allow spread trades
(c) allows only a single order placement at a time
(d) None of the above

Q.58 Margins levied on a member in respect of options contracts are Initial Margin, Premium Margin and Assignment Margin [1 Mark]

(a) TRUE
(b) FALSE

Q.59 American option are frequently deduced from those of its European counterpart [1 Mark]

(a) FALSE
(b) TRUE

Q.60 Which of the following is closest to the forward price of a share price if Cash Price = Rs.750, Futures Contract Maturity = 1 year from date, Market Interest rate = 12% and dividend expected is 6%? [2 Marks]

(a) Rs. 795
(b) Rs. 705
(c) Rs. 845
(d) None of these

Question No.	Answers	Question No.	Answers
1	(a)	31	(c)
2	(a)	32	(a)
3	(b)	33	(b)
4	(a)	34	(c)
5	(b)	35	(a)
6	(d)	36	(a)
7	(a)	37	(d)
8	(c)	38	(c)
9	(a)	39	(c)
10	(d)	40	(b)
11	(b)	41	(c)
12	(a)	42	(a)
13	(a)	43	(a)
14	(a)	44	(c)
15	(b)	45	(b)
16	(b)	46	(b)
17	(b)	47	(b)
18	(a)	48	(a)
19	(a)	49	(b)
20	(c)	50	(a)
21	(a)	51	(a)
22	(a)	52	(b)
23	(a)	53	(a)
24	(c)	54	(a)
25	(d)	55	(b)
26	(b)	56	(c)
27	(a)	57	(a)
28	(b)	58	(a)
29	(d)	59	(b)
30	(d)	60	(a)