

NCFM

NSE Academy Certification in Financial Markets

DERIVATIVES MARKET (DEALERS) MODULE

NCFM Module Examination Details

Sr. NO	Module Name	Test Duration (in minutes)	No. Of Questions	Maximum Marks	Negative Marking	Pass marks	Allowable access to Candidate at Test Centre			
							Open Office Spread Sheet	Normal Distribution Table	Regular / Scientific Calculator	Financial Calculator
FOUNDATION										
1	Financial Markets: A Beginners' Module	120	60	100	NO	50	NO	NO	YES	NO
2	Mutual Funds : A Beginners' Module	120	60	100	NO	50	NO	NO	YES	NO
3	Currency Derivatives: A Beginner's Module	120	60	100	NO	50	NO	NO	YES	NO
4	Equity Derivatives: A Beginner's Module	120	60	100	NO	50	NO	NO	YES	NO
5	Interest Rate Derivatives: A Beginner's Module	120	60	100	NO	50	NO	NO	YES	NO
6	Commercial Banking in India: A Beginner's Module	120	60	100	NO	50	NO	NO	YES	NO
7	FIMMDA-NSE Debt Market (Basic) Module	120	60	100	YES	60	YES	NO	YES	NO
8	Securities Market (Basic) Module	120	60	100	YES	60	NO	NO	YES	NO
9	Clearing Settlement and Risk Management Module	60	75	100	NO	60	YES	NO	YES	NO
10	Banking Fundamental - International	90	48	48	YES	29	YES	NO	YES	NO
11	Capital Markets Fundamental - International	90	40	50	YES	30	YES	NO	YES	NO
INTERMEDIATE										
1	Capital Market (Dealers) Module	105	60	100	YES	50	NO	NO	YES	NO
2	Derivatives Market (Dealers) Module	120	60	100	YES	60	NO	NO	YES	NO
3	Investment Analysis and Portfolio Management	120	60	100	YES	60	NO	NO	YES	NO
4	Fundamental Analysis Module	120	60	100	YES	60	NO	NO	YES	NO
5	Operation Risk Management Module	120	75	100	YES	60	NO	NO	YES	NO
6	Options Trading Strategies Module	120	60	100	YES	60	NO	NO	YES	NO
7	Banking Sector Module	120	60	100	YES	60	NO	NO	YES	NO
8	Treasury Management Module	120	60	100	YES	60	YES	NO	YES	NO
9	Insurance Module	120	60	100	YES	60	NO	NO	YES	NO
10	Macroeconomics for Financial Markets Module	120	60	100	YES	60	NO	NO	YES	NO
11	NSDL-Depository Operations Module #	75	60	100	YES	60	NO	NO	YES	NO
12	Commodities Market Module	120	60	100	YES	50	NO	NO	YES	NO
13	Surveillance in Stock Exchanges Module	120	50	100	YES	60	NO	NO	YES	NO
14	Corporate Governance Module	90	100	100	YES	60	NO	NO	YES	NO
15	Compliance Officers (Brokers) Module	120	60	100	YES	60	NO	NO	YES	NO
16	Compliance Officers (Corporates) Module	120	60	100	YES	60	NO	NO	YES	NO
17	Information Security Auditors Module (Part-1)	120	90	100	YES	60	NO	NO	YES	NO
18	Information Security Auditors Module (Part-2)	120	90	100	YES	60	NO	NO	YES	NO
19	Technical Analysis Module	120	60	100	YES	60	NO	NO	YES	NO
20	Mergers and Acquisitions Module	120	60	100	YES	60	NO	NO	YES	NO
21	Back Office Operations Module	120	60	100	YES	60	NO	NO	YES	NO
22	Wealth Management Module	120	60	100	YES	60	NO	NO	YES	NO
23	Project Finance Module	120	60	100	YES	60	NO	NO	YES	NO
24	Venture Capital and Private Equity Module	120	70	100	YES	60	NO	NO	YES	NO
25	Financial Services Foundation Module ###	120	45	100	YES	50	NO	NO	YES	NO
26	NSE Certified Quality Analyst \$	120	60	100	YES	50	NO	NO	YES	NO
27	NSE's Capital Market Aptitude Test (NCMAT)	120	100	100	NO	60	YES	NO	YES	YES
29	NSE Certified Capital Market Professional (NCCMP)	120	60	100	NO	50	NO	NO	YES	NO
30	US Securities Operation Module	90	41	50	YES	30	YES	NO	YES	NO
ADVANCED										
1	Algorithmic Trading Module	120	100	100	YES	60	YES	NO	YES	NO
2	Financial Markets (Advanced) Module	120	60	100	YES	60	YES	NO	YES	NO
3	Securities Markets (Advanced) Module	120	60	100	YES	60	YES	NO	YES	NO
4	Derivatives (Advanced) Module	120	55	100	YES	60	YES	YES	YES	NO
5	Mutual Funds (Advanced) Module	120	60	100	YES	60	YES	NO	YES	NO
6	Options Trading (Advanced) Module	120	35	100	YES	60	YES	YES	YES	YES
7	Retirement Analysis and Investment Planning	120	77	150	NO	50	YES	NO	YES	YES
8	Retirement Planning and Employee Benefits **	120	77	150	NO	50	YES	NO	YES	YES
9	Tax Planning and Estate Planning **	120	77	150	NO	50	YES	NO	YES	YES
10	Investment Planning **	120	77	150	NO	50	YES	NO	YES	YES
11	Examination 5/Advanced Financial Planning **	240	30	100	NO	50	YES	NO	YES	YES
12	Equity Research Module ##	120	49	60	YES	60	YES	NO	YES	NO
13	Financial Valuation and Modeling	120	100	100	YES	60	YES	NO	YES	YES
14	Mutual Fund and Fixed Income Securities Module	120	100	60	YES	60	YES	NO	YES	YES
15	Issue Management Module ##	120	55	70	YES	60	YES	NO	YES	NO
16	Market Risk Module ##	120	40	65	YES	60	YES	NO	YES	NO
17	Financial Modeling Module ###	120	30	100	YES	50	YES	NO	YES	NO
18	Business Analytics Module ###	120	66	100	NO	50	YES	NO	YES	NO

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

Module of IMS Preschool

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

** Financial Planning Standards Board India (Certified Financial Planner Certification) FPSB India Exam

\$ SSA Business School

The curriculum for each of the modules (except Modules of Financial Planning Standards Board India, Finitatives Learning India Pvt. Ltd. and IMS Preschool) is available on our website: www.nseindia.com

Preface

About NSE Academy

NSE Academy is a subsidiary of National Stock Exchange of India. NSE Academy straddles the entire spectrum of financial courses for students of standard VIII and right up to MBA professionals. NSE Academy has tied up with premium educational institutes in order to develop pool of human resources having right skills and expertise which are apt for the financial market. Guided by our mission of spreading financial literacy for all, NSE Academy has constantly innovated its education template, this has resulted in improving the financial well-being of people at large in society. Our education courses have so far facilitated more than 41.8 lakh individuals become financially smarter through various initiatives.

NSE Academy's Certification in Financial Markets (NCFM)

NCFM is an online certification programme aimed at upgrading skills and building competency. The programme has a widespread reach with testing centres present at more than 154+ locations across the country.

The NCFM offers certifications ranging from the Basic to Advanced.

One can register for the NCFM through:

- Online mode by creating an online login id through the link 'Education'>'Certifications'>'Online Register / Enroll' available on the website www.nseindia.com
- Offline mode by filling up registration form available on the website www.nseindia.com > 'Education' > 'Certifications' > 'Register for Certification'

Once registered, a candidate is allotted a unique NCFM registration number along with an online login id and can avail of facilities like SMS alerts, online payment, checking of test schedules, online enrolment, profile update etc. through their login id.

TABLE OF CONTENTS

Derivatives Market Dealers Module	0
CHAPTER 1: INTRODUCTION TO DERIVATIVES	5
Why is it Important to learn about Derivatives?	5
1.1 Types of Derivative Contracts	6
1.2 Basic Derivatives	8
1.3 History of Financial Derivatives Markets.....	9
1.4 Participants in a Derivative Market	11
1.5 Economic Function of the Derivative Market	12
1.6 CONCLUSION.....	13
CHAPTER 2: UNDERSTANDING INTEREST RATES AND STOCK INDICES	14
2.1 Understanding Interest Rates	14
2.2 Understanding The Stock Index	15
2.3 Economic Significance of Index Movements.....	16
2.4 Index Construction	17
2.5 Desirable Attributes Of An Index.....	18
2.6 Applications Of Index	20
2.7 CONCLUSION.....	21
CHAPTER 3: FUTURES CONTRACTS, MECHANISM AND PRICING	22
3.1 Forward Contracts	22
3.2 Limitations Of Forward Markets	23
3.3 Introduction To Futures.....	24
3.4 Distinction between Futures and Forwards Contracts.....	24
3.5 Futures Terminology	24
3.6 Trading Underlying Vs. Trading Single Stock Futures	25
3.7 Futures Payoffs	26
3.8 Pricing Futures	28
3.9 CONCLUSION	32

CHAPTER 4: APPLICATION OF FUTURES CONTRACTS	33
4.1 Understanding Beta (β)	33
4.2 Numerical illustration of applications of stock Futures	33
4.3 Hedging using stock index Futures.....	36
4.4 CONCLUSION.....	38
CHAPTER 5: OPTIONS CONTRACTS, MECHANISM AND APPLICATIONS	39
5.1 Option Terminology.....	39
5.2 Comparison between Futures and options	40
5.3 Options Payoffs	42
5.4 Application Of Options.....	46
5.5 Popular Options Trading Strategies.....	56
5.6 CONCLUSION.....	62
CHAPTER 6: PRICING OF OPTIONS CONTRACTS, VOLATILITY AND OPTION GREEKS	63
6.1 Variables Affecting Option Pricing	63
6.2 Option Price Limits	64
6.3 The Black scholes Merton Model for Option Pricing (BSO)	64
6.4 The Greeks.....	65
6.5 Volatility of Options	67
CHAPTER 7: TRADING OF DERIVATIVES CONTRACTS	69
7.1 Futures And Options Trading System.....	69
7.2 Client Broker Relationship in Derivative Segment.....	72
7.3 Order Types and Conditions	72
7.4 Order Processing and Matching	73
7.5 The Trader Workstation	74
7.6 Futures and options Market instruments	78
7.7 Criteria for Stocks and Index Eligibility for Trading	84
7.8 Charges	86
7.9 INTRODUCTION OF DERIVATIVE CONTRACTS ON FOREIGN STOCK INDICES	87
7.10 CONCLUSION.....	87

CHAPTER 8: CLEARING AND SETTLEMENT	88
8.1 Clearing Entities	88
8.2 Clearing Mechanism	89
8.3 Settlement Procedure	91
8.4 Risk Management	95
8.5 NSSCL SPAN	97
8.6 Cross Margining	102
CHAPTER 9: REGULATORY FRAMEWORK	104
9.1 Securities Contracts (Regulation) Act, 1956	104
9.2 Securities And Exchange Board Of India Act, 1992	105
9.3 Regulation for Derivatives Trading	106
9.4 Requirements for F&O Trading At NSE	107
9.5 Position limits	110
9.6 Reporting of client margin	113
9.7 Conclusion	114
CHAPTER 10: ACCOUNTING FOR DERIVATIVES	115
10.1 Key Accounting Principles	115
10.2 Applicability	115
10.1 Synthetic Accounting	116
10.2 Hedge Accounting	116
10.6 Presentation in The Financial Statements	118
10.7 Disclosures in Financial Statements	119
10.8 Taxation Of Derivative Transaction In Securities	120
CHAPTER 11: INVESTOR SERVICES	122
11.1 Commencing Trading on the NSE Derivatives Segment	122
11.2 Model Risk Disclosure Document	123
11.3 Do's and Don't's for Investors	124
11.4 SEBI Measures for Investor Rights Protection	125
REFERENCES	126
MODEL TEST PAPER	127

Distribution of weights of the Derivatives Market (Dealers) Module Curriculum

Chapter No	Title	Weights (%)
1	Introduction to Derivatives	5
2	Understanding Interest Rates and Stock Indices	5
3	Futures Contracts, Mechanism and Pricing	5
4	Application of Futures Contracts	10
5	Options Contracts, Mechanism and Applications	10
6	Pricing of Options Contracts and Greek Letters	10
7	Trading of Derivatives Contracts	20
8	Clearing and Settlement	20
9	Regulatory Framework	10
10	Accounting for Derivatives	5

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

Copyright © 2016 by NSE Academy Limited
NSE Academy Limited is a subsidiary of NSE
Exchange Plaza, Bandra Kurla Complex,
Bandra (East), Mumbai 400 051

All content included in this book, such as text, graphics, logos, images, data compilation etc. are the property of NSE Academy Ltd. This book or any part thereof should not be copied, reproduced, duplicated, sold, resold or exploited for any commercial purposes. Furthermore, the book in its entirety or any part cannot be stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise.

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:

- 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.

The concept of derivatives can be traced back to the Mesopotamian era when the sixth Babylonian king allowed sale of goods and assets at a pre-agreed price, delivered at a future date. This is nothing but a derivative. The working of a derivative contract of this nature is very simple. Let us understand this with the help of an illustration.

Illustration:

Consider that you are a farmer who has 10 acres of land. You can either cultivate rice in all 10 acres or cultivate rice in 5 acres and wheat in the remaining 5. If you cultivate rice in all 10 acres, and the demand for wheat is high that year, it would mean that you lose out on potentially high profits that you could have made if you had cultivated wheat. If you cultivate rice and wheat, and if the demand and price for rice is very high that year, then you lose out on potentially high profits arising from rice. So how do you resolve this issue?

You can enter into a contract with a distributor to purchase all your produce – whether it be all rice or 50% rice and 50% wheat, at the beginning itself, before you even begin cultivation. This way, you are assured that whatever is agreed upon, if you cultivate it, it will be sold in its entirety. Even the price that you will get for it is agreed upon in the beginning itself. Thus, you don't incur any risk from the decision, that your produce may not get sold. This agreement is a derivative contract, where the underlying asset is the produce!

WHY IS IT IMPORTANT TO LEARN ABOUT DERIVATIVES?

In the past two decades, there has been exponential growth in the volume of international trade and business due to the adoption of globalization and liberalization all over the world. The demand for the international money and financial instruments increased significantly at global level. In turn, change in exchange rates, interest rates and stock prices of different financial markets have increased the financial risk to the corporates and investors globally. Adverse changes in any of these threatened the survival of business world. Therefore, in order to manage such risk, the new instruments have been developed in the financial markets, which are popularly known as financial derivatives at national and international financial market. The primary purpose of these instruments is to ensure commitments to prices for

future dates for giving protection against adverse movements in future prices to reduce the extent of financial risk in financial markets. Now there is a faster development in derivatives products as well as trading as they are very significant for every corporates and investors.

In India, emergence and growth of derivative market is completely new phenomenon. The introduction of equity derivatives was essentially the beginning of a new era in the Indian Capital Market. With the launch of Index Futures in June 2000, as the first derivative product, SEBI expanded the portfolio by quickly adding index options, individual stock options and individual stock futures. So now, the growth of this market has been quite significant. With these products in place, Indian Capital Market is at par with any other Capital Market across the globe. The Indian derivative market has exhibited exponential growth in terms of volume and number of contracts traded. The market turnover of NSE has grown from Rs 2,365 crores in 2000-01 to Rs 3, 82, 11,408.05 crores in 2013-14 and BSE market turnover also increased from Rs 5021.81 crores in 2003-04 to Rs 92, 19,434.32 crores in 2013-14. Within a short span of fourteen years, there is a substantial development in derivatives trading in terms of turnover and number of contracts traded in India.

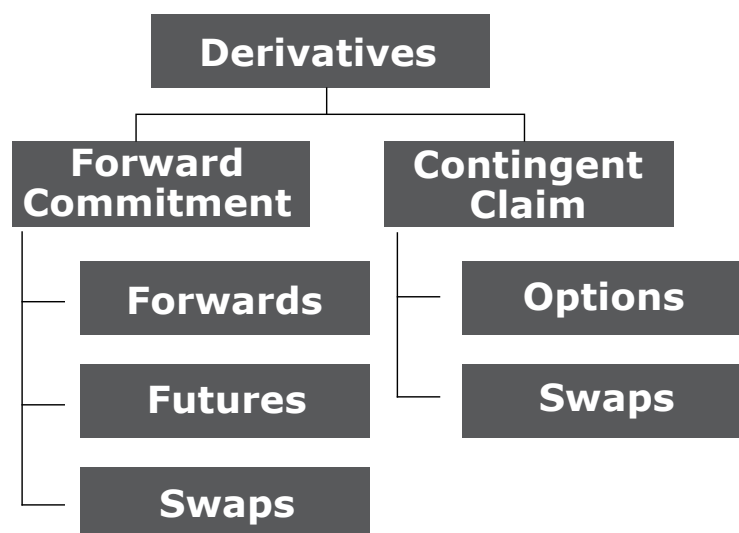
As derivatives are new products in Indian capital market, most of the investors are not aware about such a new products. Thus, there is a need to make the sense of availability of these new financial products and their usefulness particularly among medium and retail investors.

1.1 TYPES OF DERIVATIVE CONTRACTS

1. Derivatives can be classified in 3 ways: On the basis of the nature of the derivative contract
2. On the basis of the Underlying asset
3. On the basis of the place of trading

1.1.1 CLASSIFICATION BASIS NATURE OF CONTRACT

Derivatives can be broadly classified into 2 types based on the nature of contract as can be seen from the diagram below. All types of derivatives fall into either of these 2 categories



Forward Commitment

These derivatives comprise of an assured occurrence in the future. The underlying asset will get exchanged at a fixed future time, at a fixed price, agreed upon by both parties at the time of entering into the contract. Since the exchange is fixed at a future time, it is called a Forward Commitment. Neither party can back out of the contract once it has been entered into, except under mutual consent. Futures, Forwards and Swaps are three main types of derivatives that fall under this category. We will discuss each of these in detail in subsequent sessions.

Contingent Claim

These derivatives comprise of an exchange subject to a certain event occurring at a future time. If the event occurs, then the underlying asset will be exchanged at a fixed future time, at a fixed price, agreed upon by both parties at the time of entering into the contract. Since the exchange is contingent on the occurrence of an event, it is known as contingent claim. If the event does not occur, the contract becomes null and void and will expire on the expiration date. Options and swaps come under this category.

1.1.2 CLASSIFICATION BASIS UNDERLYING

Another way of classifying derivatives, is on the basis of the Underlying Asset. The types are as follows:

Type of Derivative	Underlying Asset
Equity	Stock / Share
Index	Any broad-spectrum or sectoral index
Interest rate	Debt instrument – loans / asset backed securities
Currency	Foreign Exchange
Commodities	Any commodity

1.1.3 CLASSIFICATION ON THE BASIS OF PLACE OF TRADE

Derivatives can either be traded over the counter (OTC) or on an organized exchange. Based on the place of trade, they are called OTC derivatives and Exchange traded derivatives respectively. Usually forwards, some types of options, swaps exotic products are OTC derivatives. Futures, exchange-traded options are exchange traded derivatives.

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 BASIC DERIVATIVES

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 these abovementioned contracts

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.

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.

Option 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. In case 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).

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.

1.3 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 EuroDollar 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.

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.

Box 1.2: History of Derivative trading at NSE

The derivatives trading on the NSE commenced on June 12, 2000 with futures trading on Nifty 50 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.

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	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.

1.4 PARTICIPANTS IN A DERIVATIVE MARKET

1. As with the regular financial markets, derivatives markets have the following participants:
Stock Exchange: Where the derivatives are created and traded.
2. Investors: Investors in derivatives could be retail investors, institutional investors, banks, corporates. Each investor has different objectives of investing in derivatives. The types of investors are detailed below.
3. Regulatory Authorities: They ensure smooth functioning of the markets and ensures fair practices are being followed by all participants. SEBI regulates the equity derivative markets, RBI the interest rate and currency derivative markets and FMC (Forward Markets Commission) the commodity markets. FMC is now merged with SEBI, and hence SEBI overlooks both parts of the derivative markets.
4. Others: Other participants such as Clearing and settlement agencies, credit rating agencies, investor grievances etc are shared between the financial markets and the derivatives markets.

Types of Investors:

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

- **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. Banks, treasury of companies etc fall under this category.
- **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. Retail investors who invest for the purpose of making profits on gains fall under this category.
- **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. Institutional players, proprietary dealers may fall under this category.

1.5 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. A key aspect of use of derivatives is Leverage, which allows investors to actually transact in higher

amounts than what they are investing. Transfer of risk also enables market participants to expand their volume of activity.

1.6 CONCLUSION

Derivatives are contracts in which there is an underlying asset in the form of a stock, bond, currency, commodity or another derivative. The price of the derivative is dependent on the price of the underlying asset. Derivatives are classified in various ways. One the basis of the place of trade, there are 2 types – Exchange traded derivatives and Over the Counter derivatives. On the basis of nature of the contract, there are 2 types – Forward commitment and Contingent Claim. Derivatives are also classified on the basis of nature of the underlying asset. The 4 major types of derivative contracts are – Forwards, Futures, Options and Swaps. Derivatives originated first in the commodities market in the US, then transgressed into currencies and finally into the capital markets with stocks and bonds as underlyings. In India, currently there are various futures and options traded on the major stock exchanges in stocks, indices, bonds and currencies. Derivatives serve various economic functions such as transfer of risk, moving speculation to a controlled environment and higher trading volumes due to leverage.

CHAPTER 2: UNDERSTANDING INTEREST RATES AND STOCK INDICES

Interest rates and Indices are two types of Underlying assets we will see commonly in various derivatives. Other assets such as Equity, commodities and currency you would be familiar with already. 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

Interest rate is the return on any equity or debt investment. Interest rates can be discrete or continuous. When people invest in financial markets (such as equity shares), returns on assets change continuously. Here, we find that continuous compounding of returns (the interest rate on equity) takes place. On the other hand a fixed deposit is discretely compounded and the frequency could be from annual to quarterly to daily. A continuously compounded investment will always give higher returns than a discretely compounded investment, irrespective of frequency of compounding, for the same investment period.

Interest rates are always quoted in percentage terms on per annum basis. However, they also indicate the frequency along with the per annum rates.

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 $A = P \cdot (1 + r/t)^t$) 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 $Rs\ 100 \cdot (1 + 0.1) = Rs\ 110$.

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 (calculated as $100 \cdot (1 + 0.1/2)^2$).

The returns on investment are influenced by the rate of interest and the compounding frequency. Higher the interest rate and higher the compounding frequency, higher the returns on investment!

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	$100 * e^{(10\% * 1)}$	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:

- 8% per annum semi annual compounding?
- 8% per annum annual compounding?

Solution:

- $2 * \ln(1+0.08/2)=0.078441=7.844\%$
- $\ln(1+0.08) =0.07696=7.696\%$

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:

- Continuous compounding
- Annual compounding.

Solution:

- $4 * \ln(1+0.10/4)=0.098770=9.877\%$
- $(1+0.10/4)^4 - 1 = 10.38\%$

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.

The main index of the NSE is the Nifty 50. The Nifty 50 is a well diversified 50 stock index accounting for 13 sectors of the economy. It is used for a variety of purposes such as benchmarking fund portfolios, index based derivatives and index funds. The base value of the Nifty, which is the benchmark broad-based index of the National Stock Exchange, was set to 1000 on the start date of November 3, 1995. Thereafter, changes in the values of the group of equities used to create the index will be reflected on this base number in weighted average percentage terms.

Broad-based 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:

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

Sectoral indices capture the behavior of a particular sector, just as market indices capture behavior of the overall market. For eg: The Bank Nifty / Nifty Bank Index, which is a banking sector index of the NSE, which contains the 12 most liquid and large capitalised stocks from the banking sector which trade on the National Stock Exchange (NSE). It provides investors and market intermediaries a benchmark that captures the capital market performance of Indian banking sector.

2.3 ECONOMIC SIGNIFICANCE OF INDEX MOVEMENTS

Index movements reflect the changing expectations of the stock market about future dividends of the corporate sector, just as how stock values reflect expectations of investors about a particular company. 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:

- News about the company- micro economic factors (e.g. a product launch, or the closure of a factory, other factors specific to a company)
- 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 various aspects like its market capitalization, price and so on.

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.

We will study more on how indices are constructed and the issues therein in the next section.

2.4 INDEX CONSTRUCTION

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 companies¹. 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:

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

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

The India Index Services Limited (IISL), a subsidiary of NSE Strategic Investment Corporation Limited, introduced the free float market capitalization methodology for its main four indices, viz., Nifty 50, Nifty 50 USD, Nifty Next 50 and Nifty 100. With effect from May 4, 2009 Nifty 50 Junior and with effect from June 26, 2009, Nifty 50, Nifty 100 and Nifty 50 USD 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.

Price Weighted Index: 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 the following 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.
- A single stock or a small group of stocks in the index should not move the index significantly. Otherwise, the shifts in other stocks will not be sufficiently captured in the index

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 Nifty 50 addresses these issues.

Box 2.1: The Nifty 50

The Nifty 50 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 Nifty 50 index. The results of this work are remarkably simple: (a) the correct size to use is 50, (b) stocks considered for the Nifty 50 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 Nifty 50 is well-respected internationally as a pioneering effort in better understanding how to make a stock market index. The Nifty 50 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 low market impact cost and (b) high hedging effectiveness. The good diversification of Nifty generates low initial margin requirement.

Impact cost

Impact cost represents the cost of executing a transaction in a given stock, for a specific predefined order size, at any given point of time. Impact cost is a practical and realistic measure of market liquidity; it is closer to the true cost of execution faced by a trader in comparison to the bid-ask spread. In mathematical terms it is the percentage mark up observed while buying / selling the desired quantity of a stock with reference to its ideal price (best buy + best sell) / 2.

Example A:

ORDER BOOK SNAPSHOT			
Buy Quantity	Buy Price	Sell Quantity	Sell Price
1000	98	1000	99
2000	97	1500	100
1000	96	1000	101

TO BUY 1500 SHARES

$$\begin{aligned}\text{Ideal Price} &= \frac{99 + 98}{2} = 98.5 \\ \text{Actual Buy Price} &= \frac{(1000 \times 99) + (500 \times 100)}{1500} = 99.33 \\ \text{IMPACT COST (FOR 1500 shares)} &= \frac{99.33 - 98.50}{98.50} \times 100 = 0.84\%\end{aligned}$$

Impact cost of the Nifty 50 for a portfolio size of Rs.50 lakhs is 0.06% for the month March 2015.

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 funds² and the exchange traded funds³. 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 Nifty 50 was scientifically designed to enable the launch of index-based products like index derivatives⁴ 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.

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.

- Index derivatives are cash settled, and hence do not suffer from settlement delays and problems related to bad delivery, forged/fake certificates.
- It is easier for retail investors to understand indices and track their movements, than pick stocks and track them. Hence, index derivatives are more popular amongst retail investors than stock indices.

Index futures and options are traded on the stock exchanges in India. The National Stock Exchange of India Limited (NSE) commenced trading in derivatives with index futures on June 12, 2000. The futures contracts on the NSE are based on the Nifty 50. The exchange introduced trading on index options based on the Nifty 50 on June 4, 2001. Additionally, exchange traded derivatives contracts linked to Nifty 50 are traded at Singapore Exchange Ltd. (SGX), Chicago Mercantile Exchange Inc. (CME) and Osaka Exchange Inc. (OSE).

2.7 CONCLUSION

Interest rates are the return on any investment to an investor. In case of funds lent, it is the return to the lender on account of the risk taken by lending the funds to the borrower. Interest rates may be fixed or floating. They may also be continuous or discrete in frequency. The frequency of the interest rate influences the returns on the investment, i.e. higher the frequency, higher the returns, sum, period and rate of interest being the same.

Indices are a broad market measure tool composed of representative stocks that map market behavior. They may be either broad market indices or sectoral indices, i.e. representative of a single sector. The important characteristics to be borne in mind while composing an index is that the index should truly mirror the performance of the market it represents, the stocks it is composed of must be liquid and no single / set of stocks must significantly move the index.

Index derivatives and Interest rate derivatives are traded on both the major stock exchanges in India.

CHAPTER 3: FUTURES CONTRACTS, MECHANISM AND PRICING

In recent years, derivatives have become increasingly important in the field of finance. As we saw in the first chapter, 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. Hence, it's a Forward Commitment type of derivative. One of the parties to the contract assumes a **long position (buy 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 (sell 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, in the OTC market.

The salient features of forward contracts are as given below:

- They are bilateral contracts and hence exposed to counter-party risk. Counter-party risk is the risk that the other party to the contract may not honour their part of the agreement. This is significant especially in case of Forward contracts as it can be entered into between any 2 individuals / companies / institutions, and it is not overseen by the exchanges and other regulatory bodies. Standard contract laws apply to these contracts though.
- Each contract is custom designed, and hence is unique in terms of contract size, expiration date and the asset type and quality. Even the delivery and storage terms may be negotiated mutually and built into the contract. This gives higher flexibility to the parties to the contract, which is not true in case of futures, as we will see later.
- The contract price is generally not available in public domain as these contracts are privately negotiated.
- On the expiration date, the contract has to be settled by delivery of the asset. It may also be cash-settled, as agreed by the parties at the inception of the contract. In cash

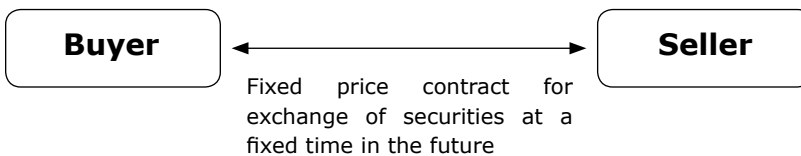
settlement, the parties pay / receive the loss or gain arising from the contract to them in cash to the other party.

- If the party wishes to reverse the contract, it has to compulsorily go to the same counterparty, which often results in high prices being charged. This is because, since these contracts are highly customized, it would be very difficult to find another counterparty with the exact same terms as the original contract to enter into an equal and opposite transaction.

Forward contract Illustration

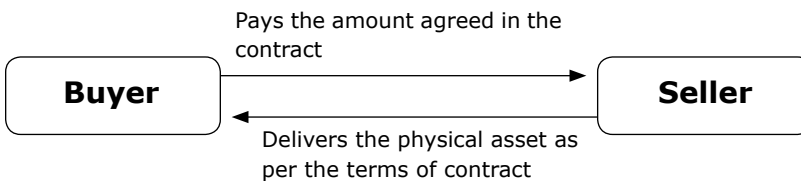
The working of a forward / futures contract can be depicted as follows:

At the beginning of the transaction:



No money or asset is exchanged at this juncture

On expiry of the futures contract, i.e. the fixed date in the future as per the contract:



3.2 LIMITATIONS OF FORWARD MARKETS

Forward markets world-wide are posed by several problems:

- Lack of centralization of trading, - Each contract is bilaterally negotiated and is not listed on any centralized platform, like a stock exchange
- Illiquidity – due to the customized nature of each contract, it would be difficult to trade it in the open market as specifications would be different from one investor to another.
- Counterparty risk – risk of default by any party to the transaction

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 is quite high in case of Forward contracts. 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.

Futures contracts aim to disperse some of these issues with forward contracts.

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. The futures contracts are created by the Stock exchange and made available for trade in the open market. , each set by the stock exchange. 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
Lower counter-party risk	High counter-party risk

3.5 FUTURES TERMINOLOGY

- **Long position:** The investor who buys the contract, and therefore the underlying asset, is said to assume a long position in the transaction
- **Short position:** The investor who sells the contract, and therefore the underlying asset, is said to assume a short position in the transaction. These are terms also used in case of other derivative contracts.

- **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. This margin money is a form of security that the broker takes from the investor for the transaction. The broker in turn has to put up margin money with the stock exchange. 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. Only when on expiration of the contract he actually gets delivery of the stocks, is he considered a shareholder of the company. However, in India, all futures are cash-settled, i.e. the investor does not get physical delivery of shares on expiration of the contract. Instead, he either receives or has to pay cash equivalent to his loss / gain on account of the futures purchase as against the prevailing spot market prices. This happens on an on-going basis through a process called Mark-to-Market, defined earlier.

3.7 FUTURES PAYOFFS

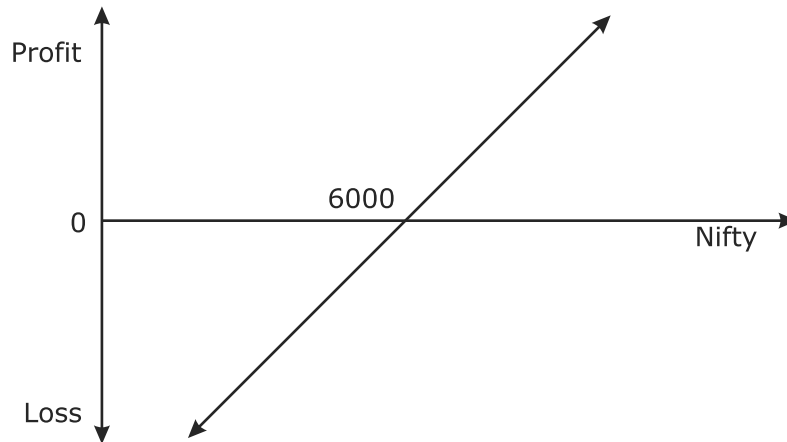
Payoff means the returns from either buying or selling a futures contract as against buying or selling the underlying asset. Payoff is positive if the position held brings profits to the holder, the payoff is negative if the position held brings losses to the holder. Futures contracts have linear or 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.

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 6000.

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

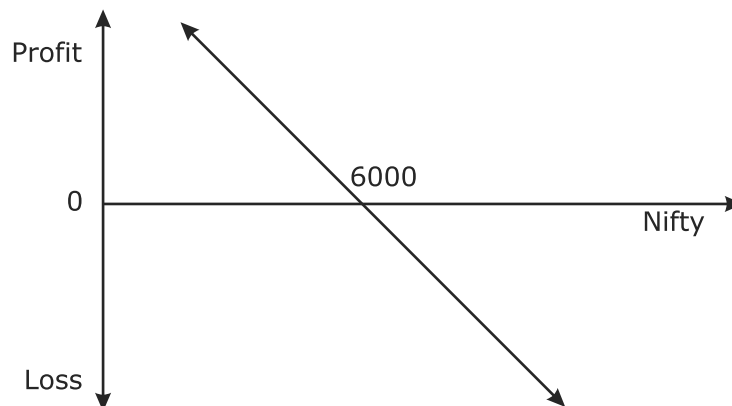


The figure 3.1 above shows the profits/losses for a long futures position. The investor bought futures when the index was at 6000. If the index goes up, his futures position starts making profit. If the index falls, his futures position starts showing losses.

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 6000. 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 6000. 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. The important concept here is the Cost of Carry Logic. Simply put, cost of carry is the cost incurred when you hold a certain investment position. This includes interest costs, margin expenses, financial expenses for advisors, fees etc. In case of commodities, it also includes cost of storage, insurance and so on. Essentially, it encompasses all such costs incurred to hold a particular position in futures.

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:

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

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.

Illustration:

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 6000 and Nifty trades with a multiplier of 50.
3. Since Nifty is traded in multiples of 50, value of the contract is $50 \times 6000 = \text{Rs.}300,000$.
4. If ABC Ltd. Has a weight of 7% in Nifty, its value in Nifty is Rs.21,000 i.e. $(300,000 \times 0.07)$.
5. If the market price of ABC Ltd. is Rs.140, then a traded unit of Nifty involves 150 shares of ABC Ltd. i.e. $(21,000/140)$.
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.3000 i.e. (150×20) . 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 50.
7. Thus, the futures price is calculated as;

$$F = 6000 * e^{0.1 * 60/365} - \left[\frac{150 * 20 * e^{0.1 * 45/365}}{50} \right] = 6,038.7$$

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 6000. What is the fair value of the futures contract?

$$\text{Fair value} = 6000 * e^{(0.1-0.02) \times (60/365)} = \text{Rs. } 6079.43$$

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.

3.8.4 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.

3.8.5 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:

Example:

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?

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

$$\begin{aligned}\text{Thus, futures price } F &= 228 * e^{0.1*(60/365)} \\ &= \text{Rs. 231.90}\end{aligned}$$

3.8.6 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:

Example:

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?

Let us assume that XYZ Ltd. will be declaring a dividend of Rs. 10 per share after 15 days of purchasing the contract. Assume that the market price of XYZ Ltd. is Rs. 140.

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.

Thus, futures price

$$F = 140 * e^{(0.1 * 60/365)} - 10 * e^{(0.1*45/35)} = \text{Rs.132.20}$$

3.9 CONCLUSION

Forwards and futures are forward commitment type of derivatives. Forwards are over-the-counter contracts wherein parties to the contract agree to exchange the underlying asset at a future date at a fixed price. These contracts are bilaterally negotiated and not listed on an exchange. The forward price is not available in the public domain. These contracts are illiquid and exposed to counter-party risk.

Futures contracts are exchange traded derivatives that are by nature the same as forward contracts. The main difference is that the contracts are introduced on an exchange with standardized terms such as price, quantity, quality of underlying asset and so on. The counterparty risk in futures is lower and they are more liquid than forward contracts.

Pricing of index and stock futures is done by the cost of carry method, viz

$$F = Se^{rT}$$

where:

r Cost of financing (using continuously compounded interest rate)

T Time till expiration in years

e 2.71828

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% ($\beta = 1.5\%$) 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% ($\beta = 1.5\%$) 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

Futures are popularly used as a risk management tool in companies, banks, public departments and investors. They are also used for speculation and making profits out of market movements. There are various strategies which can be adopted for achieving these objectives. Let us look at each of them now.

4.2.1 HEDGING: LONG SECURITY, SELL FUTURES

Futures can be used as a risk-management tool. Investors can hedge their risk of making losses in transactions by simultaneously taking opposite positions in the spot and futures market.

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

Investors can speculate on underlying assets by investing in the futures instead of the actual security. Here, leverage helps them by increasing the total exposure to the asset as compared to what they could take in the spot market.

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 derivative 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

In the previous section we saw speculation where the investor believed the security would increase in value over a period of time. Now consider the opposite scenario where the investor

believes that a particular security is over- valued and is likely to see a fall in price. How can he trade based on his opinion? In the absence of a derivative 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 contract 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.

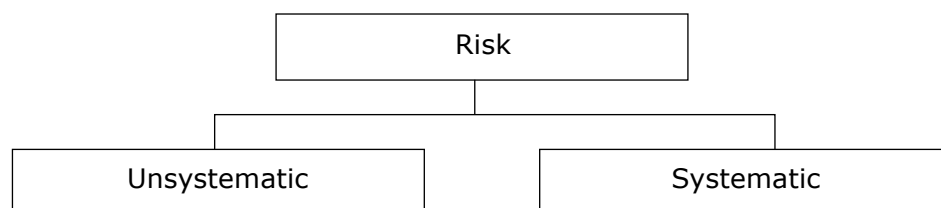
How can you cash in on this opportunity to earn riskless profits? Say for instance, ABC Ltd. trades at Rs.1000. One-month ABC futures trade at Rs. 965 and seem underpriced. As an arbitrageur, you can make riskless profit by entering into the following set of transactions.

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.
5. 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

As we have seen previously, hedging is a risk mitigation mechanism. A certain exposure in a security can be hedged by an equal and opposite transaction in the futures for the same security. But what is the risk that is mitigated? 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. Systematic Risk is the market-wide risk. Let us understand both these with some examples.

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 company's 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.

There is another 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 if 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): By selling Index futures or by selling stock Futures and buying the stock in the spot market. Let us now look at how these work.

4.3.1 BY SELLING INDEX FUTURES

Consider the following scenario:

On Dec 01 2013, an investor buys 125 shares of Infosys @ Rs. 3000 per share (approximate portfolio value of Rs. 3,75,000). However, the investor fears that the market will fall and thus needs to hedge. He uses Nifty December Futures to hedge.

- Infosys trades as Rs. 3000
- Nifty index is at 5950
- December Nifty futures is trading at Rs. 6000.
- The beta of Infosys is 1.2.

To hedge, the investor needs to sell $[\text{Rs. } 3,75,000 \times 1.2] = \text{Rs. } 4,50,000$ worth of Nifty futures ($4,50,000/6000 = 75$ Nifty Futures)

On Dec 19 2013, the market falls.

- Infosys trades at Rs. 2750
- December Nifty futures is trading at Rs. 5600

Thus, the investor's loss in Infosys is Rs. 31,250 ($\text{Rs. } 250 \times 125$). The investor's stock value now drops to Rs. 3,43,750 from Rs. 3,75,000. However, December Nifty futures position gains by Rs. 30,000 ($\text{Rs. } 400 \times 75$). Thus the final portfolio (Stocks + Futures) value is Rs. 3,73,750 ($\text{Rs. } 3,75,000 + \text{Rs. } 30,000 - \text{Rs. } 31,250$).

Therefore, the investor does not face a nominal loss of Rs.1,250 in the portfolio. Without an exposure to Nifty Futures, he would have faced a loss of Rs. 31,250.

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 December 12, 2013 buys 125 shares of Infosys at the price of Rs. 3000 per share. The portfolio value being Rs. 3,75,000 ($\text{Rs. } 3000 \times 125$). 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. 3100.
- To hedge, the investor will have to sell 125 Infosys futures.

On futures expiry day: The Infosys spot price is Rs. 2900.

Thus the investor's loss is Rs. 12,500 ($125 * (3000 - 2900)$) and the stock value would reduce to Rs. 3,62,500 ($\text{Rs. } 3,75,000 - 12,500$). On the other hand the investors profit in the futures market would be Rs. 25,000 ($125 * (3100 - 2900)$). Thus the final portfolio (Stocks + Futures) value is Rs. 3,87,500 ($\text{Rs. } 3,75,000 + \text{Rs. } 25,000 - \text{Rs. } 12,500$).

4.4 CONCLUSION

Futures are used as a risk management tool by corporate, banks and investors. A risk in the spot markets can be hedged by entering into an equal and opposite transaction for the same exposure in the futures market. There are various strategies used for Speculation and arbitrage by simultaneous transactions in the spot and futures market.

In case of speculation, the use of futures provides additional exposure due to the leverage factor, than directly purchasing in the spot markets.

In case of arbitrage, the investor can take advantage of discrepancies in the spot and futures price of the same stock by taking purchasing in one market and selling in the other, thus making almost risk-free profit in such scenarios.

Hedging can be achieved by either using index futures or the stock futures itself, to remove unsystematic risk in a transaction.

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

- **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.
- **Holder 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.
- **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.

- **Index options:** Have the index as the underlying. They can be European or American. They are also cash settled. All Indian Index Options are European Options.
- **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. All stock options on NSE are European options since 01/01/2012.
- **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 $\text{Max}[0, (S_t - K)]$ 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 $\text{Max}[0, K - S_t]$, 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 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.

Let us understand this with a scenario. A farmer wants to grow wheat and ensure that its price and sale quantity is locked in. So, he goes to a distributor and negotiates with him. Let

us first consider the case of a Futures Contract (forward contract in this case).

- The terms of the contract are as follows: Quantity – 100 kg
- Futures Price – Rs. 20/kg
- Period – 3 months

At the end of 3 months, the spot price for wheat is Rs. 25/kg. However, since the farmer has entered into the futures contract at Rs. 20/kg, and because the futures contract is binding, he has to sell 100kg of wheat at Rs. 20. If he did not enter into this contract, he could have sold at Rs. 25, thus making a total profit of Rs. 500 over the futures contract. But this is not possible, hence he makes a Loss of Rs. 500 over the spot price.

This is where an option contract proves more profitable.

Let us see what happens if he had purchased an option contract (put option). Terms are as follows:

- Quantity – 100 kg
- Strike Price – Rs. 20/kg
- Period – 3 months
- Option Premium – Rs. 100

At the end of 3 months, the spot price for wheat is Rs. 25/kg

Now, since the farmer is getting a better price in the spot market, and because it is a put option of which he is the holder, he has no obligation to sell to the distributor at the strike price. He instead sells it in the spot market, thus making a profit of Rs. 500 over the strike price. However, he has paid an option premium of Rs. 100 while entering into the contract. Thus, his net profit will be Rs. 400.

Thus, if he purchases the option contract, his downside is limited by the amount of option premium he has paid, but the upside is very high.

Buying put options is like 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 presents the comparison between the futures and options.

Table 5.1: Comparison between Futures and options

Futures	Options
Exchange traded	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.

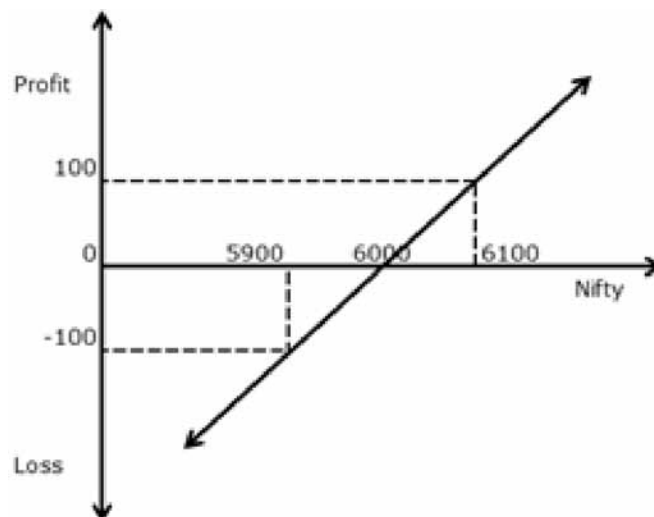
5.3 OPTIONS PAYOFFS

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 6000, and sells it at a future date at an unknown price, St. Once it is purchased, the investor is said to be “long” the asset. Payoff for a long position on the Nifty is shown below

Figure 5.1: Payoff for investor who went long Nifty at 6000

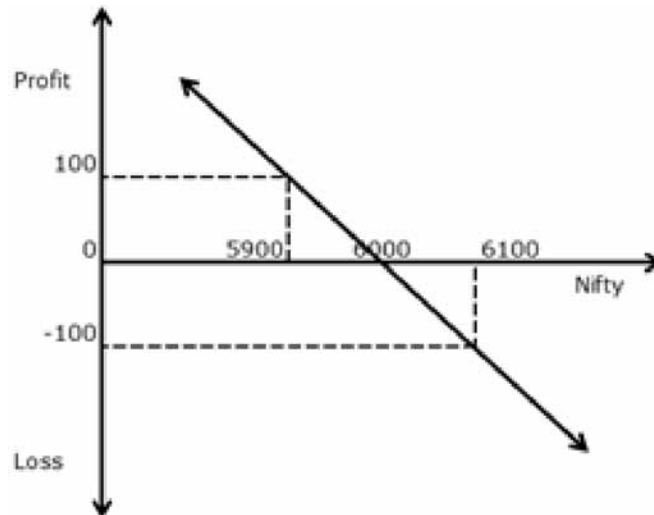


The figure 5.1 shows the profits/losses from a long position on the index. The investor bought the index at 6000. If the index goes up there is a profit else losses.

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 6000, and buys it back at a future date at an unknown price, St. 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 6000



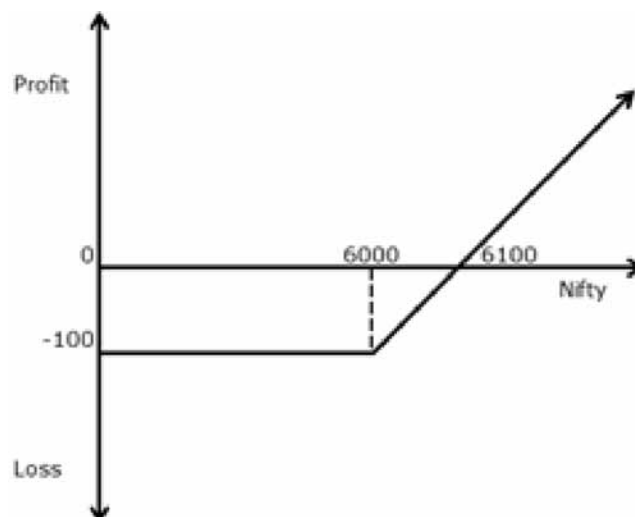
The figure 5.2 shows the profits/losses from a short position on the index. The investor sold the index at 6000. If the index falls, there are profits, else losses

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 on Nifty (often referred to as long call) with a strike of 6000 bought at a premium of 100.00.

Figure 5.3: Payoff for buyer of call option

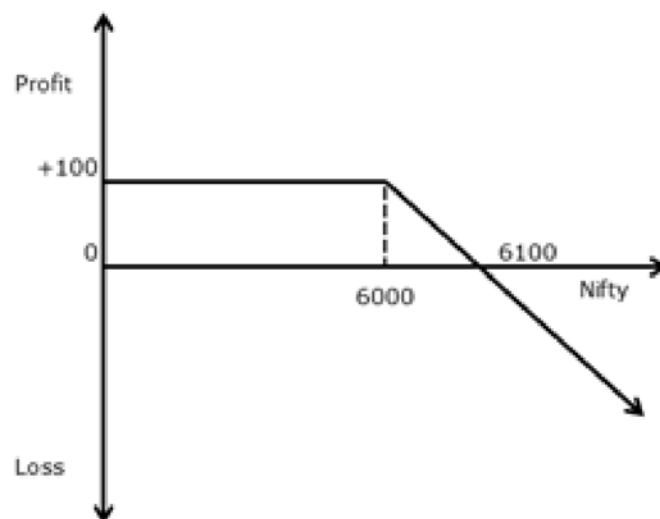


The figure 5.3 above shows the profits/losses for the buyer of a three-month Nifty 6000 call option. As can be seen, as the spot Nifty rises, the call option is in-the-money. If upon expiration, Nifty closes above the strike of 6000, the buyer would exercise his option and profit to the extent of the 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 6000, 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 un-exercised 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 6000 sold at a premium of 100.

Figure 5.4: Payoff for writer of call option



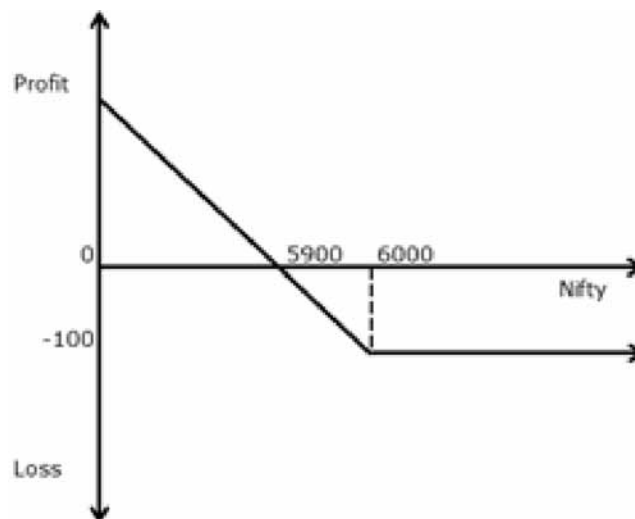
The figure 5.4 shows the profits/losses for the seller of a three-month Nifty 6000 call option. As the spot Nifty rises, the call option is in-the-money and the writer starts making losses. If upon expiration, Nifty closes above the strike of 6000, the buyer would exercise his option on the writer who 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.100 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 Nifty put option (often referred to as long put) with a strike of 6000 bought at a premium of 100.

The figure 5.5 shows the profits/losses for the buyer of a three-month Nifty 6000 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 6000, 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 6000, the option expires worthless. The losses are limited to the extent of the premium paid for buying the option.

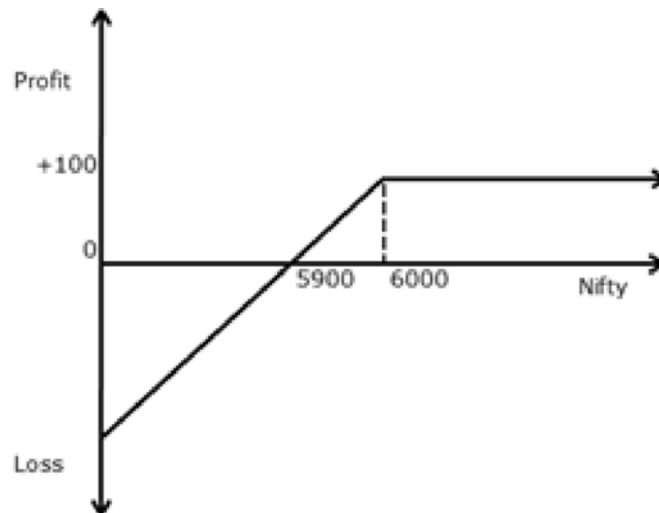
Figure 5.5: Payoff for buyer of put option



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 Nifty put option (often referred to as short put) with a strike of 6000 sold at a premium of 100.

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 6000 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 6000, 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.100 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:

- Buy call options; or
- 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? The main consideration here is that of the option premium. The potential gains from the transaction must exceed the option premium being paid upfront, otherwise it is still a loss-making proposition.

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:

- A one month call with a strike of 1200.
- A one month call with a strike of 1225.
- A one month call with a strike of 1250.
- A one month call with a strike of 1275.
- 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-the-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.

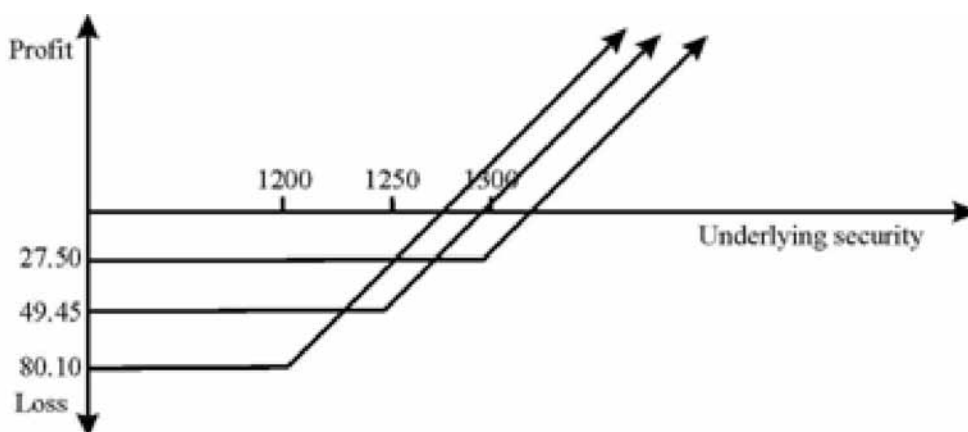
Illustration 5.1: One month calls and puts trading at different strikes

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-the-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

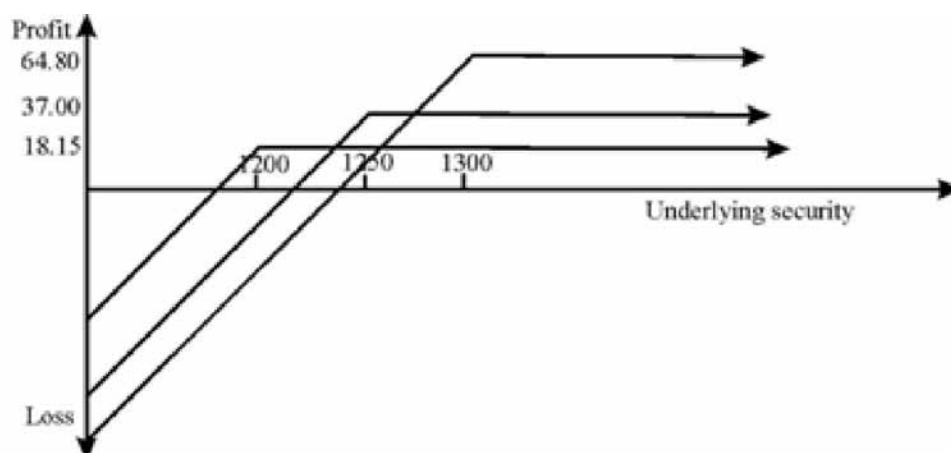
Figure 5.7: Payoff for buyer of call options at various strikes



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.

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.

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.

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:

- Sell call options; or
- 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.

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:

- A one month call with a strike of 1200.
- A one month call with a strike of 1225.
- A one month call with a strike of 1250.
- A one month call with a strike of 1275.
- 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 be 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.

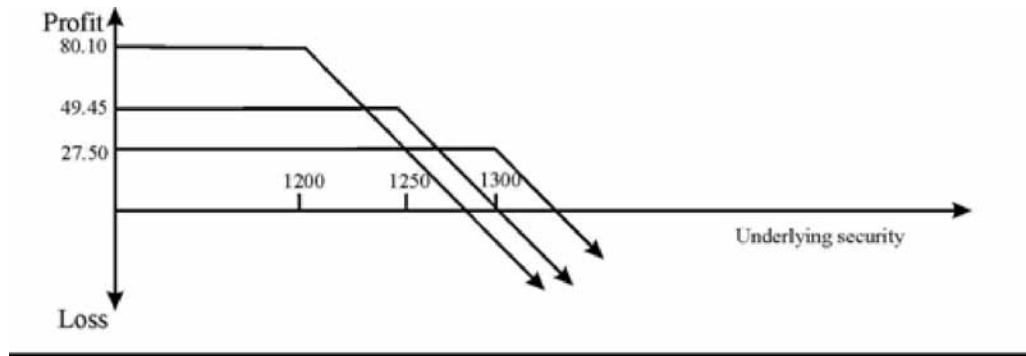
Illustration 5.2: One month calls and puts trading at different strikes

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-the-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.

Table 5.9 Shows the payoffs from buying puts at different strikes.

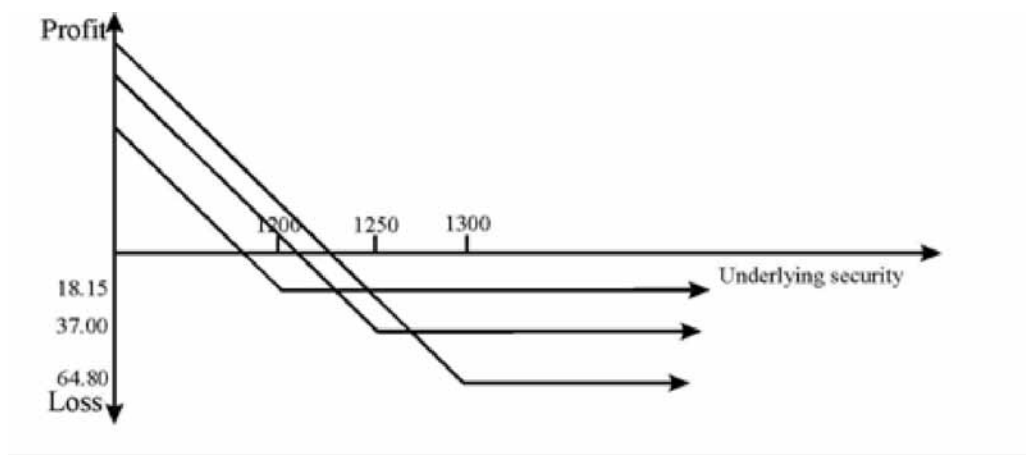
Price	Strike price of option	Call Premium(Rs.)	Put Premium(Rs.)
1250	1200	80.10	18.15
1250	1225	63.65	26.50
1250	1250	49.45	37.00
1250	1275	37.50	49.80
1250	1300	27.50	64.80

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.

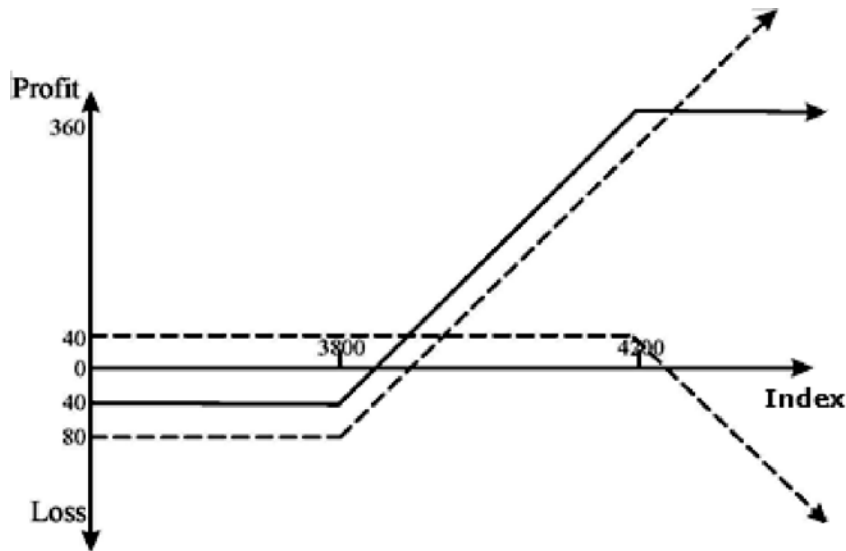
5.4.4 BULL SPREADS - BUY A CALL AND SELL ANOTHER

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:

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

Index	Buy Jan Call 3800	Sell Jan Call 4200	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:

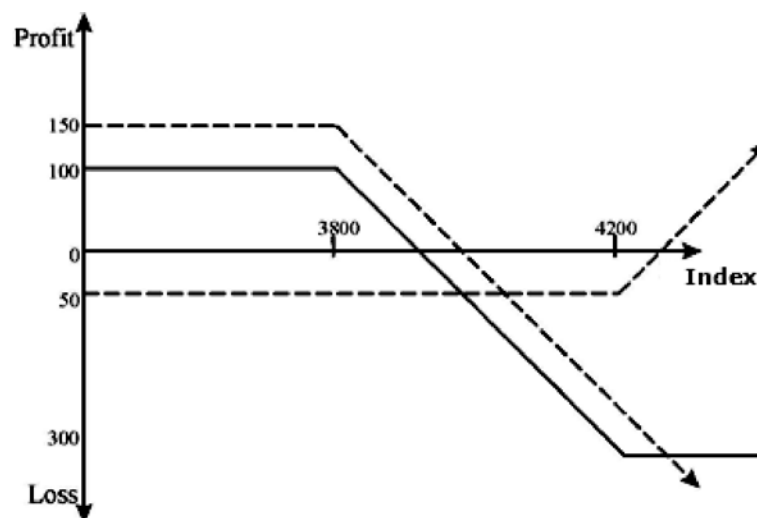
Both calls initially out-of-the-money.

One call initially in-the-money and one call initially out-of-the-money, and

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.

Index	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

5.5 POPULAR OPTIONS TRADING STRATEGIES

Apart from the basic strategies for trading given in the previous section, let us study some popular options trading strategies achieved by combining different options along with or without the underlying to achieve a certain trade objective.

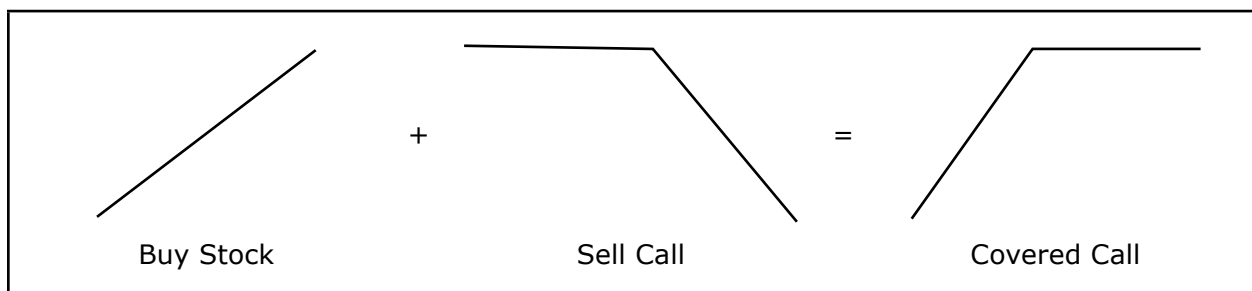
5.5.1 COVERED CALL

You own shares in a company which you feel may rise but not much in the near term (or at best stay sideways). You would still like to earn an income from the shares. The covered call is a strategy in which an investor Sells a Call option on a stock he owns (netting him a premium). The Call Option which is sold is usually an OTM Call. The Call would not get exercised unless the stock price increases above the strike price. Till then the investor in the stock (Call seller) can retain the Premium with him. This becomes his income from the stock. This strategy is usually adopted by a stock owner who is **Neutral to moderately Bullish** about the stock.

An investor buys a stock or owns a stock which he feels is good for medium to long term but is neutral or bearish for the near term. At the same time, the investor does not mind exiting the stock at a certain price (target price). The investor can sell a Call Option at the strike price at which he would be fine exiting the stock (OTM strike). By selling the Call Option the investor earns a Premium. Now the position of the investor is that of a Call Seller who owns the underlying stock. If the stock price stays at or below the strike price, the Call Buyer (refer to Strategy 1) will not exercise the Call. The Premium is retained by the investor.

In case the stock price goes above the strike price, the Call buyer who has the right to buy the stock at the strike price will exercise the Call option. The Call seller (the investor) who has to sell the stock to the Call buyer, will sell the stock at the strike price. This was the price which the Call seller (the investor) was anyway interested in exiting the stock and now exits at that price. So besides the strike price which was the target price for selling the stock, the Call seller (investor) also earns the Premium which becomes an additional gain for him. This strategy is called as a Covered Call strategy because the Call sold is backed by a stock owned by the Call Seller (investor). The income increases as the stock rises, but gets capped after the stock reaches the strike price.

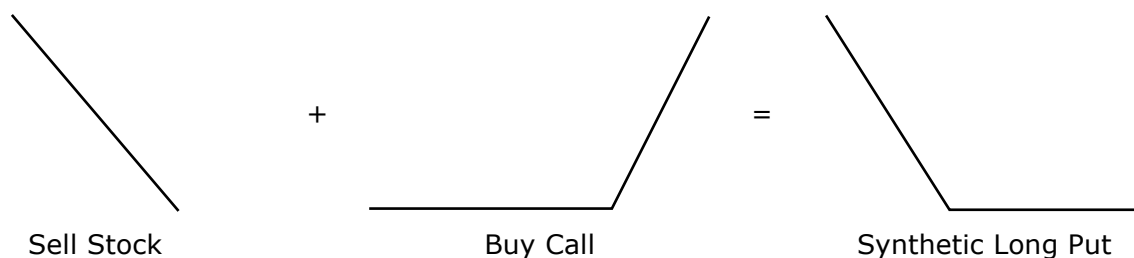
The payoff chart (Covered Call)



5.5.2 PROTECTIVE PUT / SYNTHETIC LONG PUT

This is a strategy wherein an investor has gone short on a stock and buys a call to hedge. An investor shorts a stock and buys an ATM or slightly OTM Call. The net effect of this is that the investor creates a pay-off like a Long Put, but instead of having a net debit (paying premium) for a Long Put, he creates a net credit (receives money on shorting the stock). In case the stock price falls the investor gains in the downward fall in the price. However, in case there is an unexpected rise in the price of the stock the loss is limited. The pay-off from the Long Call will increase thereby compensating for the loss in value of the short stock position. This strategy hedges the upside in the stock position while retaining downside profit potential.

The payoff chart (Synthetic Long Put)



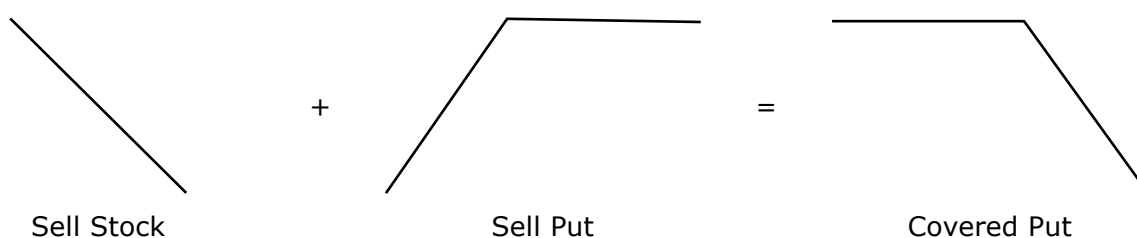
5.5.3 COVERED PUT

This strategy is opposite to a Covered Call. A Covered Call is a neutral to bullish strategy, whereas a Covered Put is a neutral to Bearish strategy. You do this strategy when you feel the price of a stock / index is going to remain range bound or move down. Covered Put writing involves a short in a stock / index along with a short Put on the options on the stock / index.

The Put that is sold is generally an OTM Put. The investor shorts a stock because he is bearish about it, but does not mind buying it back once the price reaches (falls to) a target price. This target price is the price at which the investor shorts the Put (Put strike price). Selling a Put means, buying the stock at the strike price if exercised. If the stock falls below the Put strike, the option will be exercised and the investor will have to buy the stock at the strike price (which is anyway his target price to repurchase the stock). The investor makes a profit because he has shorted the stock and purchasing it at the strike price simply closes the short stock position at a profit. And the investor keeps the Premium on the Put sold. The investor is covered here because he shorted the stock in the first place.

If the stock price does not change, the investor gets to keep the Premium. He can use this strategy as an income in a neutral market.

The payoff chart (Covered Put)



5.5.4 LONG STRADDLE

A Straddle is a volatility strategy and is used when the stock price / index is expected to show large movements. A Long Straddle involves buying a call as well as put on the same stock / index for the same maturity and strike price, to take advantage of a movement in either direction, a soaring or plummeting value of the stock / index. If the price of the stock / index increases, the call is exercised while the put expires worthless and if the price of the stock / index decreases, the put is exercised, the call expires worthless. Either way if the stock / index shows volatility to cover the cost of the trade, profits are to be made. With Straddles,

the investor is direction neutral. All that he is looking out for is the stock / index to break out exponentially in either direction.

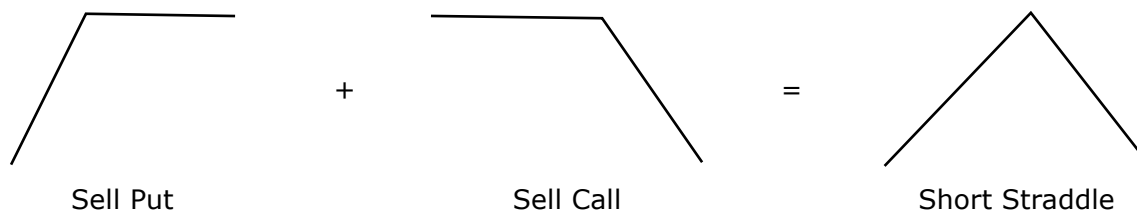
The payoff chart (Long Straddle)



5.5.5 SHORT STRADDLE

A Short Straddle is the opposite of Long Straddle. It is a strategy to be adopted when the investor feels the market will not show much movement. He sells a Call and a Put on the same stock / index for the same maturity and strike price. It creates a net income for the investor. If the stock / index does not move much in either direction, the investor retains the Premium as neither the Call nor the Put will be exercised. However, incase the stock / index moves in either direction, up or down significantly, the investor's losses can be significant. So this is a risky strategy and should be carefully adopted and only when the expected volatility in the market is limited. If the stock / index value stays close to the strike price on expiry of the contracts, maximum gain, which is the Premium received is made

The payoff chart (Short Straddle)



5.5.6 LONG STRANGLE

A Strangle is a slight modification to the Straddle to make it cheaper to execute. It is effective in markets that have a high level of volatility. This strategy involves the simultaneous buying of a slightly out-of-the-money (OTM) put and a slightly out-of-the-money (OTM) call of the same underlying stock / index and expiration date. Here again the investor is directional neutral but is looking for an increased volatility in the stock / index and the prices moving significantly in either direction. Since OTM options are purchased for both Calls and Puts it makes the cost of executing a Strangle cheaper as compared to a Straddle, where generally ATM strikes are purchased. Since the initial cost of a Strangle is cheaper than a Straddle, the returns could potentially be higher. However, for a Strangle to make money, it would require greater movement on the upside or downside for the stock / index than it would for a Straddle. As with a Straddle, the strategy has a limited downside (i.e. the Call and the Put premium) and unlimited upside potential.

The payoff chart (Long Strangle)



5.5.7 SHORT STRANGLE

A Short Strangle is a slight modification to the Short Straddle. It tries to improve the profitability of the trade for the Seller of the options by widening the breakeven points so that there is a much greater movement required in the underlying stock / index, for the Call and Put option to be worth exercising. This strategy involves the simultaneous selling of a slightly out-of-the-money (OTM) put and a slightly out-of-the-money (OTM) call of the same underlying stock and expiration date. This typically means that since OTM call and put are sold, the net credit received by the seller is less as compared to a Short Straddle, but the break even points are also widened. The underlying stock has to move significantly for the Call and the Put to be worth exercising. If the underlying stock does not show much of a movement, the seller of the Strangle gets to keep the Premium.

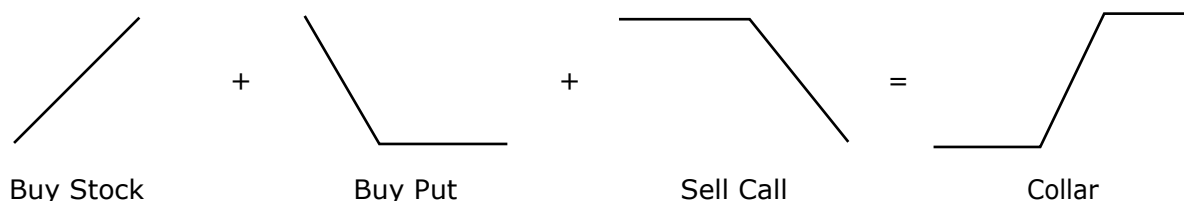
The payoff chart (Short Strangle)



5.5.8 COLLAR

A Collar is similar to Covered Call but involves another leg – buying a Put to insure against the fall in the price of the stock. It is a Covered Call with a limited risk. So a Collar is buying a stock, insuring against the downside by buying a Put and then financing (partly) the Put by selling a Call. The put generally is ATM and the call is OTM having the same expiration month and must be equal in number of shares. This is a low risk strategy since the Put prevents downside risk. However, do not expect unlimited rewards since the Call prevents that. It is a strategy to be adopted when the investor is conservatively bullish.

The payoff chart (Collar)

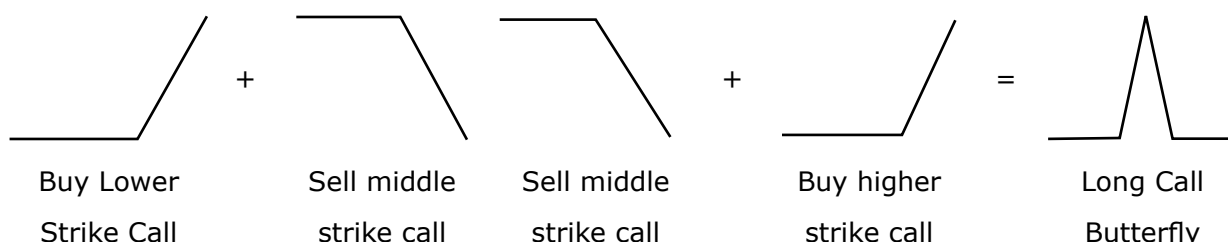


5.5.9 BUTTERFLY

A butterfly strategy is similar to that of a straddle, but looks to benefit from low volatilities at a low cost. The investor is looking to gain from low volatility at a low cost.

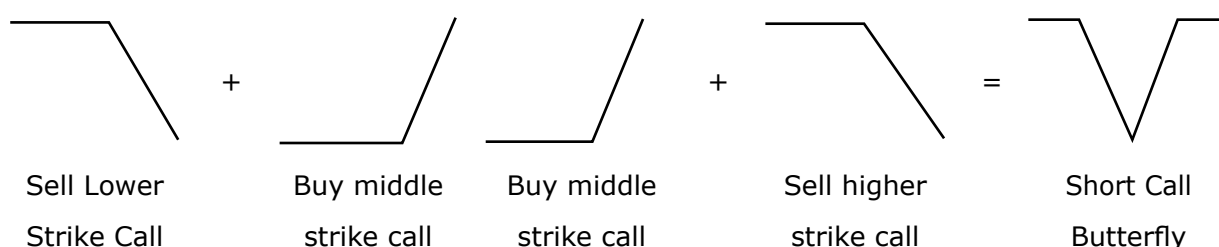
A long butterfly is similar to a Short Straddle except your losses are limited. The strategy can be done by selling 2 ATM Calls, buying 1 ITM Call, and buying 1 OTM Call options (there should be equidistance between the strike prices). The result is positive incase the stock / index remains range bound. The maximum reward in this strategy is however restricted and takes place when the stock / index is at the middle strike at expiration. The maximum losses are also limited.

The payoff chart (Long Call Butterfly)



The Short Call Butterfly can be constructed by Selling one lower striking in-the-money Call, buying two at-the-money Calls and selling another higher strike out-of-the-money Call, giving the investor a net credit (therefore it is an income strategy). There should be equal distance between each strike. The resulting position will be profitable in case there is a big move in the stock / index. The maximum risk occurs if the stock / index is at the middle strike at expiration. The maximum profit occurs if the stock finishes on either side of the upper and lower strike prices at expiration. However, this strategy offers very small returns when compared to straddles, strangles with only slightly less risk.

The payoff chart (Short Call Butterfly)



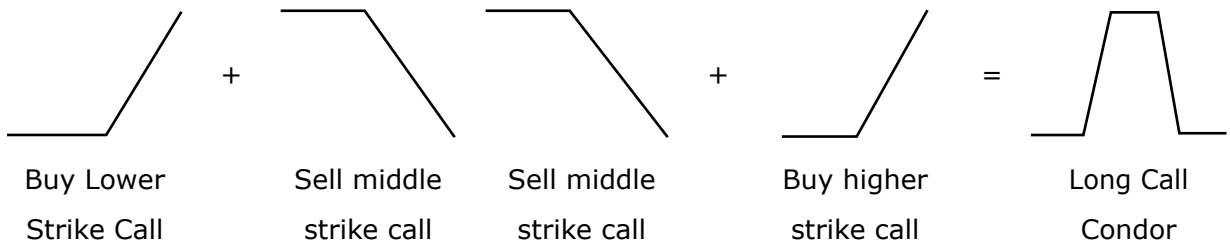
5.5.10 CONDOR

The condor strategies are similar to that of the Butterfly, but the 2 options in the middle are bought / sold at different strikes. The profitable area of the pay-off is wider than the butterfly. This strategy is used in range-bound markets.

The Long Call Condor involves buying 1 ITM Call (lower strike), selling 1 ITM Call (lower middle), selling 1 OTM call (higher middle) and buying 1 OTM Call (higher strike). The long

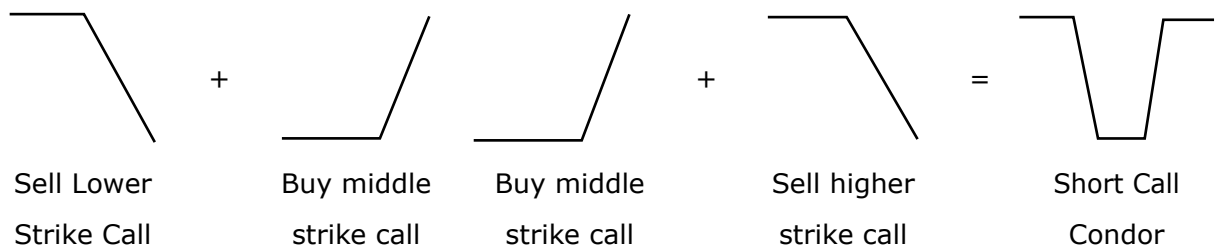
options at the outside strikes ensure that the risk is capped on both the sides. The resulting position is profitable if the stock / index remains range bound and shows very little volatility. The maximum profits occur if the stock finishes between the middle strike prices at expiration.

The payoff chart (Long Call Condor)



The Short Call Condor involves selling 1 ITM Call (lower strike), buying 1 ITM Call (lower middle), buying 1 OTM call (higher middle) and selling 1 OTM Call (higher strike). The resulting position is profitable if the stock / index shows very high volatility and there is a big move in the stock / index. The maximum profits occur if the stock / index finishes on either side of the upper or lower strike prices at expiration.

The payoff chart (Short Call Condor)



5.6 CONCLUSION

Options are derivative contracts in which parties may either sell or buy the underlying asset at a future date and a fixed price called the Strike Price. The option to buy the underlying asset is called a Call Option, and option to sell the underlying asset is called the Put Option. Unlike futures, where both parties are obligated to exchange as per the contract, in an Option contract, the buyer of the option has the right, but not the obligation, to buy or sell the underlying asset, depending on whether it is a call or put option respectively.

Options are used effectively for hedging and speculation. An important consideration while speculating with options is the option premium being paid. The expected profits out of using an option for speculation must exceed the option premium being paid. Otherwise, it would be better to invest in the futures / spot market. The advantage with options is that the downside is limited to the option premium paid.

CHAPTER 6: PRICING OF OPTIONS CONTRACTS, VOLATILITY AND OPTION GREEKS

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 which was developed in 1973. 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.

This interrelation between the variables and the option price in case of call and put options is summarized in the table below:

Table 6.1: Increase in variables v/s Call option price and Put option price

Variable	Call Option Price	Put Option Price
Stock Price	Increases	Decreases
Strike Price	Decreases	Increases
Volatility of spot price	Increases	Increases
Time to Expiration	Increases	Increases
Interest Rate	Increases	Decreases
Dividend	Decreases	Increases

6.2 OPTION PRICE LIMITS

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:

- 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.
- 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.
- The maximum 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.
- 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 in the formulae to calculate the price limits for options on dividend paying stocks.

6.3 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 the 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).

$$\frac{\partial f}{\partial t} + rS \frac{\partial f}{\partial S} + \frac{1}{2} \sigma^2 S^2 \frac{\partial^2 f}{\partial S^2} + rf \dots\dots\dots 6.1$$

Here S is stock price t is term of the option (time to maturity) r the risk free rate and σ 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 can be depicted as follows

Value of a Call, **$C = S N(d_1) - K e^{-rt} N(d_2)$**

Where,

$$d_1 = \frac{\ln\left(\frac{S}{K}\right) + r - \frac{\sigma^2}{2}t}{\sigma\sqrt{t}}$$

$$d_2 = d_1 - \sigma\sqrt{t}$$

When dividends have to be considered, the formula is adjusted as follows:

$C = S e^{-yt} N(d_1) - K e^{-rt} N(d_2)$

$$d_1 = \frac{\ln\left(\frac{S}{K}\right) + r - y - \frac{\sigma^2}{2}t}{\sigma\sqrt{t}}$$

$$d_2 = d_1 - \sigma\sqrt{t}$$

The value of a put, **$P = K e^{-rt} (1-N(d_2)) - S e^{-yt} (1-N(d_1))$**

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).

6.4 THE GREEKS

The Black Scholes model gives us a method of computing the prices of options. The Greeks are a collection of statistical values that give the investor a better overall view of option

premiums change given changes in pricing model inputs. These values can help decide what options strategies to use. The investor should remember that statistics show trends based on past performance. It is not guaranteed that the future performance of the stock will behave according to the historical numbers. These trends can change drastically based on new stock performance.

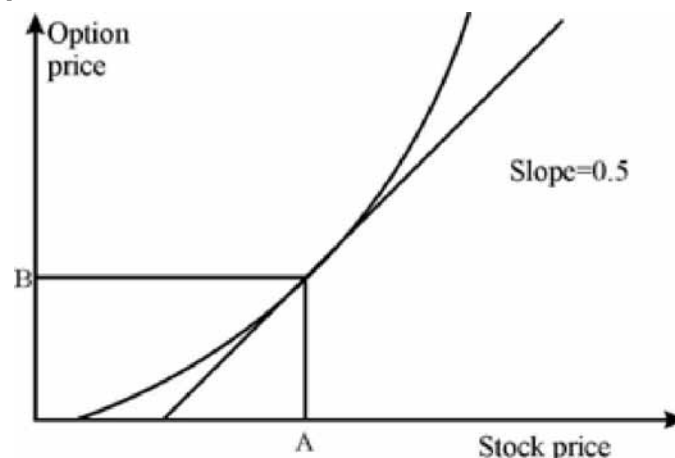
Each Greek letter measures a different dimension to the risk in an option position. These are used by traders who have sold options in the market. Aim of traders is to manage the Greeks in order to manage their overall portfolio. There are five Greeks used for hedging portfolios of options with underlying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

6.4.1 DELTA (Δ)

In general delta (Δ) 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.

Δ 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 Δ 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 6.1 shows the delta of a stock option.

Figure 6.1 Δ as slope



Expressed differently, Δ is the change in the price of call option per unit change in the spot price of the underlying asset. $\Delta = \partial C / \partial S$. The delta of a European call on a stock paying dividends at rate q is $N(d) e^{-qT}$. The delta of a European put is $e^{-qT} [N(d) - 1]$

The Δ of a call is always positive and the Δ 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.

6.4.2 GAMMA (Γ)

Γ is the rate of change of the option's Delta Δ 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. For example, a Gamma of 0.150 indicates the Delta increases or decreases by 0.150 if the underlying price increases or decreases by Rs. 1.00.

6.4.3 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.

6.4.4 VEGA (N)

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 v is high in absolute terms, the portfolio's value is very sensitive to small changes in volatility. If v is low in absolute terms, volatility changes have relatively little impact on the value of the portfolio.

6.4.5 RHO (P)

The P 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.

6.5 VOLATILITY OF OPTIONS

Volatility of a stock is a measure of the uncertainty of the annual returns provided by it. It is an important input that affects the valuation of options. Thus, the study of volatility is imperative while studying pricing of options. The value of volatility is given as the annualized standard deviation of a stock's daily price changes.

There are two types of volatility: statistical volatility and implied volatility.

Statistical (Historical) Volatility

It is a measure of actual asset price changes over a specific period. More the data points, better the estimate of historical volatility. A thumb rule is to have as many days' return data as the number of days to which the volatility is to be applied. For example, the most recent 180 days' return data is used for valuing a 6-month product; most recent 90 days' returns data is used for valuing a 3-month product.

Implied Volatility

It is a measure of how much the marketplace expects asset price to move for an option price. That is, the volatility that the market implies.

Implied volatility of a contract is the same for the whole market. However, historical volatility used by different market participants varies, depending on the periodicity of data, period covered by the data and the model used for the estimation of volatility. Given the difference in historic volatility, the option value calculated using the same Black Scholes model varies between market participants.

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

There are 2 types of trading systems – Order Driven and Quote-Driven.

- An order driven market is one in which all of the orders of both buyers and sellers are displayed, detailing the price at which they are willing to buy or sell a security and the amount of the security that they are willing to buy or sell at that price.
- A quote driven market only displays the bid and ask offers of designated market makers, dealers or specialists. These market makers will post the bid and ask price that they are willing to accept at that time.

NSE operates on the 'National Exchange for Automated Trading' (NEAT) system, a fully automated screen based trading system, which adopts the principle of an order driven market. 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. Further, suitable revisions are made to the software from time to time, based on changing regulations and processes.

7.1.1 ENTITIES IN THE TRADING SYSTEM

Following are the 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.

Trading cum Self Clearing Member: This category of membership entitles a member to execute trades and to clear and settle the trades executed on his own account as well as on account of his clients.

Trading cum Clearing Member: This category of membership entitles a member to execute trades on his own account as well as on account of his clients and to clear and settle trades executed by themselves as well as by other trading members who choose to use clearing services of the 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:

- 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.
- 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.
- Outstanding orders, previous trades and net position entered for his branch by entering his TM ID and branch ID fields.
- 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:

Outstanding requests and activity log for requests entered by him by entering his own branch and user IDs. This is his default screen.

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:

Outstanding requests and activity log for requests entered by him by entering his own branch and user IDs. This is his default screen.

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.

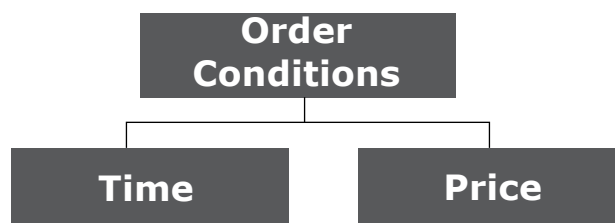
7.2 CLIENT BROKER RELATIONSHIP IN DERIVATIVE SEGMENT

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.

7.3 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 2 categories:



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

Limit Price/Order - An order that allows the price to be specified while entering the order into the system.

Market Price/Order - An order to buy or sell securities at the best price obtainable at the time of entering the order.

Stop Loss (SL) Price/Order - The one that allows the Trading Member to place an order which gets activated only when the market price of the relevant security reaches or crosses a threshold price. Until then the order does not enter the market.

A sell order in the Stop Loss book gets triggered when the last traded price in the normal market reaches or falls below the trigger price of the order. A buy order in the Stop Loss book gets triggered when the last traded price in the normal market reaches or exceeds the trigger price of the order.

E.g. If for stop loss buy order, the trigger is 93.00, the limit price is 95.00 and the market (last traded) price is 90.00, then this order is released into the system once the market price reaches or exceeds 93.00. This order is added to the regular lot book with time of triggering as the time stamp, as a limit order of 95.00

7.4 ORDER PROCESSING AND MATCHING

As discussed earlier the NEAT F&O trading system follows an order-driven approach. Orders, as and when they are received, are first time stamped and then immediately processed for potential match. If a match is not found, then the orders are stored in different 'books'. Orders are stored in price-time priority in various books in the following sequence:

1. Best Price

2. Within Price, by time priority.

The best buy order will match with the best sell order. An order may match partially with another order resulting in multiple trades. For order matching, the best buy order is the one with highest price and the best sell order is the one with lowest price. This is because the computer views all buy orders available from the point of view of a seller and all sell orders from the point of view of the buyers in the market. So, of all buy orders available in the market at any point of time, a seller would obviously like to sell at the highest possible buy price that is offered. Hence, the best buy order is the order with highest price and vice-versa.

Members can pro actively enter orders in the system which will be displayed in the system till the full quantity is matched by one or more of counter-orders and result into trade(s). Alternatively members may be reactive and put in orders that match with existing orders in the system. Orders lying unmatched in the system are 'passive' orders and orders that come in to match the existing orders are called 'active' orders. Orders are always matched at the passive order price. This ensures that the earlier orders get priority over the orders that come in later.

7.5 THE TRADER WORKSTATION

The trader workstation is the terminal from which the member accesses the trading system. Each trader has a unique identification by way of Trading Member ID and User ID through which he is able to log on to the system for trading or inquiry purposes. A member can have several user IDs allotted to him by which he can have more than one employee using the system concurrently.

The Exchange may also allow a Trading Member to set up a network of dealers in different cities all of whom are provided a connection to the NSE central computer. A Trading Member can define a hierarchy of users of the system with the Corporate Manager at the top followed by the Branch Manager and Dealers.

1. The trader workstation screen of the Trading Member is divided into several major windows: Title Bar – Displays the current time, trading system name and date
2. Tool Bar - A window with different icons which provides quick access to various functions
3. Ticker window of futures and options market - displays information about a trade as and when it takes place in the F&O market
4. Ticker window of underlying (capital) market - displays information about a trade as and when it takes place in the spot market
5. Market Watch Window – window to view market information of pre-selected securities that are of interest to the Trading Member.
6. Snap Quote – provides instantaneous market information on any desired security.
7. Inquiry Window - inquiries such as Market by Order, Market by Price, Previous Trades, Outstanding Orders, Activity Log, Order Status and Market Inquiry can be viewed.

8. Order / Trade Window – for order entry, confirmation and to check the status of orders already placed in the system.
9. System message window – to view messages from the Exchange to all specific trading members

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.

7.5.1 THE MARKET WATCH 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.

The screenshot shows the NSEIL Market Watch Window. The title bar includes 'NEAT-F&O', 'NSEIL', '71 INQUIRY', and the date/time '17 MAR 2016 14:48:56'. The window displays a table of market data for Nifty 50 and other securities. The table has columns for contract name, date, and various price and volume metrics. The data is as follows:

Contract Name	Date	Open	High	Low	Close	Volume	Open Interest
N FUTIDX NIFTY	31MAR2016	675	7539.50	7539.95	75	7540.95	22342500
N FUTIDX BANKNIFTY	31MAR2016	30	15528.80	15529.90	30	15529.80	2026200
N FUTSTK RELIANCE	31MAR2016	500	1018.50	1018.90	1000	1018.70	22476500
N OPTSTK ACC	31MAR2016 1220.00 CE	3750	84.15	86.20	11250	81.70	3375
N EQUITY ACC	EQ	11	1270.15	1270.95	48	1270.10	1771500

At the bottom of the window, there are system messages:

```

13:39:08 M/C :1 VIKRAMADITYA DELIMA SIGNED OFF.
14:39:44 M/C :1 VIKRAMADITYA DELIMA SIGNED ON.

```

7.5.2 INQUIRY WINDOW

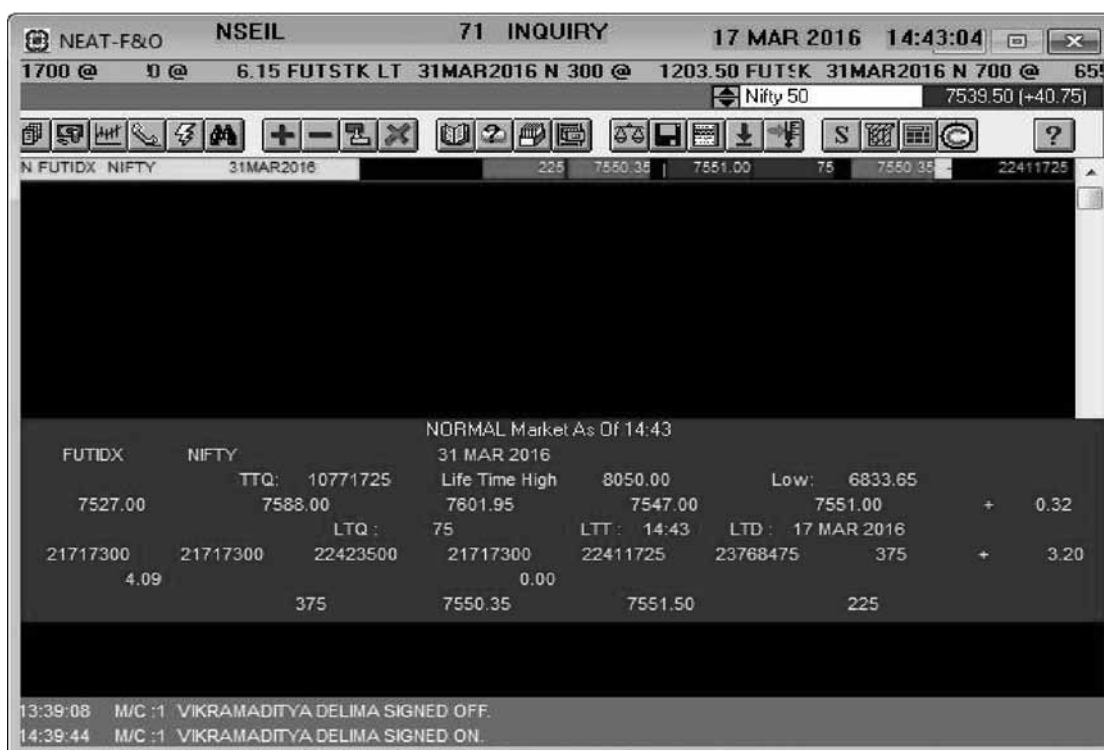
The inquiry window enables the user to view information such as Market by Price (MBP), Previous Trades (PT), Outstanding Orders (OO), Activity log (AL), Snap Quote (SQ), Order Status (OS), Market Movement (MM), Market Inquiry (MI), Net Position, On line backup, Multiple index inquiry, Most active security 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.

N	FUTIDX	NIFTY	31 MAR 2016	RL	
	10673775	7601.95	7547.00	7558.10	+ 0.41
1			300 7558.40	7559.00	75
1			75 7558.35	7559.05	75
2			225 7558.25	7559.10	150
4			825 7558.00	7559.15	300
1			450 7557.70	7559.20	75
3.49			Total Buy: 766950	Total Sell: 983700	3.69

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.



7.5.3 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.

7.5.4 MARKET SPREAD/COMBINATION ORDER ENTRY

The NEAT F&O trading system also enables to enter spread/combination trades. 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 counter-match, 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.

Spread market by price

NEAT-F&O

NSEIL

71 INQUIRY

21 MAR 2016 09:46:17

64.75 FUTIDX BANKNIFTY 31MAR2016 N 30 @ 15765.50 OPTSTK SBIN 31MAR2016 200 CE N

Nifty 50

7635.40 (+32.05)

N FUTIDX NIFTY	31MAR2016	75	7634.55	7635.00	75	7634.25	22819575
N FUTIDX BANKNIFTY	31MAR2016	30	15770.10	15773.75	30	15774.50	2279710
N FUTSTK RELIANCE	31MAR2016	500	1029.20	1029.40	500	1029.10	21452000
N OPTSTK ACC	31MAR2016 1220.00 CE	0	0.00	0.00	0	0.00	0
N EQUITY ACC	EQ	1009	1366.30	1367.00	83	1367.00	1649625

N FUTSTK ACC

31 MAR 2016

FUTSTK ACC

28 APR 2016

Open PD 0.00

Low PD 0.00

High PD 0.00

Last Traded PD 0.00

TTQ: 0

BUY

SELL

TIME 09:43:55

1	750	3.40	5.90	375	1
1	750	3.35	6.00	375	1
2	750	3.30	6.45	750	1
1	750	3.25	6.50	750	1
1	750	1.00	6.90	750	2

Total Buy : 8250

Total Sell : 4500

09:45:45 M/C :1 MARKET WIDE LIMIT FOR WOCKPHARMA IS 5676674. OPEN POSITIONS IN WOCKPHARMA HAVE REACHED 69 PERCENT OF THE MARKET WIDE LIMIT.

Spread Order Entry

NEAT-F&O		NSEIL		71 INQUIRY		21 MAR 2016 09:47:06	
6 N 150 @ 7673.00 OPTIDX NIFTY 28APR2016 7100 CE N 75 @ 590.75 OPTIDX NIFTY 31MAR2016						Nifty 50 7635.55 (+31.20)	
N FUTIDX NIFTY 31MAR2016		75	7633.90	7635.25	75	7633.85	22858500
N FUTIDX BANKNIFTY 31MAR2016		80	15777.10	15782.70	30	15778.00	2288460
N FUTSTK RELIANCE 31MAR2016		500	1028.85	1029.20	500	1029.00	21452000
N OPTSTK ACC 31MAR2016 1220.00 CE		0	0.00	0.00	0	0.00	0
N EQUITY ACC EQ		36	1366.05	1366.75	375	1366.05	1656375
S FUTSTK ACC MAR16APR16		750	3.40	5.90	375	0.00	5.25
L 1	S	O	U	FUTSTK	ACC	31 MAR 2016	375 5.90
L 2	B	O	U	FUTSTK	ACC	28 APR 2016	
L 3							
☐ BSP ☐ IOC ☐ AON ☐ COL ☐ PRO ☐ NSE ☐ NSE							
09:46:59 M/C :1 The orders beyond the new range shall be subject to price freeze, as intimated in the above circular.							

7.6 FUTURES AND OPTIONS MARKET INSTRUMENTS

The National Stock Exchange of India Limited (NSE) commenced trading in derivatives with the launch of index futures on June 12, 2000. The futures contracts are based on the popular benchmark Nifty 50 Index. The Exchange introduced trading in Index Options (also based on Nifty 50) on June 4, 2001. NSE also became the first exchange to launch trading in options on individual securities from July 2, 2001. Futures on individual securities were introduced on November 9, 2001. Futures and Options on individual securities are available on 173

securities⁴ stipulated by SEBI. The Exchange has also introduced trading in Futures and Options contracts based on Nifty IT, Nifty Bank, and Nifty Midcap 50, Nifty Infrastructure, Nifty PSE indices.

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

- a) Index based futures
- b) Index based options
- c) Individual stock options
- d) Individual stock futures

7.6.1 CONTRACT SPECIFICATIONS FOR INDEX FUTURES

On NSE's platform one can trade in Nifty, Nifty IT, Nifty BANK, Mini Nifty etc. futures contracts having a 3 month trading cycle – the near month (one-month), the next month (two-month) and the far month (three-month). All contracts except volatility index derivatives and Global Index Derivatives 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.

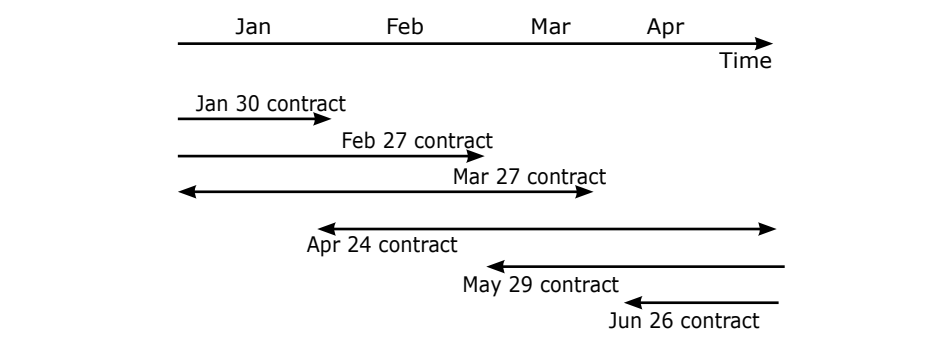
Volatility Index derivatives have a weekly expiration, expiring every Tuesday.

Global Index derivatives expire on the 3rd Friday of every month.

Weekly Bank Nifty Index also has a weekly expiration, expiring every Thursday.

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. 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.

Figure 7.4: Contract cycle



⁴ Number of securities as of July 31, 2016. This number may change subsequently.

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.

Table 7.1: Contract specification of Nifty 50 Futures

Underlying index	Nifty 50
Exchange of trading	National Stock Exchange of India Limited
Security descriptor	FUTIDX
Contract size	As specified by SEBI from time to time. As on March 31, 2016, the minimum contract value should be Rs. 5 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.

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.

7.6.2 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 $3 \times 13 \times 2$ (call and put options) i.e. 78 options contracts available on an index. Option contracts are specified as follows: DATE-EXPIRY/MONTH-YEAR/Strike Price/CALL/PUT-AMERICAN/EUROPEAN-. For example the European style call option contract on the Nifty index with a strike price of 5000 expiring on the 28th November 2013 is specified as

'28NOV2013 5000 CE'.

Just as in the case of futures contracts, each option product (for instance, the 28 NOV 2013 5000 CE) has its own order book and its 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.

On the recommendations given by the SEBI, Derivatives Market Review Committee, NSE also introduced the 'Long Term Options Contracts' on Nifty 50 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.

Table 5.2 gives the contract specifications for index options trading on the NSE.

Table 7.2: Contract specification of Nifty 50 options

Underlying index	Nifty 50
Exchange of trading	National Stock Exchange of India Limited
Security descriptor	OPTIDX
Contract size	As specified by SEBI from time to time. As on March 31, 2016 the minimum contract value is Rs. 5 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 separate policies for introducing strike prices and determining the strike price intervals for index options and stock options. Table 7.3 summarises the policy for introducing strike prices and determining the strike price interval for index options.

Table 7.3 and 7.4: Generation of strikes for index options

1. The Strike scheme for all near expiry (near, mid and far months) Nifty Index Options is:

Index Level	Strike Interval	Number of strikes In the money - At the money - out of the money
≤ 2000	50	8-1-8
>2001 ≤ 3000	100	6-1-6
>3000 ≤ 4000	100	8-1-8
>4000 ≤ 6000	100	12-1-12
>6000	100	16-1-16

2. The Strike scheme for Nifty long term Quarterly and Half Yearly expiry option contracts is:

Index level	Strike interval	Number of strikers in the money - at the money- out of the money
≤ 2000	100	6-1-6
>2001 ≤ 3000	100	9-1-9
>3000 ≤ 4000	100	12-1-12
>4000 ≤ 6000	100	18-1-18
>6000	100	24-1-24

Exchange maintains strike scheme for stock options as follows:

1. The strike interval applicable for each stock is determined based on the volatility of the underlying stock.
2. The strike interval is reviewed and if necessary revised on a quarterly basis.
3. Exchange provides a minimum of 5-1-5 strikes subject to a maximum of 10-1-10 strikes for each underlying (In the money-At the money-Out of the money).
4. If necessary, the Exchange also introduces new strike prices intra-day.

The current strike scheme applicable for stock underlying is updated on the NSE website at http://www.nseindia.com/content/fo/sos_scheme.xls

7.6.3 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	173 securities
Exchange of trading	National Stock Exchange of India Limited
Security descriptor	FUTSTK
Contract size	As specified by SEBI from time to time. As on March 31, 2016, the minimum contract value is Rs. 5 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 price of the underlying security on the last trading day.

7.6.4 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	173 securities
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.5 lakh as on March 31, 2016)
Price steps	Re. 0.05
Price bands	A contract specific price range based on its delta value 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.
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

Contract Value and Lot Size of Equity Derivatives

SEBI issued a circular on July 13, 2015 revising the minimum contract size in the equity derivatives segment. Accordingly, the following rules apply concerning lot sizes and contract value:

- i. The lot size for derivatives contracts in equity derivatives segment shall be fixed in such a manner that the contract value of the derivative on the day of review is within Rs. 5 lakhs and Rs. 10 lakhs.
- ii. For stock derivatives, the minimum lot size (in units of underlying) is 50 and thereafter in multiples of 25. However, if the contract value of the stock derivatives at the minimum lot size of 50 is greater than Rs. 10 lakhs, then the minimum lot size will be 10 with multiples of 5.
- iii. For index derivatives, the minimum lot size (in units of underlying) is 10 and thereafter in multiples of 5.

7.7 CRITERIA FOR STOCKS AND INDEX ELIGIBILITY FOR TRADING

The eligibility of a stock / index for trading in Derivatives segment is based upon the criteria laid down by SEBI through various circulars issued from time to time. Based on SEBI guidelines and as a surveillance measure, following criteria has been adopted by the Exchange for selecting stocks and indices on which Futures & Options contracts would be introduced.

7.7.1 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. 10 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. 300 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.

Continued Eligibility

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. 200 crores and stock's median quarter-sigma order size over the last six months shall be not less than Rs. 5 lakh.

Additionally, the stock's average monthly turnover in derivatives segment over last three months shall not be less than Rs. 100 crores.

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.

A stock which has remained subject to a ban on new position for a significant part of the month consistently for three months, will be phased out from trading in the F&O segment.

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

Re-introduction of excluded stocks

A stock which is excluded from derivatives trading may become eligible once again. In such instances, the stock is required to fulfill the eligibility criteria for three consecutive months to be re-introduced for derivatives trading.

7.7.2 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 contracts will be permitted to trade till expiry and new strikes can also be introduced in the existing contracts.

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

New securities being introduced in the F&O segment are based on the eligibility criteria which take into consideration average daily market capitalization, average daily traded value, the market wide position limit in the security, the quarter sigma values and as approved by SEBI. The average daily market capitalisation and the average daily traded value would be computed on the 15th of each month, on a rolling basis, to arrive at the list of top 500 securities. Similarly, the quarter sigma order size in a stock would also be calculated on the 15th of each month, on a rolling basis, considering the order book snapshots of securities in the previous six months and the market wide position limit (number of shares) shall be valued taking the closing prices of stocks in the underlying cash market on the date of expiry of contract in the month.

The number of eligible securities may vary from month to month depending upon the changes in quarter sigma order sizes, average daily market capitalisation & average daily traded value calculated every month on a rolling basis for the past six months and the market wide position limit in that security.

7.8 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 reducing 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 cores up to Rs. 7500 cores	Rs. 1.85 each side
More than Rs. 7500 cores up to Rs. 15000 cores	Rs. 1.80 each side
Exceeding Rs.15000 cores	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).

7.9 INTRODUCTION OF DERIVATIVE CONTRACTS ON FOREIGN STOCK INDICES

SEBI has permitted Indian stock exchanges to introduce derivative contracts (futures and options) on foreign stock indices in the equity derivatives segment in January 2011. Currently the following indices are traded on the NSE (F&O) Segment:

- a. Standard & Poor's 500 (S&P 500)
- b. Dow Jones Industrial Average (DJIA)
- c. FTSE100

In accordance with this objective, the various criteria for indices on which derivative contracts may be introduced were identified:

A stock exchange may introduce derivatives on a foreign stock index if:

- i. Derivatives on that Index is available on any of the stock exchanges listed in the SEBI circular. Some of the exchanges include, Chicago Board Options exchange (CBOE), Hong Kong Exchanges, Singapore Exchange, Eurex, NYSE Liffe and so on.
- ii. In terms of trading volumes (number of contracts), derivatives on that Index figure among the top 15 Index derivatives globally.

OR

That Index has a market capitalization of at least USD 100 billion.

- iii. That index is "broad based". An Index is broad based if :
 - a. The Index consists of a minimum of 10 constituent stocks and
 - b. No single constituent stock has more than 25% of the weight, computed in terms of free float market capitalization, in the Index

All contracts are denominated in Indian Rupees (INR). After introduction of derivatives on a particular stock index, if that stock index fails to meet any of the eligibility criteria for three months consecutively, no fresh contract shall be introduced on that Index. However, the existing unexpired contracts would be traded till expiry and new strikes may be introduced on those contracts.

Trading in derivatives of Foreign Stock Indices is restricted to residents of India. The Trading Member/Mutual Funds position limits (higher of Rs. 500 crore or 15% of the total open interest in Index derivatives) as well as the disclosure requirement for clients whose position exceeds 15% of the open interest of the market, as applicable to domestic stock index derivatives, shall be applicable to derivatives on foreign stock indices.

7.10 CONCLUSION

One can trade in derivatives on the NSE using NSE's NEAT F&O system. It follows the order driven style, and a price-time priority. There are various types of memberships for trading on the NEAT F&O system such as Professional clearing member, trading member, trading cum self clearing member and so on. NSE allows trading of stock and index futures, stock and index options having maturity of 1-month, 2-months and 3 months. More recently, long-term index options have been introduced having 3 quarterly and 5 half yearly expiries.

CHAPTER 8: CLEARING AND SETTLEMENT

After trades are executed, they need to be cleared and settled, wherein the actual transfer of funds and securities occurs. 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:

Clearing Members

A Clearing Member (CM) of NSCCL has the responsibility of clearing and settlement of all deals executed by Trading Members (TM) on NSE, who clear and settle such deals through them. Primarily, the CM performs the following functions:

- Clearing - Computing obligations of all his TM's i.e. determining positions to settle.
- Settlement - Performing actual settlement. Only funds settlement is allowed at present in Index as well as Stock futures and options contracts
- Risk Management - Setting position limits based on upfront deposits / margins for each TM and monitoring positions on a continuous basis.

Types of Clearing Members

Trading Member Clearing Member (TM-CM): A Clearing Member who is also a TM. Such CMs may clear and settle their own proprietary trades, their clients' trades as well as trades of other TM's & Custodial Participants

Professional Clearing Member (PCM): A CM who is not a TM. Typically banks or custodians could become a PCM and clear and settle for TM's as well as of the Custodial Participants

Self Clearing Member (SCM): A Clearing Member who is also a TM. Such CMs may clear and settle only their own proprietary trades and their clients' trades but cannot clear and settle trades of other TM's.

Clearing Member Eligibility Norms

In order to become a clearing member with NSCCL, entities must meet the following eligibility norms:

- Net worth of at least Rs.300 lakhs. The net worth requirement for a CM who clears and settles only deals executed by him is Rs. 100 lakhs.

- Deposit of Rs. 50 lakhs to NSCCL which forms part of the security deposit of the CM
- Additional incremental deposits of Rs.10 lakhs to NSCCL for each additional TM in case the CM undertakes to clear and settle deals for other TMs.

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.

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 Clearing members (CMs) are arrived at by aggregating the open positions of all the Trading Members (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.

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 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.

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

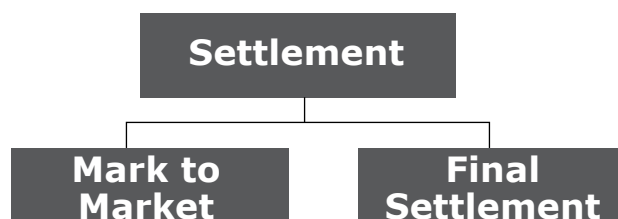
TMs clearing through CM	Proprietary trades			Trades: Client 1			Trades: Client 1			Open position	
	Buy	Sell	Net	Buy	Sell	Net	Buy	Sell	Net	Long	Short
ABC	4000	2000	2000	3000	1000	2000	4000	2000	2000	6000	-
PQR	2000	3000	(1000)	2000	1000	1000	1000	2000	(1000)	1000	2000
Total	6000	5000	+2000	5000	2000	+3000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



Mark to Market (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. The final settlement of the futures contracts is similar to the daily settlement process except for the method of computation of final settlement price. The final settlement profit / loss is computed as the difference between trade price or the previous day's settlement price, as the case may be, and the final settlement price of the relevant futures contract.

Final settlement loss/ profit amount is debited/ credited to the relevant CMs clearing bank account on T+1 day (T = expiry day).

Open positions in futures contracts cease to exist after their expiration day

Settlement Procedure: Daily MTM settlement on T+0 day

Clearing members who opt to pay the Daily MTM settlement on a T+0 basis would compute such settlement amounts on a daily basis and make the amount of funds available in their clearing account before the end of day on T+0 day. Failure to do so would amount to non-payment of daily MTM settlement on a T+0 basis. Further, partial payment of daily MTM settlement would also be considered as non-payment of daily MTM settlement on a T+0 basis. These would be construed as non compliance and penalties applicable for fund shortages from time to time would be levied.

A penalty of 0.07 % of the margin amount at end of day on T+0 would be levied on the clearing members. Further, the benefit of scaled down margins shall not be available in case of non-payment of daily MTM settlement on a T+0 basis from the day of such default to the end of the relevant quarter.

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.

The CMs who have a premium payable position are required to pay the premium amount to NSCCL which is in turn passed on to the members who have a premium receivable position. This is known as daily premium settlement. CMs are responsible to collect and settle for the premium amounts from the TMs and their clients clearing and settling through them.

The pay-in and pay-out of the premium settlement is on T+1 day (T = Trade day). The premium payable amount and premium receivable amount are directly debited or credited to the CMs clearing bank account.

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.

Option contracts, which have been exercised, are assigned and allocated to Clearing Members at the client level. Exercise settlement is cash settled by debiting/ crediting of the clearing

accounts of the relevant Clearing Members with the respective Clearing Bank.

Final settlement loss/ profit amount for option contracts on Index as well as individual securities is debited/ credited to the relevant CMs clearing bank account on T+1 day (T = expiry day). Open positions, in option contracts, cease to exist after their expiration day. The pay-in / pay-out of funds for a CM on a day is the net amount across settlements and all TMs/ clients, in F&O Segment.

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 through 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.

8.3.3 PENALTIES

The following penal charges are levied for failure to pay funds/ settlement obligations:

Penal Charges

A penal charge will be levied on the amount in default as per the byelaws relating to failure to meet obligations by any Clearing Member.

Type of Default	Penalty Charge per day	Chargeable to
Overnight settlement shortage of value more than Rs.5 lakhs	0.07%	Clearing Member
Security deposit shortage	0.07%	Clearing Member
Shortage of Capital cushion	0.07%	Clearing Members

Violations if any by the custodial participants shall be treated in line with those by the trading member and accordingly action shall be initiated against the concerned clearing member.

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.
- 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.

- 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 from their respective clients.
- 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.
- 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.
- 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 exceeds 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.
- A member is alerted of his position to enable him to adjust his exposure or bring in additional capital.
- 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

Risk Management for Derivative products is managed with Standard Portfolio Analysis of Risk (SPAN)[®] is a highly sophisticated, value-at-risk methodology that calculates performance bond/margin requirements by analyzing the "what-if's" of virtually any market scenario.

SPAN[®] is a registered trademark of the Chicago Mercantile Exchange, used herein under License. The Chicago Mercantile Exchange assumes no liability in connection with the use of SPAN by any person or entity.

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.

Initial margin requirements are based on 99% value at risk over a one day time horizon. However, in the case of futures contracts (on index or individual securities), where it may not be possible to collect mark to market settlement value, before the commencement of trading on the next day, the initial margin is computed over a two-day time horizon, applying the appropriate statistical formula. The methodology for computation of Value at Risk percentage is as per the recommendations of SEBI from time to time.

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 on a CM 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. The Assignment Margin is the net exercise settlement value payable by a Clearing Member towards interim and final exercise settlement and is deducted from the effective deposits of the Clearing Member available towards margins.

8.5 NSSCL SPAN

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:

- Underlying market price
- Volatility (variability) of underlying instrument
- Time to expiration

As these factors change, so too will the value of futures and options maintained within a portfolio. SPAN constructs 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.

8.5.1 THE 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 .

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

Where λ is 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.

8.5.2 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:

- Adds up the scanning risk charges and the calendar spread charges.
- Compares this figure to the short option minimum charge and selects the larger of the two. This is the SPAN risk requirement.
- 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.
- Initial margin requirement = Total SPAN margin requirement + Net Buy Premium.

8.6 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-

1. Index Futures and constituent Stock Futures positions in F&O segment
2. Index futures position in F&O segment and constituent stock positions in CM segment
3. Stock futures position in F&O segment and stock positions in CM segment
4. 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.
5. The positions in F&O segment for stock futures and index futures of the same expiry month are eligible for cross margining benefit.
6. 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.
7. 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 was subsequently amended by the Finance Act in 2015. 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 (SARFAESI) Act, 2002
- Units or any other such instrument issued to the investor under any mutual fund scheme⁵.
- 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.

It is also clarified that Securities does not include Unit Linked Insurance Policies or other similar instruments having dual benefit of risk cover and investment issues by an insurer.

“Derivative” is defined to include:

⁵ 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)

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.

Commodity derivatives; and

Such other instruments as may be declared by the Central Government to be derivatives;

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.

Between such parties and such terms as the Central Government may, by notification in the Official Gazette, specify.

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.
- Registering and regulating the working of depositories, custodians, credit rating agencies and other such intermediaries
- Registering and regulating the working of venture capital funds and collective investment schemes including mutual funds.
- Promoting and regulating self-regulatory organizations.
- Prohibiting fraudulent and unfair trade practices relating to securities markets.
- Promoting investors' education and training of intermediaries in the securities markets.
- Prohibiting insider trading in securities
- Regulating substantial acquisition and takeover by companies
- 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.
- Levying fees and charges for carrying out these functions
- Conducting research to carry out the above functions

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.

Some highlights of this framework are as follows:

- 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.5 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.

9.4 REQUIREMENTS FOR F&O TRADING AT NSE

The trading memberships, clearing memberships, limits, collateral requirements etc at each stock exchange are governed by the bye-laws of the respective stock exchange. Let us look at some key requirements at NSE.

9.4.1 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.

9.4.2 REQUIREMENTS TO BECOME F&O SEGMENT MEMBER

The following are eligible to apply for membership subject to the regulatory norms and provisions of SEBI and as provided in the Rules, Regulations, Byelaws and Circulars of the Exchange -

- Individuals;
- Partnership Firms registered under the Indian Partnership Act, 1932;
- Corporations, Companies or Institutions or subsidiaries of such Corporations, Companies or Institutions set up for providing financial services;

Banks for Currency Derivative Segment

The eligibility criteria for each of the above is given in the tables below

Eligibility criteria for Individuals

Age	Minimum age : 21 years
Status	Indian Citizen
Education	At least HSC or equivalent qualification
Experience	Applicant should have an experience for not less than two years as a partner with, or an authorised assistant or authorised clerk or remisier or apprentice to, a member.

Eligibility criteria for partnership firms

Where the applicant is a partnership firm, the applicant shall identify a Dominant Promoter Group as per the norms of the Exchange at the time of making the application. Any change in the shareholding of the partnership firm including that of the said Dominant Promoter Group or their sharing interest shall be effected only with the prior permission of NSEIL/SEBI.

Age	Minimum age of partner(s) : 21 years
Status	Registered Partnership firm under Indian Partnership Act, 1932
Education	Partners should be at least HSC or equivalent qualification
Designated Partners	Identify at least two partners as designated partners who would be taking care of the day to day management of the partnership firm
Designated Partners Experience	Should have a minimum of 2 years experience in an activity related to dealing in securities or as portfolio manager or as investment consultant or as a merchant banker or in financial services or treasury, broker, sub broker, authorised agent or authorised clerk or authorised representative or remisier or apprentice to a member of a recognised stock exchange, dealer, jobber, market maker, or in any other manner in dealing in securities or clearing and settlement thereof.
Dominant Promoter Norms	Identify partner's sharing interest as per Exchange DPG norms

Eligibility criteria for Corporates

A Company as defined in the Companies Act, 1956 (1 of 1956), shall be eligible to be admitted as a member of a Stock Exchange provided:

- Such company is formed in compliance with the provisions of Section 12 of the said Act;
- It undertakes to comply with such other financial requirements and norms as may be specified by the Securities and Exchange Board of India for the registration of such company under sub-section (1) of section 12 of the Securities and Exchange Board of India Act, 1992 (15 of 1992);
- The directors of such company are not disqualified for being members of a stock exchange under clause (1) of rule 8 [except sub-clauses (b) and (f) thereof] or clause (3) of

rule 8 [except sub-clauses (a) and (f) thereof] of the Securities Contracts (Regulation) Rules, 1957 and the directors of the company had not held the offices of the directors in any company which had been a member of the stock exchange and had been declared defaulter or expelled by the stock exchange

Age	Minimum age of director(s) : 21 years
Status	Corporate registered under The Companies Act, 1956 (Indian)
Minimum Paid up Equity Capital	Rs.30 lakhs
Designated Directors	Identification of at least two directors as designated directors who would be managing the day to day trading operations
Education	Each of the Designated Directors should be at least HSC or equivalent qualification
Designated Directors Experience	Should have a minimum of 2 years experience in an activity related to dealing in securities or as portfolio manager or as investment consultant or as a merchant banker or in financial services or treasury, broker, sub broker, authorised agent or authorised clerk or authorised representative or remisier or apprentice to a member of a recognised stock exchange, dealer, jobber, market maker, or in any other manner in dealing in securities or clearing and settlement thereof.
Dominant Promoter Norms	Identify dominant group as per Exchange DPG norms

Eligibility criteria for Banks

Banks authorized by the Reserve Bank of India under section 10 of the Foreign Exchange Management Act, 1999 as 'AD Category - I bank' are permitted to become trading and clearing members of the currency futures market of the recognized stock exchanges, on their own account and on behalf of their clients, subject to fulfilling the following minimum prudential requirements:

Minimum net worth of Rs. 500 crores. Minimum CRAR of 10 per cent. Net NPA should not exceed 3 per cent. Made net profit for last 3 years.

The AD Category - I banks which fulfill the prudential requirements are required to lay down detailed guidelines with the approval of their Boards for trading and clearing of currency futures contracts and management of risks. AD Category - I banks which do not meet the above minimum prudential requirements and AD Category - I banks which are Urban Co-operative banks or State Co-operative banks can participate in the currency futures market only as clients, subject to approval therefore from the respective regulatory Departments of the Reserve Bank.

9.4.3 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.

9.5 POSITION LIMITS

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

Trading member position limits

1. Trading member position limits are specified as given below: 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 whichever is lower. The Clearing Corporation shall specify the trading member-wise position limits on the last trading day of the 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.

9.6 REPORTING OF CLIENT MARGIN

NSCCL collects upfront initial margin for all the open positions of a CM based on the margins computed by NSCCL-SPAN®. A CM is in turn required to collect the initial margin from the TMs and his respective clients. Similarly, a TM should collect upfront margins from his clients.

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. Penalties, as specified by the stock exchange, is levied on trading members for short- collection / non-collection of margins from clients.

Initial margin requirements are based on 99% value at risk over a one day time horizon. However, in the case of futures contracts (on index or individual securities), where it may not be possible to collect mark to market settlement value, before the commencement of trading on the next day, the initial margin is computed over a two-day time horizon, applying the appropriate statistical formula.

- i. Initial margin requirement for a member: For client positions - is netted at the level of individual client and grossed across all clients, at the Trading/ Clearing Member level, without any setoffs between clients.
- ii. For proprietary positions - is netted at Trading/ Clearing Member level without any setoffs between client and proprietary positions.

Voluntary Close-out Facility

The Voluntary Close out facility enables members to voluntarily define a margin limit beyond which all the orders would get risk managed thereby preventing him from getting disabled by

virtue of execution of such orders. Voluntary Close out limits for open interest enables member to define position limit beyond which all the orders will be check for trading member level position limit violations thereby preventing from getting disabled for particular underlying symbol.

9.7 CONCLUSION

The Derivatives segment is governed by the SC(R)A 1956, SEBI Act, 1992, subsequent notifications by SEBI and the respective byelaws of the exchanges on which they are traded.

While SCRA defines a derivative, SEBI governs its usage by providing periodic notifications to all trading and clearing members regarding position limits, margining and so on apart from regular guidances on trading.

NSE prescribes the eligibility criteria for various members to operate in the F&O space based on the guidelines from SEBI.

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).

Until recently, the standard for accounting of derivatives was Accounting Standard AS 30. However, in order to make the practice of accounting for derivative contracts uniform, the ICAI issued a guidance note on accounting for derivatives contracts on 12th May 2015. This guidance note provides recommendatory guidance on accounting for derivative contracts and hedging activities overcoming a lack of mandatory guidance in this aspect. It is applicable for accounting periods beginning on or after April 1, 2016.

In this section, we will look at the key highlights of this guidance note and then move on to discuss taxation aspects of derivatives.

10.1 KEY ACCOUNTING PRINCIPLES

- i. All derivative contracts must be recognized on the balance sheet and measured at fair value
- ii. If any entity decides not to use hedge accounting, it should account for its derivatives at fair value with changes in fair value being recognized in the statement of profit and loss.
- iii. If an entity decides to apply hedge accounting it should be able to clearly identify its risk management objective, the risk that it is hedging, how it will measure the derivative instrument if its risk management objective is being met and document this adequately at the inception of the hedge relationship and on an ongoing basis.
- iv. An entity may decide to use hedge accounting for certain derivative contracts and for derivatives not included as part of hedge accounting, it will apply the principles at (i) and (ii) above.
- v. Adequate disclosures of accounting policies, risk management objectives and hedging activities should be made in its financial statements

10.2 APPLICABILITY

The guidance note applies to:

1. Foreign exchange forward contracts that are hedges of highly probable forecast transactions and firm commitments
2. Other foreign currency derivative contracts such as cross currency interest rate swaps, foreign currency futures, options and swaps if not in the scope of AS 11;

3. Other derivative contracts such as traded equity index futures, traded equity index options, traded stock futures and option contracts; and
4. Commodity derivative contracts

10.3 SYNTHETIC ACCOUNTING

Synthetic accounting is not permitted. i.e., accounting of combining a derivative and the underlying together as a single package. For instance, if any entity has a foreign currency borrowing that it has hedged by entering into a cross currency interest rate swap, it would require the entity to recognise the loan liability separately from the cross currency interest rate swap and not treat them as a package (synthetic accounting) as INR loan. Alternatively, if any entity has borrowed in terms of INR which it swaps with foreign currency borrowing it would not treat such a loan as a foreign currency borrowing.

10.4 HEDGE ACCOUNTING

10.4.1 DESIGNATION OF A DERIVATIVE CONTRACT AS A HEDGING INSTRUMENT

An entity is permitted but not required to designate a derivative contract as a hedging instrument. Where it designates a derivative contract as a hedging instrument, it needs to, as a minimum:

- (i) identify its risk management objective;
- (ii) demonstrate how the derivative contract helps meet that risk management objective;
- (iii) specify how it plans to measure the fair value of the derivative instrument if the derivative contract is effective in meeting its risk management objective (including the relevant hedge ratio);
- (iv) document this assessment (of points (i), (ii), (v), (vi) and (vii) of this paragraph) at inception of the hedging relationship and subsequently at every reporting period;
- (v) demonstrate in cases of hedging a future cash flow that the cash flows are highly probable of occurring;
- (vi) conclude that the risk that is being hedged could impact the statement of profit and loss; and
- (vii) adequately disclose its accounting policies, risk management objectives and hedging activities (as required by this Guidance Note) in its financial statements.

In case a derivative contract is not classified as a hedging instrument because it does not meet the required criteria or an entity decides against such designation, it will be measured at fair value and changes in fair value will be recognized immediately in the statement of profit and loss.

Derivatives cannot be designated for a partial term of the derivative instrument. A derivative may be used in a hedging relationship relating to a portion of a non-financial item as long as

the hedged portion is clearly identifiable and capable of being measured reliably. Examples of such non-financial components include exchange (for instance London Metal Exchange) traded prices components of metal inventory and crude oil components of aviation turbine fuel.

10.4.2 NEED FOR HEDGE ACCOUNTING

Hedge accounting may be required due to accounting mismatches in:

- Measurement – some financial instruments (non-derivative) are not measured at fair value with changes being recognised in the statement of profit and loss whereas all derivatives, which commonly are used as hedging instruments, are measured at fair value.
- Recognition – unsettled or forecast transactions that may be hedged are not recognised on the balance sheet or are included in the statement of profit and loss only in a future accounting period, whereas all derivatives are recognised at inception.

10.4.3 TYPES OF HEDGE ACCOUNTING

There are 3 types of hedging:

1. Fair value hedge accounting model
2. Cash flow hedge accounting model
3. Hedge of a net investment in a foreign operation.

Fair value hedge accounting model

A fair value hedge seeks to offset the risk of changes in the fair value of an existing asset or liability or an unrecognised firm commitment that may give rise to a gain or loss being recognised in the statement of profit and loss. A fair value hedge is a hedge of the exposure to changes in fair value of a recognised asset or liability or an unrecognised firm commitment, or an identified portion of such an asset, liability or firm commitment, that is attributable to a particular risk and could affect the statement of profit and loss.

When applying fair value hedge accounting, the hedging instrument is measured at fair value with changes in fair value recognised in the statement of profit and loss. The hedged item is remeasured to fair value in respect of the hedged risk even if normally it is measured at cost, e.g., a fixed rate borrowing. Any resulting adjustment to the carrying amount of the hedged item related to the hedged risk is recognised in the statement of profit and loss even if normally such a change may not be recognised, e.g., for inventory being hedged for fair value changes

The fair value changes of the hedged item and the hedging instrument will offset and result in no net impact in the statement of profit and loss except for the impact of ineffectiveness

Cash Flow hedge accounting model

A cash flow hedge seeks to offset certain risks of the variability of cash flows in respect of an existing asset or liability or a highly probable forecast transaction that may be reflected in the statement of profit and loss in a future period

Under a cash flow hedge, the hedging instrument is measured at fair value, but any gain or loss that is determined to be an effective hedge is recognised in equity, e.g., cash flow hedge reserve. This is intended to avoid volatility in the statement of profit and loss in a period when the gains and losses on the hedged item are not recognised therein.

In order to match the gains and losses of the hedged item and the hedging instrument in the statement of profit and loss, the changes in fair value of the hedging instrument recognised in equity must be recycled from equity and recognised in the statement of profit and loss at the same time that the impact from the hedged item is recognised (recycled) in the statement of profit and loss. The manner in which this is done depends on the nature of the hedged item.

Net Investment Hedging

An investor in a non-integral operation is exposed to changes in the carrying amount of the net assets of the foreign operation (the net investment) arising from the translation of those assets into the reporting currency of the investor.

10.5 PRESENTATION IN THE FINANCIAL STATEMENTS

Derivative assets and liabilities recognised on the balance sheet at fair value should be presented as current and non-current based on the following considerations:

- Derivatives that are intended for trading or speculative purposes should be reflected as current assets and liabilities.
- Derivatives that are hedges of recognised assets or liabilities should be classified as current or non-current based on the classification of the hedged item.
- Derivatives that are hedges of forecasted transactions and firm commitments should be classified as current or non-current based on the settlement date / maturity dates of the derivative contracts.
- Derivatives that have periodic or multiple settlements such as interest rate swaps should not be bifurcated into current and non-current elements. Their classification should be based on when a predominant portion of their cash flows are due for settlement as per their contractual terms

Netting off of assets and liabilities is not permitted except where basis adjustment is applied under cash flow hedges and hence all the amounts presented in the financial statements should be gross amounts. Amounts recognised in the statement of profit and loss for derivatives not designated as hedges may be presented on a net basis

10.6 DISCLOSURES IN FINANCIAL STATEMENTS

An entity should satisfy the broader disclosure requirements by describing its overall financial risk management objectives, including its approach towards managing financial risks. Disclosures should explain what the financial risks are, how the entity manages the risk and why the entity enters into various derivative contracts to hedge the risks.

An entity should disclose the methodology used to arrive at the fair value of derivative contracts (whether used for hedging or not) and the extent of fair value gains/losses recognized in the statement of profit and loss and in equity.

The entity should disclose its risk management policies. This would include the hedging strategies used to mitigate financial risks. This may include a discussion of:

- how specific financial risks are identified, monitored and measured;
- what specific types of hedging instruments are entered into and how these instruments modify or eliminate risk; and
- details of the extent of transactions that are hedged.

An entity is also required to make specific disclosures about its outstanding hedge accounting relationships. The following disclosures are made separately for fair value hedges, cash flow hedges and hedges of net investments in foreign operations:

- a description of the hedge;
- a description of the financial instruments designated as hedging instruments for the hedge and their fair values at the balance sheet date;
- the nature of the risks being hedged;
- for hedges of forecast transactions, the periods in which the transactions are expected to occur, when they are expected to affect the statement of profit and loss, and a description of any forecast transactions that were originally hedged but now are no longer expected to occur. The Guidance Note does not specify the future time bands for which the disclosures should be made. Entities should decide on appropriate groupings based on the characteristics of the forecast transactions;
- if a gain or loss on derivative or non-derivative financial assets and liabilities designated as hedging instruments in cash flow hedges has been directly recognised in the hedging reserve: -
 - the amount recognised in hedge reserve during the period.
 - the amount recycled from the hedge reserve and reported in statement of profit and loss.
 - the amount recycled from hedge reserve and added to the initial measurement of the acquisition cost or other carrying amount of a non-financial asset or non-financial liability in a hedged forecast transaction

- a breakup of the balance in the hedge reserve between realised and unrealised components and a reconciliation of the opening balance to the closing balance for each reporting period.

10.7 TAXATION OF DERIVATIVE TRANSACTION IN SECURITIES

10.7.1 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.

10.7.2 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 is entered into in a recognized stock exchange

Sl. No.	Taxable securities transaction	New rate from 01.06.2013	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	0.01%	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:

Total futures contract value = $1000 \times 300 = \text{Rs. } 3,00,000$

Securities transaction tax payable thereon $0.01\% = 3,00,000 \times 0.01\% = \text{Rs. } 30$ Note: No tax on such a transaction is payable by the buyer of the futures contract.

Note:

Value of taxable securities transaction relating to an "option in securities" shall be the option premium, in case of sale of an option in securities.

Value of taxable securities transaction relating to an "option in securities" shall be the settlement price, in case of sale of an option in securities, where option is exercised.

The following procedure is adopted by the Exchange in respect of the calculation and collection of STT:

- STT is applicable on all sell transactions for both futures and option contracts.
- For the purpose of STT, each futures trade is valued at the actual traded price and option trade is valued at premium. On this value, the STT rate as prescribed is applied to determine the STT liability. In case of final exercise of an option contract STT is levied on settlement price on the day of exercise if the option contract is in the money.
- STT payable by the clearing member is the sum total of STT payable by all trading members clearing under him. The trading member's liability is the aggregate STT liability of clients trading through him.

CHAPTER 11: INVESTOR SERVICES

So far, we have understood the dynamics of the derivatives markets. In this chapter, we will look at practical aspects of investing in the derivatives market in NSE. We will first look at various requirements to commence trading in the derivatives market, the risks associated with trading and grievance redressal mechanisms available for investors.

11.1 COMMENCING TRADING ON THE NSE DERIVATIVES SEGMENT

For trading in futures and options an investor first needs to open a trading account with his broker (trading member). If an investor already has a trading account for capital markets then only a futures & options trading account is to be opened by submitting necessary documents. No demat account is required since futures and options trading in India does not involve any delivery of securities. Only a trading account and a savings bank account are sufficient to commence trading. An investor can choose to trade on-line (internet based) or the conventional off-line method. An investor would need to fill in a client registration form and submit documents that will prove his identity, his residential address, income details etc. A passport, driving license, voter's ID, ration card etc. are some of the documents for residence proof. Permanent Account Number (PAN) would be required for opening a trading account and is also used as a proof of identity. Trading members provide investors a client registration kit which contains all the details for opening an account. Investors should read all documents carefully, fill in the forms and submit them along with necessary proofs.

11.1.1 DOCUMENTS REQUIRED

Generally the following are required for opening a trading account :-

1. Know Your Client (KYC) form – document captures basic information about the investor. Please fill this form correctly and strike off blank fields in the form.
2. Risk Disclosure Document - This document contains important information on risks associated with trading in Futures & Option (F&O) Segment of stock exchanges. Investors should read and understand this document before trading on the F&O segment of the Exchange.
3. Power of attorney PoA (non-mandatory) – an important document authorizing your trading member to operate your bank account. The PoA should be specific and not a general one.
4. For identity proof, residential address proof, income proof :
 - i. Two recent passport size photographs
 - ii. Proof of bank account : any one of the following may be submitted :-
 - Copy of bank statement
 - Copy of first page of the bank pass book.

- A cancelled cheque
- iii. Proof of identity: Pan Card, Aadhar, passport etc
 - iv. Proof of address: any one of the following:-
 - Passport copy
 - Voter id card copy
 - Copy of ration card
 - Driving license copy
 - Bank pass book copy
 - Verified copies of Electricity bill or telephone bill in the investor's name, Leave and license agreement/agreement for sale.
 - v. Identity card/document with address, issued by Central/state government and its departments, Statutory /regulatory authorities, Public sector undertakings, Scheduled commercial banks, Public financial institutions, Colleges affiliated to Universities, Professional Bodies such as ICAI, ICWAI, ICSI, Bar council etc. to their Members
 - vi. Copy of tax return
 - vii. Copy of salary slip
 - viii. Bank statement for last six months

Originals of documents should be produced for verification along with self-attested copies of documents. Trading member would allot a Unique Client Code to the investor. The investor should place orders and ensure his trades are executed only in the Unique Client Code assigned to him.

11.2 MODEL RISK DISCLOSURE DOCUMENT

Investors must understand that investment in derivatives has an element of risk and is generally not an appropriate avenue for someone of limited resources/ limited investment and / or trading experience and low risk tolerance. An investor should therefore carefully consider whether such trading is suitable for him or her in the light of his or her financial condition. An investor must accept that there can be no guarantee of profits or no exception from losses while executing orders for purchase and / or sale of derivative contracts. Investors who trade in derivatives at the Exchange are advised to carefully read the Model Risk Disclosure Document and the details contained therein. This document is given by the broker to his clients and must be read, the implications understood and signed by the investor. The document clearly states the risks associated with trading in derivatives and advises investors to bear utmost caution before entering into the markets.

Example 1

An investor purchased 100 Nifty Futures @ Rs. 7200 on June 10. Expiry date of futures contract is June 26. Total Investment : Rs. 7,20,000.

Initial Margin paid : Rs. 72,000 (10% of value)

On June 26, suppose, Nifty index closes at 6,780.

Loss to the investor $(7200 - 6780) \times 100 = \text{Rs. } 42,000$

The entire initial investment (i.e. Rs. 42,000) is lost by the investor.

Example 2

An investor buys 100 Nifty call options at a strike price of Rs. 7000 on June 15. Nifty index is at 7050. Premium paid = Rs. 10,000 (@Rs.100 per call X 100 calls).

Expiry date of the contract is June 26

On June 26, Nifty index closes at 7900.

The call will expire worthless and the investor losses the entire Rs.10,000 paid as premium.

Example 3

An investor buys 100 ABC Ltd. put options at a strike price of Rs. 400 on June 15. ABC Ltd. share price is at 380. Premium paid = Rs. 5,000 (@Rs. 50 per put X 100 calls).

Expiry date of the contract is June 26

On June 26, ABC Ltd. shares close at Rs. 410.

The put will expire worthless and the investor losses the entire Rs. 5,000 paid as premium

11.3 Do's AND DON'T'S FOR INVESTORS

- Trading security futures contracts may not be suitable for all investors. This is because futures and options trading is highly leveraged. A relatively small amount of money can be placed as initial margin to establish a position having a much greater value. With small amounts of price changes, you may lose a substantial amount of money in a very short period of time. If you are uncomfortable with this level of risk, do not trade in futures and options contracts.
- Any advice or tip that claims that there are fixed or huge returns expected may be risky and may lead to losing some, most, or all of your money.
- Be cautious of claims that a trading strategy in futures and options is completely risk free and returns are guaranteed. Do your own research, understand the strategy thoroughly before investing.
- Do not be misled by market rumors, luring advertisements of futures and options.
- Do not be attracted to investments based on what an internet website, SMS, emails etc. promotes, unless you have done adequate study of the product.
- Ensure that you deal with and through only SEBI registered intermediaries.
- Ensure that you fill the KYC form completely and strike off the blank fields in the KYC form.

- Ensure that you have read all the mandatory documents viz. Rights and Obligations, Risk Disclosure Document, Policy and Procedure document of the trading member.
- Ensure to read, understand and then sign the voluntary clauses, if any, agreed between you and the trading member. Note that the clauses as agreed between you and the trading member cannot be changed without your consent.
- Get a clear idea about all brokerage, commissions, fees and other charges levied by the broker on you for trading and the relevant provisions/ guidelines specified by SEBI/Stock exchanges.
- Obtain a copy of all the documents executed by you from the trading member free of charge.
- In case you wish to execute Power of Attorney (POA) in favor of the trading member, authorizing it to operate your bank account, please refer to the guidelines issued by SEBI/Exchanges in this regard.
- Ensure that you receive contract notes signed by authorized signatory for all your transactions.
- Make sure you get the final monthly derivatives bill on every expiry.

11.4 SEBI MEASURES FOR INVESTOR RIGHTS PROTECTION

- Investor's money has to be kept separate at all levels and is permitted to be used only against the liability of the Investor and is not available to the trading member or clearing member or even any other investor.
- The Trading Member is required to provide every investor with a risk disclosure document which will disclose the risks associated with the derivatives trading so that investors can take a conscious decision to trade in derivatives.
- Investor would get the contract note duly time stamped for receipt of the order and execution of the order. The order will be executed with the identity of the client and without client ID order will not be accepted by the system. The investor could also demand the trade confirmation slip with his ID in support of the contract note. This will protect him from the risk of price favour, if any, extended by the Member.
- In the derivative markets all money paid by the Investor towards margins on all open positions is kept in trust with the Clearing House/Clearing corporation and in the event of default of the Trading or Clearing Member the amounts paid by the client towards margins are segregated and not utilized towards the default of the member. However, in the event of a default of a member, losses suffered by the Investor, if any, on settled / closed out position are compensated from the Investor Protection Fund, as per the rules, bye-laws and regulations of the derivative segment of the exchanges.
- The Exchanges are required to set up arbitration and investor grievances redressal mechanism operative from all the four areas / regions of the country.

REFERENCES

1. Jorion, Phillipe, (2009), Financial Risk Manager Handbook Risk (5th ed.) New Jersey: John Wiley
2. Kolb, Robert W., (2007) Futures, Options and Swaps, (3rd ed.) Blackwell: Malden, MA
3. Hull, John C., Futures, Options and Other Derivatives (2009) (7th ed). Prentice Hall India: New Delhi
4. Chance, Don, M., Brooks Robert (2008), Derivatives and Risk Management Basics, Cengage Learning: New Delhi.
5. Morgan J. P., Risk Metrics, Irwin
6. Stulz, Rene M, (2003), Risk Management and Derivatives, Thomson South Western: Cincinnati
7. Strong, Robert A. (2006), Derivatives- An Introduction, Thomson Asia: Singapore
8. Ajay Shah and Susan Thomas, Derivatives FAQ
9. Leo Melamed, Escape to Futures
10. Hans R. Stoll and Robert E. Whaley, Futures and options
11. Terry J. Watsham, Futures and options in risk management
12. Robert W. Kolb, Futures, options and swaps
13. National Stock Exchange, Indian Securities Market Review
14. John Kolb, Introduction to futures and options markets
15. National Stock Exchange, NSENEWS
16. David A. Dubofsky, Options and financial future: Valuation and uses
17. Dr. L. C. Gupta Committee, Regulatory framework for financial derivatives in India
18. Prof. J. R. Varma & Group, Risk containment in the derivatives market
19. Mark Rubinstein, Rubinstein on derivatives
20. Rules, regulations and bye-laws, (F & O segment) of NSE & NSCCL
21. Robert W. Kolb, Understanding futures markets
22. A study on strategic growth in Indian financial derivatives market, Prakash Yalavati, International journal of recent scientific research, Oct 2015
23. Websites
 - <http://www.derivativesindia.com>
 - <http://www.derivatives-r-us.com>
 - <http://www.igidr.ac.in/~ajayshah>
 - <http://www.mof.nic.in>
 - <http://www.nseindia.com>
 - <http://www.rediff/money/derivatives>
 - <http://www.sebi.gov.in>
 - <http://www.icai.org>

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 An investor makes a net profit of Rs. 5000 by sale of options contract. What is the net STT payable by him? Rs. _____ [2 Marks]
- (a) 0
 - (b) 5
 - (c) 0.85
 - (d) 1
- Q.22 The F&O segment of NSE provides trading facilities for the following derivative instruments, except [2 Marks]
- (a) Interest rate swaps
 - (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 Nifty 50 Junior Index
- Q.35 IDerivatives that are intended for trading or speculative purposes should be classified as current or non-current assets and liabilities. [2 Marks]
- (a) TRUE
 - (b) FALSE

- 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 50, Nifty 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 $N(d_1)$ and $N(d_2)$ 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	(b)
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	(c)	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)

[illegible]

[illegible]

[illegible]