

Term Project

ON

Futures and options as a risk management tool

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January-May, 2016

DECLARATION

I **Mani Bhushan Prasad** student of EMBA 2014-2016 batch of Delhi School of Management, Delhi Technological University, Bawana road, Delhi-42 declare that term project **Futures and options as a risk management tool** submitted in partial fulfilment of Executive MBA programme is the original work conducted by me.

The information and data given in the report is authentic to the best of my knowledge.

This Report is not being submitted to any other University for award of any other Degree, Award and Fellowship.

Name of candidate with
sign_____

(Mani Bhushan Prasad)

Place: New Delhi

Date:

ACKNOWLEDGEMENT

I would like to express my deepest appreciation to all those who provided me the opportunity to complete this project. Firstly, *I would like to express my special thanks of gratitude to my teacher Dr. Archana Singh for giving me the opportunity to do this exciting project on the topic Fundamental Analysis of Power Sector. This project really helped me a lot in learning many new things which I never dealt with. Last but not the least; I would also like to thank my parents and friends for their mental support in completing the project on this wonderful topic.*

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1 Introduction

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

Derivatives are risk management instruments, which derive their value from an underlying asset. The underlying asset can be bullion, index, share, bonds, currency, interest, etc.. Banks, Securities firms, companies and investors to hedge risks, to gain access to cheaper money and to make profit, use derivatives. Derivatives are likely to grow even at a faster rate in future.

1.1 NEED FOR STUDY:

In recent times the Derivative markets have gained importance in terms of their vital role in the economy. The increasing investments in derivatives (domestic as well as overseas) have attracted my interest in this area. Through the use of derivative products, it is possible to partially or fully transfer price risks by locking-in asset prices. As the volume of trading is tremendously increasing in derivatives market, this analysis will be of immense help to the investors.

1.2 OBJECTIVES OF THE STUDY:

- ❖ To analyze the operations of futures and options.
- ❖ To find the profit/loss position of futures buyer and seller and also the option writer and option holder.
- ❖ To study about risk management with the help of derivatives.

1.3 SCOPE OF THE STUDY:

The study is limited to “Derivatives” with special reference to futures and option in the Indian context and the Inter-Connected Stock Exchange has been taken as a representative sample for the study. The study can't be said as totally perfect. Any alteration may come. The study has only made a humble attempt at evaluation derivatives market only in India context. The study is not based on the international perspective of derivatives markets, which exists in NASDAQ, CBOT etc.

1.4 LIMITATIONS OF THE STUDY:

- ❖ The scrip chosen for analysis is only for L&T and the contract taken is Mar 2016 ending one –month contract i.e. only one month.
- ❖ The data taken is completely restricted to one company L&T of Apr 2016 and data may vary with actuals; hence this analysis cannot be taken universal.

1.5 RESEARCH METHODOLOGY:

Data has been collected in two ways. These are:

Secondary Method:

Various portals

- www.nseindia.com.
- www.moneycontrol.com

Financial newspapers, Economics times.

➤ **BOOKS :-**

- Financial Derivatives By S L Gupta
- Options Futures & Other Derivatives- John C.Hull - (Pearson Education), 6/e

Financial market liberalization

Since early 1990s has brought about major changes in the financial markets in India. The creation and empowerment of Securities and Exchange Board of India (SEBI) has helped in providing higher level accountability in the market.

New institutions like National Stock Exchange of India (NSEIL), National Securities

Clearing Corporation (NSCCL), National Securities Depository (NSDL) have been the

Change agents and helped cleaning the system and provided safety to investing public at large.

With modern technology in hand, these institutions did set benchmarks and standards for

others to follow. Microstructure changes brought about reduction in transaction cost that helped investors to lock in a deal faster and cheaper.

One decade of reforms saw implementation of policies that have improved transparency in the system, provided for cheaper mode of information dissemination without much time delay, better corporate governance, etc. The capital market witnessed a major transformation and structural change during the period. The reforms process have helped to improve efficiency in information dissemination, enhancing transparency, prohibiting unfair trade practices like insider trading and price rigging. Introduction of derivatives in Indian capital market was initiated by the Government through L C Gupta Committee report. The L.C. Gupta Committee on Derivatives had recommended in December 1997 the introduction of stock index futures in the first place to be followed by other products once the market matures. The preparation of regulatory framework for the operations of the index futures contracts took some more time and finally futures on benchmark indices were introduced in June 2000 followed by options on indices in June 2001 followed by options on individual stocks in July 2001 and finally followed by futures on individual stocks in November 2001.

Do Futures and Options trading increase stock market volatility?

Dr. Premalata Shenbagaraman², Research Paper (NSE)

Numerous studies on the effects of futures and options listing on the underlying cash market volatility have been done in the developed markets. The empirical evidence is mixed and most suggest that the introduction of derivatives do not destabilize the underlying market. The studies

also show that the introduction of derivative contracts improves liquidity and reduces informational asymmetries in the market. In the late nineties, many emerging and transition economies have introduced derivative contracts, raising interesting issues unique to these markets. Emerging stock markets operate in very different economic, political, technological and social environments than markets in developed countries like the USA or the UK. This paper explores the impact of the introduction of derivative trading on cash market volatility using data on stock index futures and options contracts traded on the S & P CNX Nifty (India). The results suggest that futures and options trading have not led to a change in the volatility of the underlying stock index, but the nature of volatility seems to have changed post-futures. We also examine whether greater futures trading activity (volume and open interest) is associated with greater spot market volatility. We find no evidence of any link between trading activity variables in the futures market and spot market volatility. The results of this study are especially important to stock exchange officials and regulators in designing trading mechanisms and contract specifications for derivative contracts, thereby enhancing their value as risk management tools.

2. DERIVATIVES

The emergence of the market for derivatives products, most notably forwards, futures and options, can be tracked back to the willingness of risk-averse economic agents to guard themselves against uncertainties arising out of fluctuations in asset prices. By their very nature, the financial markets are marked by a very high degree of volatility. Through the use of derivative products, it is possible to partially or fully transfer price risks by locking-in asset prices. As instruments of risk management,

these generally do not influence the fluctuations in the underlying asset prices. However, by locking-in asset prices, derivative product minimizes the impact of fluctuations in asset prices on the profitability and cash flow situation of risk-averse investors.

Derivatives are risk management instruments, which derive their value from an underlying asset. The underlying asset can be bullion, index, share, bonds, currency, interest, etc.. Banks, Securities firms, companies and investors to hedge risks, to gain access to cheaper money and to make profit, use derivatives. Derivatives are likely to grow even at a faster rate in future.

2.1 DEFINITION

Derivative is a product whose value is derived from the value of an underlying asset in a contractual manner. The underlying asset can be equity, forex, commodity or any other asset.

- 1) Securities Contracts (Regulation) Act, 1956 (SCR Act) defines “derivative” to secured or unsecured, risk instrument or contract for differences or any other form of security.
- 2) A contract which derives its value from the prices, or index of prices, of underlying securities.

2.2 EMERGENCE OF DERIVATIVE PRODUCTS

Derivative products initially emerged as hedging devices against fluctuations in commodity prices, and commodity-linked derivatives remained the sole form of such products for almost three hundred years. Financial derivatives came into spotlight in the post-1970 period due to growing instability in the financial markets. However, since their emergence, these products have become very popular and by 1990s, they accounted for about two-thirds of total transactions in derivative products. In recent years,

the market for financial derivatives has grown tremendously in terms of variety of instruments available, their complexity and also turnover. In the class of equity derivatives the world over, futures and options on stock indices have gained more popularity than on individual stocks, especially among institutional investors, who are major users of index-linked derivatives. Even small investors find these useful due to high correlation of the popular indexes with various portfolios and ease of use. The lower costs associated with index derivatives vis-a-vis derivative products based on individual securities is another reason for their growing use

PARTICIPANTS:

The following three broad categories of participants in the derivatives market.

HEDGERS:

Hedgers face risk associated with the price of an asset. They use futures or options markets to reduce or eliminate this risk.

SPECULATORS:

Speculators wish to bet on future movements in the price of an asset. Futures and options contracts can give them an extra leverage; that is, they can increase both the potential gains and potential losses in a speculative venture.

ARBITRAGERS:

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

2.3FUNCTION OF DERIVATIVES MARKETS:

The following are the various functions that are performed by the derivatives markets. They are:

- ❖ Prices in an organized derivatives market reflect the perception of market participants about the future and lead the price of underlying to the perceived future level.
- ❖ Derivatives market helps to transfer risks from those who have them but may not like them to those who have an appetite for them.
- ❖ Derivatives trading acts as a catalyst for new entrepreneurial activity.
- ❖ Derivatives markets help increase saving and investment in long run.

2.4TYPES OF DERIVATIVES:

The following are the various types of derivatives. They are:

2.4.1 FORWARDS:

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

2.4.2 FUTURES:

A futures contract is an agreement between two parties to buy or sell an asset in a certain time at a certain price, they are standardized and traded on exchange.

2.4.3 OPTIONS:

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

2.4.4 WARRANTS:

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

2.4.5 LEAPS:

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

2.4.5 BASKETS:

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

2.4.6 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:

a) Interest rate Swaps:

These entail swapping only the related cash flows between the parties in the same currency.

b) 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.

2.5 SWAPTION:

Swaptions are options to buy or sell a swap that will become operative at the expiry of the options. Thus a swaption is an option on a forward swap.

2.6 RATIONALE BEHIND THE DEVELOPMENT OF DERIVATIVES:

Holding portfolios of securities is associated with the risk of the possibility that the investor may realize his returns, which would be much lesser than what he expected to get. There are various factors, which affect the returns:

1. Price or dividend (interest)
2. Some are internal to the firm like-
 - Industrial policy

- Management capabilities
- Consumer's preference
- Labor strike, etc.

These forces are to a large extent controllable and are termed as nonsystematic risks. An investor can easily manage such non-systematic by having a well-diversified portfolio spread across the companies, industries and groups so that a loss in one may easily be compensated with a gain in other.

There are yet other of influence which are external to the firm, cannot be controlled and affect large number of securities. They are termed as systematic risk. They are:

1. Economic

2. Political

3. Sociological changes are sources of systematic risk.

For instance, inflation, interest rate, etc. their effect is to cause prices of nearly all-individual stocks to move together in the same manner. We therefore quite often find stock prices falling from time to time in spite of company's earnings rising and vice versa.

Rational Behind the development of derivatives market is to manage this systematic risk, liquidity in the sense of being able to buy and sell relatively large amounts quickly without substantial price concession.

In debt market, a large position of the total risk of securities is systematic. Debt instruments are also finite life securities with limited marketability due to their small size relative to many common stocks. Those factors favor for the purpose of both portfolio hedging and speculation, the introduction of a derivatives securities that is on some broader market rather than an individual security.

2.6 REGULATORY FRAMEWORK:

The trading of derivatives is governed by the provisions contained in the SC R A, the SEBI Act, and the regulations framed there under the rules and byelaws of stock exchanges.

Regulation for Derivative Trading:

SEBI set up a 24 member committee under Chairmanship of Dr. L. C. Gupta develop the appropriate regulatory framework for derivative trading in India. The committee submitted its report in March 1998. 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. SEBI also approved he “suggestive bye-laws” recommended by the committee for regulation and control of trading and settlement of Derivative contract.

The provision in the SCR Act governs the trading in the securities. The amendment of the SCR Act to include “DERIVATIVES” within the ambit of securities in the SCR Act made trading in Derivatives possible within the framework of the Act.

1. Eligibility criteria as prescribed in the L. C. Gupta committee report may apply to SEBI for grant of recognition under section 4 of the SCR Act, 1956 to start Derivatives Trading. The derivative exchange/segment should have a separate governing council and

representation of trading/clearing member shall be limited to maximum 40% of the total members of the governing council. The exchange shall regulate the sales practices of its members and will obtain approval of SEBI before start of Trading in any derivative contract.

2. The exchange shall have minimum 50 members.
3. The members of an existing segment of the exchange will not automatically become the members of the derivatives segment. The members of the derivatives segment need to fulfill the eligibility conditions as lay down by the L. C. Gupta committee.
4. The clearing and settlement of derivatives trades shall be through a SEBI approved clearing corporation/clearing house. Clearing Corporation/Clearing House complying with the eligibility conditions as lay down By the committee have to apply to SEBI for grant of approval.
5. Derivatives broker/dealers and Clearing members are required to seek registration from SEBI.
6. The Minimum contract value shall not be less than Rs.2 Lakh. Exchange should also submit details of the futures contract they purpose to introduce.
7. The trading members are required to have qualified approved user and sales persons who have passed a certification programme approved by SEBI.

2.6 Introduction to futures and options

In recent years, derivatives have become increasingly important in the field of finance. While futures and options are now actively traded on many exchanges, forward contracts are popular on the OTC market. In this chapter we shall study in detail these three derivative contracts.

2.7 Forward contracts

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

They are bilateral contracts and hence exposed to counter-party risk.

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

The contract price is generally not available in public domain.

On the expiration date, the contract has to be settled by delivery of the asset.

If the party wishes to reverse the contract, it has to compulsorily go to the same counterparty, which often results in high prices being charged.

However forward contracts in certain markets have become very standardized, as in the case of foreign exchange, thereby reducing transaction costs and increasing transactions volume. This process of standardization reaches its limit in the organized futures market.

Forward contracts are very useful in hedging and speculation. The classic hedging application would be that of an exporter who expects to receive payment in dollars three months later. He

is exposed to the risk of exchange rate fluctuations. By using the currency forward market to sell dollars forward, he can lock on to a rate today and reduce his uncertainty. Similarly an importer who is required to make a payment in dollars two months hence can reduce his exposure to exchange rate fluctuations by buying dollars forward.

If a speculator has information or analysis, which forecasts an upturn in a price, then he can go long on the forward market instead of the cash market. The speculator would go long on the forward, wait for the price to rise, and then take a reversing transaction to book profits.

Speculators may well be required to deposit a margin upfront. However, this is generally a relatively small proportion of the value of the assets underlying the forward contract. The use of forward markets here supplies leverage to the speculator.

2.7.1 Limitations of forward markets

Forward markets world-wide are afflicted by several problems:

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

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

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

2.7.2 Introduction to futures

A Futures contract is an agreement between two parties to buy or sell an asset a certain time in the future at a certain price. To facilitate liquidity in the futures contract, the exchange specifies certain standard features of the contract. The standardized items on a futures contract are:

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

Futures markets were designed to solve the problems that exist in forward markets. A futures contract is an agreement between two parties to buy or sell an asset at a certain time in the future at a certain price. But unlike forward contracts, the futures contracts are standardized and exchange traded. To facilitate liquidity in the futures contracts, the exchange specifies certain standard features of the contract. It is a standardized contract with standard underlying instrument, a standard quantity and quality of the underlying instrument that can be delivered, (or which can be used for reference purposes in settlement) and a standard timing of such

settlement. A futures contract may be offset prior to maturity by entering into an equal and opposite transaction. More than 99% of futures transactions are offset this way.

2.7.3 FEATURES OF FUTURES:

- Futures are highly standardized.
- The contracting parties need to pay only margin money.
- Hedging of price risks.
- They have secondary markets to.

2.7.4 TYPES OF FUTURES:

On the basis of the underlying asset they derive, the financial futures are divided into two types:

❖ Stock futures:

❖ Index futures:

2.7.5 Distinction between futures and forwards

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

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 as they are exchange traded. Above table lists the distinction between the two

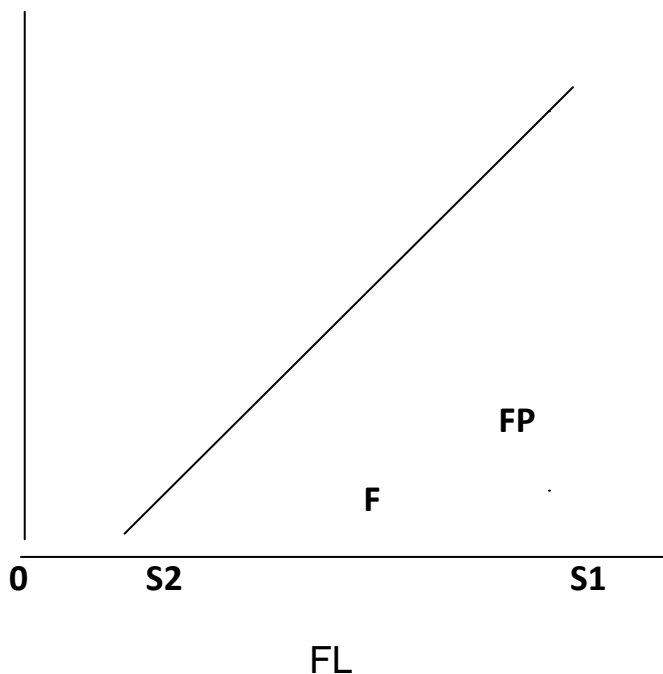
2.7.6 Parties in the futures contract:

There are two parties in a future contract, the buyer and the seller. The buyer of the futures contract is one who is LONG on the futures contract and the seller of the futures contract is who is SHORT on the futures contract.

The payoff for the buyer and the seller of the futures of the contracts are as follows:

2.7.7 PAY-OFF FOR A BUYER OF FUTURES:

PROFIT



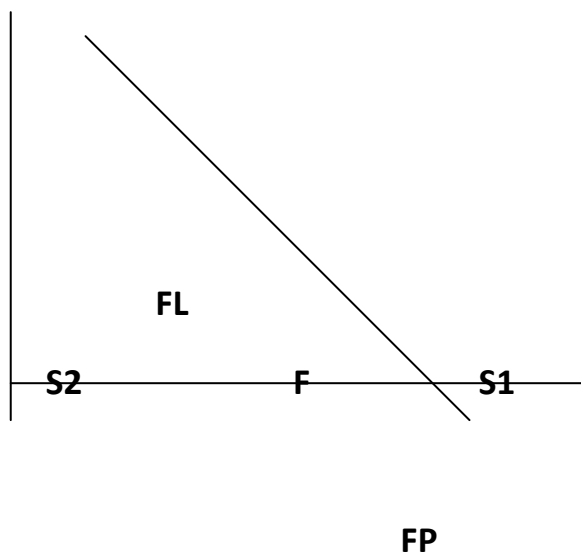
LOSS

CASE 1:-The buyer bought the futures contract at (F); if the future price goes to S1 then the buyer gets the profit of (FP).

CASE 2:-The buyer gets loss when the future price goes less than (F), if the future price goes to S2 then the buyer gets the loss of (FL).

2.7.8 PAY-OFF FOR A SELLER OF FUTURES:

PROFIT



LOSS

F – FUTURES PRICE

S1, S2 – SETTLEMENT PRICE

CASE 1:- *The seller sold the future contract at (F); if the future goes to S1 then the seller gets the profit of (FP).*

CASE 2:- The seller gets loss when the future price goes greater than (F), if the future price goes to S2 then the seller gets the loss of (FL).

2.8 MARGINS:

Margins are the deposits which reduce counter party risk, arise in a futures contract. These margins are collected in order to eliminate the counter party risk. There are three types of margins:

2.8.1 Initial Margins:

Whenever a futures contract is signed, both buyer and seller are required to post initial margins. Both buyer and seller are required to make security deposits that are intended to guarantee that they will in fact be able to fulfill their obligation. These deposits are initial margins.

2.8.2 Marking to market margins:

The process of adjusting the equity in an investor's account in order to reflect the change in the settlement price of futures contract is known as MTM margin.

2.8.3 Maintenance margin:

The investor must keep the futures account equity equal to or greater than certain percentage of the amount deposited as initial margin. If the equity goes less than that percentage of initial margin, then

the investor receives a call for an additional deposit of cash known as maintenance margin to bring the equity upto the initial margin.

2.9 PRICING THE FUTURES:

The Fair value of the futures contract is derived from a model known as the cost of carry model. This model gives the fair value of the contract.

Cost of Carry:

$$F = S(1+r-q)^t$$

Where

F- Futures price

S- Spot price of the underlying

r- Cost of financing

q- Expected Dividend yield

t - Holding Period.

2.10 FUTURES TERMINOLOGY:

Spot price:

The price at which an asset trades in the spot market.

Futures price:

The price at which the futures contract trades in the futures market.

Contract cycle:

The period over which contract trades. The index futures contracts on the NSE have one- month, two –month and three-month expiry cycle 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:

It is the date specifies in the futures contract. This is the last day on which the contract will be traded, at the end of which it will cease to exist.

Contract size:

The amount of asset that has to be delivered under one contract. For instance, the contract size on NSE's futures market is 100 nifties.

Basis:

In the context of financial futures, basis can be defined as the futures price minus the spot price. The 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:

The relationship between futures prices and spot prices can be summarized in terms of what is known as the cost of carry. This measures the storage cost plus the interest that is paid to finance the asset less the income earned on the asset.

Open Interest:

Total outstanding long or short position in the market at any specific time. As total long positions in the market would be equal to short positions, for calculation of open interest, only one side of the contract is counter.

3 INTRODUCTION TO OPTIONS:

3.1 DEFINITION

Option is a type of contract between two persons where one grants the other the right to buy a specific asset at a specific price within a specific time period. Alternatively the contract may grant the other person the right to sell a specific asset at a specific price within a specific time period. In order to have this right. The option buyer has to pay the seller of the option premium

The assets on which option can be derived are stocks, commodities, indexes etc. If the underlying asset is the financial asset, then the option are financial option like stock options, currency options, index options etc, and if options like commodity option.

3.2 PROPERTIES OF OPTION:

Options have several unique properties that set them apart from other securities. The following are the properties of option:

- Limited Loss
- High leverages potential
- Limited Life

3.3 PARTIES IN AN OPTION CONTRACT:

1. Buyer of the option:

The buyer of an option is one who by paying option premium buys the right but not the obligation to exercise his option on seller/writer.

2. Writer/seller of the option:

The writer of the call /put options is the one who receives the option premium and is their by obligated to sell/buy the asset if the buyer exercises the option on him

3.4 TYPES OF OPTIONS:

The options are classified into various types on the basis of various variables. The following are the various types of options.

1. On the basis of the underlying asset:

On the basis of the underlying asset the option are divided in to two types :

- INDEX OPTIONS

The index options have the underlying asset as the index.

- STOCK OPTIONS:

A stock option gives the buyer of the option the right to buy/sell stock at a specified price. Stock option are options on the individual stocks, there are currently more than 150 stocks, there are currently more than 150 stocks are trading in the segment.

II. On the basis of the market movements:

On the basis of the market movements the option are divided into two types. They are:

- CALL OPTION:

A call option is bought by an investor when he seems that the stock price moves upwards. A call option gives the holder of the option the right but not the obligation to buy an asset by a certain date for a certain price.

- PUT OPTION:

A put option is bought by an investor when he seems that the stock price moves downwards. A put options gives the holder of the option right but not the obligation to sell an asset by a certain date for a certain price.

III. On the basis of exercise of option:

On the basis of the exercising of the option, the options are classified into two categories.

- AMERICAN OPTION:

American options are options that can be exercised at any time up to the expiration date, all stock options at NSE are American.

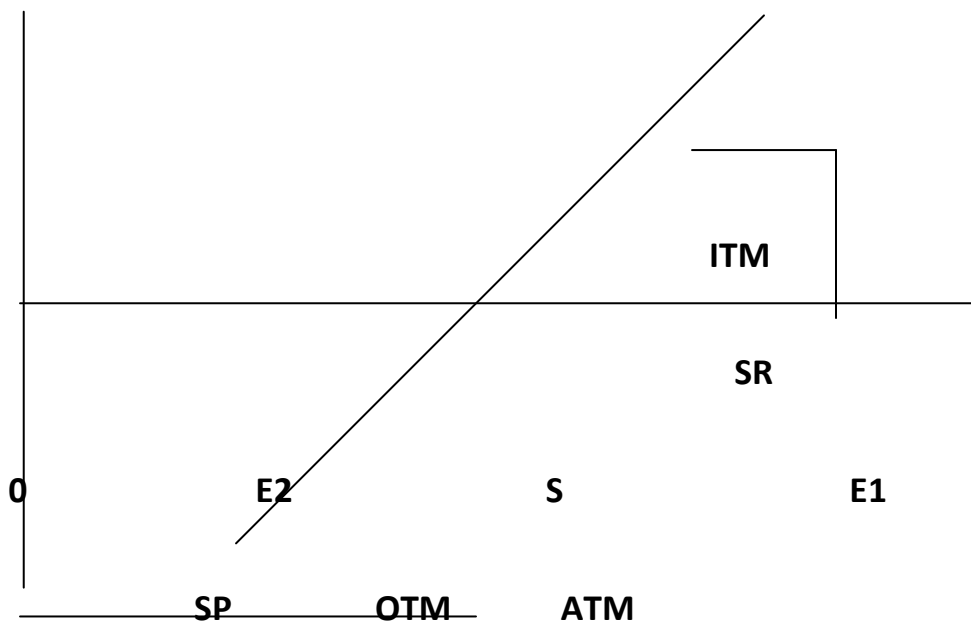
- EUROPEAN OPTION:

European options are options that can be exercised only on the expiration date itself. European options are easier to analyze than American options.all index options at NSE are European.

3.5 PAY-OFF PROFILE FOR BUYER OF A CALL OPTION:

The pay-off of a buyer options depends on a spot price of a underlying asset. The following graph shows the pay-off of buyer of a call option.

PROFIT



LOSS

S - Strike price OTM - Out of the money

SP - Premium/ Loss ATM - At the money

E1 - Spot price 1 ITM - In the money

E2- Spot price 2

SR- profit at spot price E1

CASE 1: (Spot price > Strike price)

As the spot price (E1) of the underlying asset is more than strike price (S). The buyer gets profit of (SR), if price increases more than E1 then profit also increase more than SR.

CASE 2: (Spot price < Strike price)

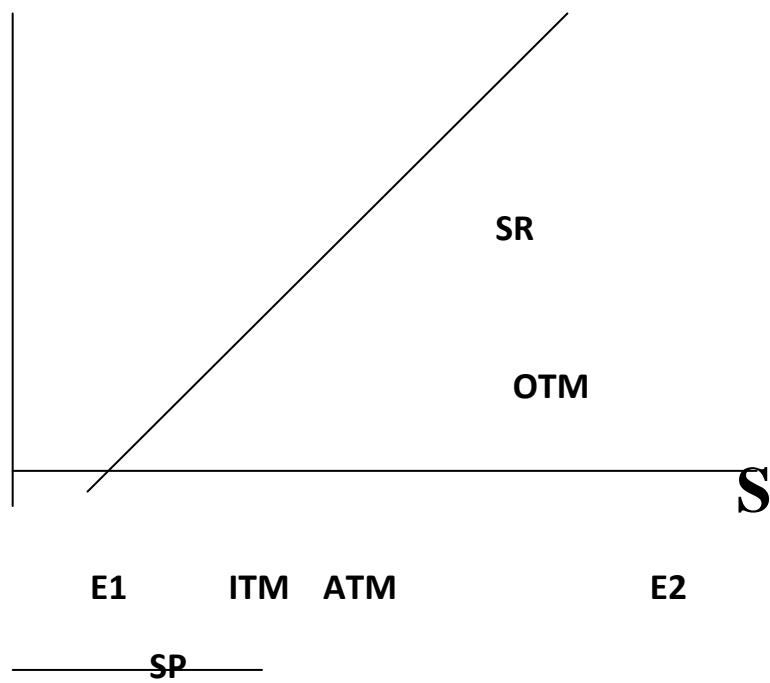
As a spot price (E2) of the underlying asset is less than strike price (s)

The buyer gets loss of (SP), if price goes down less than E2 then also his loss is limited to his premium (SP)

3.6 PAY-OFF PROFILE FOR SELLER OF A CALL OPTION:

The pay-off of seller of the call option depends on the spot price of the underlying asset. The following graph shows the pay-off of seller of a call option:

PROFIT



LOSS

S - Strike price

ITM - In the money

SP - Premium /profit

ATM - At the money

E1 - Spot price 1

OTM - Out of the money

E2 - Spot price 2

SR - Loss at spot price E2

CASE 1: (Spot price < Strike price)

As the spot price (E1) of the underlying is less than strike price (S). the seller gets the profit of (SP), if the price decreases less than E1 then also profit of the seller does not exceed (SP).

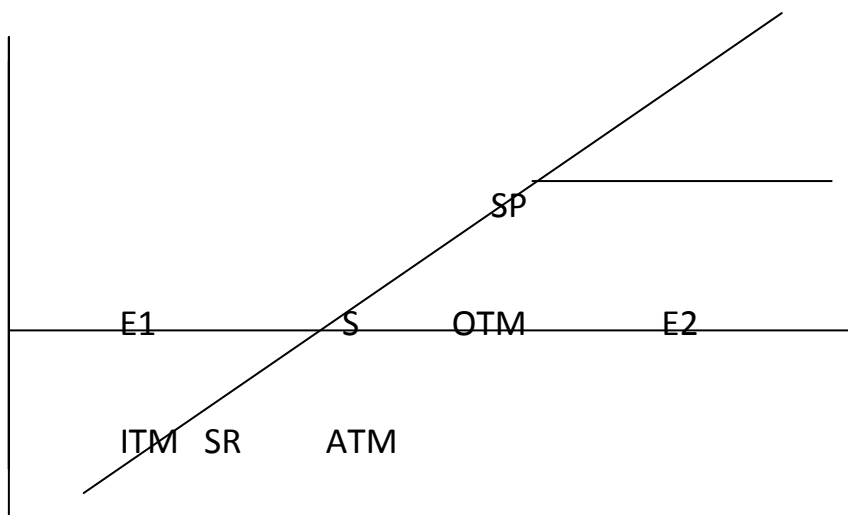
CASE 2: (Spot price > Strike price)

As the spot price (E2) of the underlying asset is more than strike price (S) the seller gets loss of (SR), if price goes more than E2 then the loss of the seller also increase more than (SR).

3.7PAY-OFF PROFILE FOR BUYER OF A PUT OPTION:

The pay-off of the buyer of the option depends on the spot price of the underlying asset. The following graph shows the pay-off of the buyer of a call option.

Profit



loss

S - Strike price

ITM - In the money

SP - Premium /profit

OTM - Out of the money

E1 - Spot price 1

ATM - At the money

E2 - Spot price 2

SR - Profit at spot price E1

CASE 1: (Spot price < Strike price)

As the spot price (E1) of the underlying asset is less than strike price (S). the buyer gets the profit (SR), if price decreases less than E1 then profit also increases more than (SR).

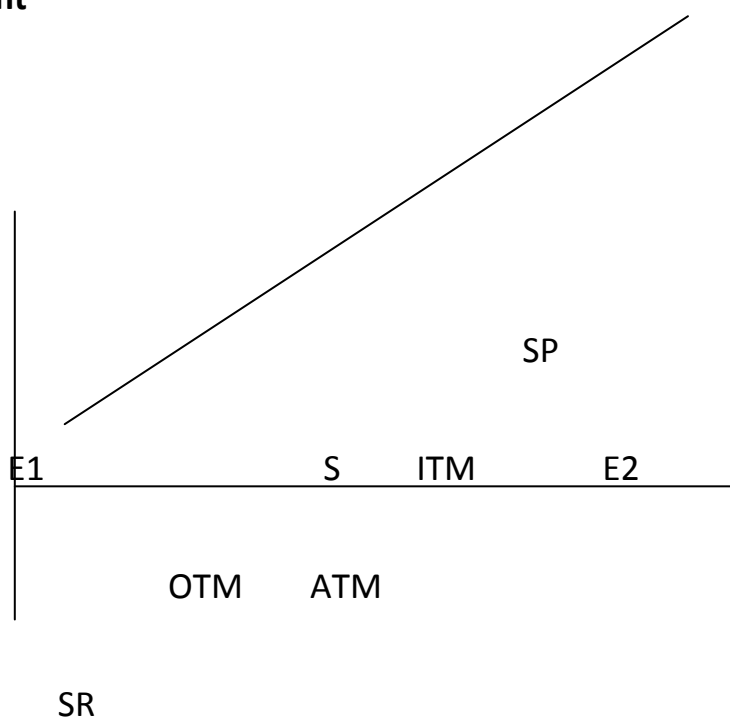
CASE 2: (Spot price > Strike price)

As the spot price (E2) of the underlying asset is more than strike price (s), the buyer gets loss of (SP), if price goes more than E2 than the loss of the buyer is limited to his premium (SP).

3.8PAY-OFF PROFILE FOR SELLER OF A PUT OPTION:

The pay-off of a seller of the option depends on the spot price of the underlying asset. The following graph shows the pay-off of seller of a put option:

Profit



Loss

S - Strike price

ITM - In the money

SP - Premium/ profit

ATM - At the money

E1 - Spot price 1

OTM - Out of the money

E2 - Spot price 2

SR - Loss at spot price E1

CASE 1: (Spot price < Strike price)

As the spot price (E1) of the underlying asset is less than strike price (S), the seller gets the loss of (SR), if price decreases less than E1 than the loss also increases more than (SR).

CASE 2: (Spot price > Strike price)

As the spot price (E2) of the underlying asset is more than strike price (S), the seller gets profit of (SP), if price goes more than E2 than the profit of seller is limited to his premium (SP).

3.9 Factors affecting the price of an option:

The following are the various factors that affect the price of an option they are:

Stock price: The pay –off from a call option is a amount by which the stock price exceeds the strike price. Call options therefore become more valuable as the stock price increases and vice versa. The pay-off from a put option is the amount; by which the strike price exceeds the stock price. Put options therefore become more valuable as the stock price increases and vice versa.

Strike price: In case of a call, as a strike price increases, the stock price has to make a larger upward move for the option to go in-the-money. Therefore, for a call, as the strike price increases option becomes less valuable and as strike price decreases, option become more valuable.

Time to expiration: Both put and call American options become more valuable as a time to expiration increases.

Volatility: The volatility of a stock price is measured of uncertain about future stock price movements. As volatility increases, the chance that the stock will do very well or very poor increases. The value of both calls and puts therefore increase as volatility increase.

Risk-free interest rate: The put option prices decline as the risk-free rate increases where as the prices of call always increase as the risk-free interest rate increases.

Dividends: Dividends have the effect of reducing the stock price on the x- dividend rate. This has an negative effect on the value of call options and a positive effect on the value of put options.

4. PRICING OPTIONS

The black- Scholes formula for the price of European calls and puts on a non-dividend paying stock are:

CALL OPTION:

$$C = SN(D1) - Xe^{-rt}N(D2)$$

PUT OPTION

$$P = Xe^{-rt}N(-D2) - SN(-D2)$$

Where

C = VALUE OF CALL OPTION

S = SPOT PRICE OF STOCK

N= NORMAL DISTRIBUTION

V= VOLATILITY

X = STRIKE PRICE

r = ANNUAL RISK FREE RETURN

t = CONTRACT CYCLE

$$d_1 = \frac{\ln(S/X) + (r + v^2/2)t}{v\sqrt{t}}$$

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

Options Terminology:

Strike price:

The price specified in the options contract is known as strike price or Exercise price.

Options premium:

Option premium is the price paid by the option buyer to the option seller.

Expiration Date:

The date specified in the options contract is known as expiration date.

In-the-money option:

An In the money option is an option that would lead to positive cash inflow to the holder if it exercised immediately.

At-the-money option:

An at the money option is an option that would lead to zero cash flow if it is exercised immediately.

Out-of-the-money option:

An out-of-the-money option is an option that would lead to negative cash flow if it is exercised immediately.

Intrinsic value of money:

The intrinsic value of an option is ITM, If option is ITM. If the option is OTM, its intrinsic value is zero.

Time value of an option: The time value of an option is the difference between its premium and its intrinsic value.

5. Risk Management Using Options

5.1 Hedging

5.1.1. Long Positions (inventory/long futures)

i. **Purchase puts** - Their value increases as that of the actuals decreases. The premium is the only cost of this strategy. The underlying may well increase in value.

ii. **Sell futures** - The short position gains with falling prices and reduces profit on the underlying if values increase.

iii. **Sell calls** - A bearish approach, this strategy is less effective than the previous two as the only gain that inures to the seller is the premium that he or she receives.

iv. **Sell Covered Calls** (Long futures and short calls) - This strategy provides protection for a long position with limited profitability. The strategy is covered as the investor is long futures should the call be exercised. The futures are offset at the strike price. In the call holder does not exercise his or her position, the call writer keep the premium which enhances the position's return because no exercise occurred.

v. **Long Futures and Long Puts** - The investor purchases puts with a strike price at or close to the price he paid for the futures. Should prices decline below the strike price, he may exercise and sell. Should prices rise, the investor loses only the premium, but retains unlimited gain on the long futures position.

5.1.2. Short Positions (short cash market position or anticipated purchase/short futures)

i. **Purchase Calls** - The intrinsic and time value gain in a rising market, offsetting the higher cash market prices. If they decline below the strike price, then the owner has paid for insurance that was not used.

ii. **Purchase Futures** - The value of the contract gains with the increase in value of the actuals.

iii. **Sell Puts** - Doing so is of limited effectiveness as the writer receives only the premium, but has to go to the cash market if prices rise to deliver on the owner's exercise of a put. He or she has to buy, and possibly in a rising market.

iv. **Short Futures and Long Calls** - As upside risk on a short futures position is unlimited, exercising the call if prices exceed the strike price limits the upside on the short position. Should futures prices decline, then the investor has only spent money on the call premium.

v. **Short Futures and Short Puts** - This strategy is of limited use in protecting a short futures position from an increase. As the upside is unlimited, the investor's loss is mitigated only by the premium received.

5.2 Synthetic Options:

5.2.1 Both futures and options may be used simultaneously to create a synthetic options

a. Synthetic Long Call = long futures + long put on the same underlying. Like a long call, prices can increase without restriction. The long put protects the risk of a price decrease. Like a long call, the only cost of this synthetic transaction is the premium for the long put.

b. Synthetic Put = short futures + long call on the same underlying contract. The investor makes money in a declining market. Should prices rise, the long call enables the investor to exercise the option once the underlying exceeds the strike price, effectively "stopping" it on the way up. As with a real put, the sole cost of a synthetic put is the cost of the long call.

c. Conversion: Long Futures + Long Puts + Short Calls. Long futures benefit from rising prices. Long puts protect against falling prices. Short calls furnish premium income. If prices rise and the call is not assigned, the investor makes money. If the call is exercised against her, she has the futures to deliver against the call holder. The strategy helps to secure a futures price and generate premium income greater than the premium paid.

d. Delta Hedging: [Delta](#) measures how volatile an option on futures premium is relative to the underlying, expressed by the formula: change in option premium/Change in futures price. The greater the extent to which the option is in the money, the greater its delta and vice versa. Delta is measured on a continuum from 0 to 1. High delta options are close to one. Deep out of the money options are close to 0. Delta is a metric for hedgers to determine how volatile the underlying is that they are attempting to hedge and the degree to which a hedge might be effective. Knowing the delta helps the investor determine the number of options needed to hedge one's position.

5.2.2 Use of Multiple Options:

These are protective strategies that use more than one option to manage risk and return. These approaches partially hedge as they assume the bullish and bearish sides of the market. If one side rises, the other falls.

a. Spreads - The simultaneous purchase and sale of options of the same class, but of different series (strike prices and/or expiry dates may differ).

1. Call Spreads - An investor purchases a call and sells a call

2. Price (vertical) spread - The strike prices differ.

3. Calendar (time or horizontal) spread - Expiry dates differ.

4. Diagonal - Both price and expiry dates differ.

5. Put Spreads - An investor purchases a put and sells a put.

b. Straddles - This strategy entails the simultaneous purchase (long) of a call and put or sale (short) of a call and put, on the same underlying futures contract. The options have the same strike price and expiration month. The former is profitable when prices of the underlying rise or fall by amounts that exceed the two premia paid; the latter when the underlying prices move by less than the combined premia received.

c. Combinations - There are both long and short strategies of this type, where the investor buys both a call and put or sells both a call and put. They differ from straddles to the extent that the strike prices and/or expiration dates differ.

5.3 Options - Strategies And Risk

1. Risk Parameters of Debit and Credit Spreads

	Debit Call Spread (Bullish)	Debit Put Spread (Bearish)	Credit Call Spread (Bearish)	Credit Put Spread (Bullish)
Description	Buy call with low strike price, sell call with high strike price.	Buy put with higher strike price, sell put with lower strike price.	Buy call with high strike price, sell call with low strike price.	Buy put with low strike price, sell put with high strike price.
Maximum Gain	Futures price equals or exceeds strike price of higher option (in the money)	Futures price equals or is less than put with lower strike price. (in the money)	Net premium received	Net premium received.
Maximum Loss	Net premium (futures prices drops below lower option's strike	Net premium (futures equals or exceeds strike price of higher option)	Strike price –net premium (Futures contract exceeds higher strike price)	Strike price-net premium

	price)			
Break Even	Lower strike price + net premium	Strike price –net premium.	Lower strike price + net premium.	Higher strike price-net premium received.
Profitability	Premium difference widens.	Premium difference widens.	Premium difference narrows	Premium difference narrows

2. Risk Parameters of Straddles

As distinct from spreads where an investor articulates a view on the direction of the market (bullish or bearish), the use of straddles signals a certain degree of ambivalence as the trader is unsure of the market's direction and wants to plan for multiple outcomes.

	Long Straddle	Short Straddle
Description	Purchase of a Call and a Put on the same underlying commodity, expiration month and strike price.	Sale of a Call and a Put on the same underlying commodity, expiration month and strike price.
Maximum Gain	Unlimited	Initial premia received.
Maximum Loss	The premia	Unlimited (the short call)
Breakeven	Two points-one above and one below the strike price. Market price=strike price+/-total premia paid	Two points-one above and one below the strike price. Market price=strike price+/-total premia paid

3. Risk Parameters of Strangles

Similar to a straddle, strangles use different strike prices. Both options are out of the money, requiring more considerable price movement to reach or exceed breakeven. Because both positions are out of the money, this strategy is less expensive.

	Long Strangle	Short Strangle
Description	Purchase both a put and a call. Both are out of the money	Sell a put and a call. Both are out of the money.
Maximum Gain	Unlimited	Premia received
Maximum Loss	Premia paid	Unlimited
Breakeven	Call strike price + premium Put strike price - premium	Call strike price + premium Put strike price - premium

Guts: the purchase in the money calls and puts. The call strike price is lower than the put strike price. As both options are in the money, this approach is used much less as it is quite expensive..

5.4 Use options as risk control in volatile conditions

Options are often a better risk management tool than stop orders. A stop order is an order to buy or sell a stock, futures contract or exchange-traded fund when a specific price point is triggered. This helps to establish a defined exit point for the trader. Stop orders become market orders as soon as the security goes beyond the trigger price. Traders who are followers of technical analysis use stop orders at key support and resistance points.

A stop loss order is entered to prevent further loss to a trader's position. As an example, let's say that a trader buys a futures contract on April-16 gold for Rs.2,244 a gm. The trader wants to define their risk to the downside. Let's say that they will not tolerate losses greater than 10% of their investment. The trader can enter a stop loss order at Rs.2,020 a gm. If gold trades below that level, the order becomes a market order and the trader's position is closed out. If the trader shorted the April futures contract, the stop loss order would be placed at Rs.2,468 a gm. The short position is bought back at the market as soon as April gold trades beyond \$2,468 a gm. That trade would require an account of more than Rs.50,00,000/-. If the trader's account was say Rs.12,50,000/- and he wanted to limit his loss to 10% of that account, he would need to place a stop Rs.1,250/- away from the entry less, if he takes into account the real possibility of slippage.

Let's compare stops to the use of options. Take DLF trading at Rs.127 as an example. If a trader buys DLF at Rs.127 they can set up stop loss orders at 5% or 10% below the current market price. That would be Rs.120 or Rs.113.70. They could also buy an DLF March Rs.120 put for Rs.0.54 per share. Listed options contracts generally represent a round lot (100 shares) for stocks and exchange-traded funds. For futures, one option equals one futures contract. This put contract gives the trader the right to sell 100 shares of DLF at Rs.120. If a trader has to pay \$54 for the put contract and pays nothing for the stop loss order, why would any trader ever buy a put?

A couple of reasons: First, what if some terrible news came out on DLF and it opened at Rs.100? The stop loss order would be executed at Rs.100 for a loss of Rs.2,700 (so much for your risk management parameters), while the put that the trader bought would be worth at least Rs.20 per share. Second, there is another and equally compelling reason to use the put over the stop

order. When the trader uses a stop order they are permanently smoked out of their position. Let's say that DLF traded at Rs.119 and then ricocheted back up to Rs.127. The buyer of the put would still be long DLF, while the trader who used a stop order would have a Rs.7 (Rs.700 on 100 shares) loss and would be on the outside looking in.

Let's use the same logic for the trader who shorts DLF at Rs.130. If the trader can only tolerate a 5% loss, they can place a stop loss order above the market at Rs.136.50. The trader also can buy either an DLF March 133 call at Rs.1.10 per share or a March Rs.140 call at Rs.0.20 per share. A call option contract allows the purchaser to buy the stock at either Rs.135 or Rs.140 per share. The less protection provided by the call, the smaller the premium for the call option. If DLF gaps up to Rs.150, the trader who used a stop loss order is then buying their stock back at the Rs.150 level, while the buyer of the Rs.140 call is already Rs.10 in the money. Similarly, if DLF trades at Rs.140 and then drops back down to Rs.127, the call buyer still maintains their short position.

Options work better than stop loss orders for two very important reasons. They don't face the very real risk of slippage when a market blasts through a level congested with many technical based stops, and they can withstand more pressure and maintain the opportunity of the initial positions.

6. DATA ANALYSIS AND INTERPRETATION

ANALYSIS OF L&T:

The objective of this analysis is to evaluate the profit/loss position of futures and options. This analysis is based on sample data taken of L&T scrip. This analysis considered the Jan 2016 contract of L&T. The lot size of L&T is 175, the time period in which this analysis done is from 24-03-2016 to 28.04.16.

Date	Market price	Future price
28-03-16	1236.7	1237.05
29-03-16	1238.7	1239.7
30-03-16	1228.75	1233.75
31-03-16	1267.25	1277
01-04-16	1228.95	1238.75
04-04-16	1286.3	1287.55
05-04-16	1362.55	1358.9
06-04-16	1339.95	1338.5
07-04-16	1307.95	1310.8
08-04-16	1356.15	1358.05
11-04-16	1435	1438.15
12-04-16	1410	1420.75
13-04-16	1352.2	1360.1
14-04-16	1368.3	1375.75
18-04-16	1173.2	1167.85
19-04-16	1124.95	1127.85
21-04-16	1151.45	1156.35
22-04-16	1131.85	1134.5
23-04-16	1261.3	1265.6
24-04-16	1273.95	1277.3
25-04-16	1220.45	1223.85

26-04-16	1187.4	1187.4
27-04-16	1147	1145.9
28-04-16	1141	1146.9

7. OBSERVATIONS AND FINDINGS:

- If a person buys 1 lot i.e. 175 futures of L&T on 28th Mar, 2016 and sells on 28th Apr, 2016 then he will get a loss of $1146.9 - 1237.05 = -90.15$ per share. So he will get a loss of 15861.25 i.e. $-90.15 * 175$
- If he sells on 12th Apr, 2016 then he will get a profit of $1420.75 - 1237.05 = 183.7$ i.e. a profit of 183.7 per share. So his total profit is 32147.5 i.e. $183.7 * 175$.

The closing price of L&T at the end of the contract period is 1146.9 and this is considered as settlement price.

The following table explains the market price and premiums of puts.

- The first column explains trading date
- Second column explains the SPOT market price in cash segment on that date. The third column explains put premiums amounting at these strike prices; 1200, 1230, 1260, 1290, 1320 and 1350.

7.1 Put Option

Date Date	Market price	1200	1230	1260	1290	1320	1350
28-03-16	1226.7	67.85	53.05	41.65	32.25	24.2	18.5
29-03-16	1238.7	74.65	58.45	44.05	32.75	23.85	19.25
30-03-16	1228.75	62	56.85	39.2	30	22.9	18.8
31-03-16	1267.25	100.9	75.55	63.75	49.1	36.55	27.4
01-04-16	1228.95	75	60.1	45.85	34.5	26.4	22.5
04-04-16	1286.3	109.6	91.05	68.25	51.35	38.6	29.15
05-04-16	1362.55	170	143.3	120	100	79.4	62.35
06-04-16	1339.95	140	119.35	100	85	59.2	42.85
07-04-16	1307.95	140	101	74.35	62.05	46.65	33.15
08-04-16	1356.15	160.6	131	110	95.45	70.85	53.1
11-04-16	1435	250.7	151.8	188.9	164.7	130.9	104.55
12-04-16	1410	240	213.5	148	134.9	96	88.2
13-04-16	1352.2	155	150.05	107.5	134.9	66	52.65
14-04-16	1368.3	128.4	140	90	63	78.2	60.95
18-04-16	1322.1	128.4	140	95	67.5	50.2	39.15
19-04-16	1248.85	128.4	60	54	37.95	29.15	19.3
21-04-16	1173.2	52	36.5	26.3	24.45	14.55	9.95
22-04-16	1124.95	44.15	31.05	22.55	12.45	10.35	6.7
23.04.16	1131.85	40.4	22	17.05	12.1	9.45	5.1

24-04-16	1261.3	80.5	62	40.85	24.55	16.15	9.75
25-04-16	1273.95	91.85	61.65	44.8	31.4	20.25	11.35
26-04-16	1220.45	46	25.95	17.45	10.5	4.05	2.95
27-04-16	1187.4	18.65	9.05	4.5	1.4	0.75	0.2
28-04-16	1147	0.45	0.5	1	1.4	0.1	0.2

7.2 CALL OPTION

BUYERS PAY OFF:

- ❖ Those who have purchase call option at a strike price of 1260, the premium payable is 41.65
- ❖ On the expiry date the spot market price enclosed at 1147. As it is out of the money for the buyer and in the money for the seller, hence the buyer is in loss.
- ❖ So the buyer will lose only premium i.e. 41.65 per share.
So the total loss will be 7288.75 i.e. 41.65×175

7.3 PUT OPTION

7.3.1BUYERS PAY OFF:

- ❖ As brought 1 lot of L&T that is 175, those who buy for 1200 paid 44.05 premium per share.
- ❖ Settlement price is 1147

Strike price 1200.00

Spot price 1147.00

53.00

Premium (-) 44.05

8.95 x 175 = 1566.25

Buyer Profit = Rs. 1566.25

Because it is positive it is in the money contract hence buyer will get more profit, incase spot price decreases, buyer's profit will increase.

7.3.2SELLERS PAY OFF:

- ❖ It is in the money for the buyer so it is in out of the money for the seller, hence he is in loss.
- ❖ The loss is equal to the profit of buyer i.e. 1566.25.

7.4 Observation and Findings

- The future price of L&T is moving along with the market price.
- If the buy price of the future is less than the settlement price, then the buyer of a future gets profit.

- If the selling price of the future is less than the settlement price, then the seller incur losses.

8. SUMMARY

- Derivatives market is an innovation to cash market. Approximately its daily turnover reaches to the equal stage of cash market. The average daily turnover of the NSE derivative segments
- In cash market the profit/loss of the investor depends on the market price of the underlying asset. The investor may incur huge profits or he may incur huge losses. But in derivatives segment the investor enjoys huge profits with limited downside.
- In cash market the investor has to pay the total money, but in derivatives the investor has to pay premiums or margins, which are some percentage of total contract.
- Derivatives are mostly used for hedging purpose.
- In derivative segment the profit/loss of the option writer purely depends on the fluctuations of the underlying asset.

9. SUGESSTIONS

- The derivatives market is newly started in India and it is not known by every investor, so SEBI has to take steps to create awareness among the investors about the derivative segment.

- In order to increase the derivatives market in India, SEBI should revise some of their regulations like contract size, participation of FII in the derivatives market.
- Contract size should be minimized because small investors cannot afford this much of huge premiums.
- SEBI has to take further steps in the risk management mechanism.
- SEBI has to take measures to use effectively the derivatives segment as a tool of hedging.

10. CONCLUSION

- In bullish market the call option writer incurs more losses so the investor is suggested to go for a call option to hold, whereas the put option holder suffers in a bullish market, so he is suggested to write a put option.
- In bearish market the call option holder will incur more losses so the investor is suggested to go for a call option to write, whereas the put option writer will get more losses, so he is suggested to hold a put option.
- In the above analysis the market price of L&T is having low volatility, so the call option writer enjoys more profits to holders.

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