CHAPTER – I
THE CONCEPTUAL FRAMEWORK OF RISK AND DERIVATIVE INSTRUMENTS

1.1 Risk: Conceptual Framework

Every business, individual, portfolio investments and the by-products of underlying assets, contracts are exposed to risk of one or the other type i.e. uncertainty/deviation or less than expected returns.

Every prudent investor and portfolio manager runs the investments by analysing and assessing the quantum/volume of risk (particularly the Non-systematic risk) and by taking steps in the name of financial engineering or risk management. The present plethora of capital market terminologies and mechanics are widely used by the financial investment market players in various ways. However, every kind of effort made by the investment analyst to reduce down the risk propensity is known as risk managing activity. That is why interested participant in the field of capital market should make himself/herself acquainted with the concept of risk very clearly, *ab initio*.

In fact the uncertainty associated with the outcome of an event that leads to loss or return less than expected is known as risk. From a mathematical perspective one could say that risk is the variation of outcomes from an expected return.

1.1.1 Risk: Meaning

Risk has its synonyms like uncertainty and deviations. Concept of risk is to be distinguished from the terms *'Peril'* and *'Hazard'***.** Peril is defined as the cause of loss, for example Rama's car is damaged in a collision with Ramesh's Car, and collision is the peril or cause of loss whereas a condition which creates the chance of a loss is termed a *'Hazard'*. Hazards can be action of three types Physical, Moral and Morale. Physical Hazard means hazards of physical property of assets, which is visual but intentional. Morale is the character of the individual which can cause the risk may be non-visual yet deliberate. Third category of hazard is Morale i.e. not doing prudent

action or to remain in state of indifference and carelessness, which can also cause loss.

1.1.2 Financial Risk: Meaning

In finance, risk is the probability that an investment's actual return will be different than expected. This includes the possibility of losing some or all of the original investment. The standard deviation of the historical returns or average returns of a specific investment is regarded as historical measure of risk. Financial risk may be market-dependent, determined by numerous market factors or operational, resulting from fraudulent behaviour also.

It is to be noted that in finance literature, risk has no one definition, but some theorists have defined quite general methods to assess risk as an expected after-the-fact level of regret. Such methods have been uniquely successful in limiting interest rate risk in financial markets. However, these methods are difficult to implement on newer financial products. Difficulties also arise such as on disclosure, valuation, transparency and purposes of such transactions. In particular, it is not always obvious if such financial instruments are *"hedging"* (purchasing/selling a financial instrument specifically to reduce or cancel out the risk in another investment) or *"speculation"* (increasing measurable risk and exposing the investor to catastrophic loss in pursuit of very high windfalls that increase expected value).

Thus, the fundamental idea in finance is the relationship between risk and return. The greater the potential return one might seek, the greater the risk that one generally assumes. A free market reflects this principle in the pricing of an instrument: *strong demand for a safer instrument drives its price higher (and its return proportionately lower), while weak demand for a riskier instrument drives its price lower (and its potential return thereby higher).*

1.1.3 Financial Risk: Types

Financial Risk can be categorized into pure and speculative depending upon whether they are static, dynamic or subjective/objective.

1.1.4 Distinction between Pure and Speculative Risk

- Pure risk are generally insurable while speculative are not.
- Under pure risk law of average and normal distribution apply while in that of speculative risk no such law can be applied

- Pure risks do not do well to society whereas speculative risk can do well to a sector of society.

1.1.5 Categories of Risks

1) **Market Risk:** is the uncertainty of a firm value that is associated with movements in an underlying source of risk. For example, firm might be concerned about movements in interest rates, foreign Exchange rates, Stock prices or commodity prices.
2) **Credit Risk:** Any party that have to receive obligatory payment in future faces this risk of default.
3) **Accounting Risk:** Accounting risks basically originate from contravention difference in interpretation of basic accounting postulates and thus consequent affect on Net Profit.
4) **Tax Risk:** Tax risk is the risk that the interpretation possibility of taxing a transaction in two different manners creates this risk.
5) **Regulating Risk:** Annulment of trade, allegation of manipulating the prices, imposition of penalties, suspension of business, regulatory arbitrage etc. are few example of regulating risk.
6) **Operational Risk:** is the risk of a breakdown in the operations of the derivatives such as power failure, computer problems such as various, software bugs, and the failure of staff to monitor and record transactions properly.
7) **Model Risk:** It is the risk that in pricing a financial instrument, such as a derivative, the firm will use an inappropriate model or models using incorrect inputs or programme being used having bugs and errors. For example a customer wants to buy a 3 year American put options on the S&P 500, yet the present index be a, the exercise price be at the risk free rate is 6% the volatility be 18%, the dividend yield 1.5. If we use the Black –Scholes model value of call comes to 88.05. But if we use the Binomial model value obtained is 111.82. Thus the error is over 20%.
8) **Liquidity Risk:** is the risk that a firm will need to enter into a derivatives transaction and find that the market for the transaction is so thin that the price includes a significant discount for that liquidity. Thus most plain vanilla

derivatives have little risks as compared to exotic transactions having lesser liquidity and higher risk.

9) **Legal Risk:** is the risk that the legal system will fail to enforce a contract. This risk can effectively turn a swap into options, because the counter party simply walks away without paying if the market moves against it as the defender may assume there is hardly any law that can enforce recovery from him.
10) **Settlement Risk:** can arise out of Bankruptcy, insolvency or fraud of the counter parties. Some times it may result due to govt. policies, particularly in case of foreign exchange.
11) **Systemic Risk:** When one company default, it could trigger the default of one of its creditors, which could trigger further defaults. These effects can ripple through the entire financial system, leading to widespread panic and a meltdown of the whole system. This is called systemic risk.

1.1.6 Risk Standard Working Group

A very comprehensive standards pertaining to risk was developed by the RSWG of New York, some of which are as follows:

Standard 7 - Understanding of Identification of Key Risks

Risks should be analysed to determine relevancy. This entails understanding strategies and their vulnerabilities, as well as assumptions built into an instrument, system, process, model or strategy. Key risks should be reviewed periodically as well as when significant events occur.

Standard 8 - Setting Risk Limits

Risk limits should be set for the aggregate portfolio and all individual portfolios. These may include limits on asset classes, individual instruments and specific types of risk.

Standard 12 - Risk Measurements and Risk /Return Attribution Analysis

The Primary and Manager Fiduciaries should regularly measure relevant risks and quantify the key drivers of risk and return.

1.1.7 Application of Options as Risk Management Tools

An option is a contract that gives the buyer the right, but not the obligation, to buy or sell an underlying asset at a specific price on or before a certain date. An option, just like a stock or bond, is a security. It is also a binding contract with strictly defined terms and properties. There are two types of options which are calls and puts. A call

gives the holder the right to buy an asset at a certain price within a specific period of time. Calls are similar to having a long position on a stock. Buyers of calls hope that the stock will increase substantially before the options expire. On the other hand, a put gives the holder the right to sell an asset at a certain price within a specific period of time. Puts are very similar to having a short position on a stock. Buyers of puts hope that the price of the stock will fall before the options expire.

There are four types of participants in options markets depending on the position they take:

- Buyers of calls
- Sellers of calls
- Buyers of puts
- Sellers of puts

One who buys options is called holders and those who sell options are called writers. Buyers are said to have long positions, and sellers are said to have short positions. It must be noted that Call holders and put holders (buyers) are not obligated to buy or sell. They have the choice to exercise their rights if they choose. But, Call writers and put writers (sellers), however, are obligated to buy or sell. This means that a seller may be required to make good on a promise to buy or sell.

The price at which an underlying stock can be purchased or sold is called the strike price. This is the price a stock price must go above (for calls) or go below (for puts) before a position can be exercised for a profit. All of this must occur before the expiration date.

For call options, the options is said to be in-the-money if the share price is above the strike price. A put option is in-the-money when the share price is below the strike price. The amount by which an option is in-the-money is referred to as intrinsic value.

The total cost (the price) of an option is called the premium. This price is determined by factors including the stock price, strike price, time remaining until expiration (time value) and volatility.

1.2 Derivatives in India

The Security Contract (Regulation) Act 1956 was amended in December 1999 to include derivatives within the ambit of `securities' and the regulatory framework was developed for governing derivatives trading. Derivatives were formally defined to include:

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

Derivatives trading commenced in India in June 2000 after SEBI granted the final approval to this effect in May 2000. SEBI permitted the derivative segments of two stock exchanges, viz NSE and BSE, and their clearing house/corporation to commence trading and settlement in approved derivative contracts. To begin with, SEBI approved trading in index futures contracts based on S & P CNX Nifty Index and BSE-30 (Sensex) Index. This was followed by approval for trading in options based on these two indices and options on individual securities. The trading in index options commenced in June 2001 and trading in options on individual securities commenced in July 2001.

Futures contracts on individual stock were launched in November 2001. Derivative contracts are traded and settled in accordance with the rules, byelaws, and regulations of the respective exchanges and their clearing house/ corporation duly approved by SEBI and notified in the official gazette.

1.2.1 Derivative Products in Indian Market

Various derivatives products are described below:

- **Forward -** "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.
- **Futures -** "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. Futures contracts are special types of forward contracts in the sense that the former are standardized exchange-traded contracts.

- **Options -** "Options contract" gives the right, but not the obligation, to buy or sell a specified quantity of the underlying at a fixed exercise, on or before, the expiration date. A call options gives the right to buy and a put options gives the right to sell.
- **Swaps -** "Swaps" are private agreements between two parties to exchange cash flows in the future according to a pre-arranged formula. The two commodity used swaps are interest rate swaps and currency swaps.
- **Warrants -** Options generally have lives of up to one year; the majority of options traded on options exchange having a maximum maturity of nine months. Longer-dated options are called warrants and are generally traded over-the-counter.
- **Leaps -** The acronym LEAPS means Long-Term- Equity Anticipation Securities. These are options having a maturity of up to three years.
- **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. Rather than have calls and puts, the swaptions market has receiver swaptions and payer swaptions. A receiver swaption is an option to receive fixed and pay floating. A payer swaption is options to pay fixed and receive floating.

1.2.2 Trading of Derivatives in Indian Secondary Capital Market

The emergence of the market for derivative products such as futures and forwards can be traced back to the willingness of risk-averse economic agents to guard themselves against uncertainties arising out of price fluctuations in various asset classes. Through the use of derivative products, it is possible to partially or fully transfer price risks by locking in asset prices. However, by locking in asset prices, derivative products minimize the impact of fluctuations in asset prices on the profitability and cash flow situation of risk-averse investors. This instrument is used by all sections of businesses, such as corporate, SMEs, banks, financial institutions, retail investors, etc.

According to the International Swaps and Derivatives Association, more than 90 percent of the global 500 corporations use derivatives for hedging risks in interest rates, foreign exchange, and equities. In the over-the-counter (OTC) markets, interest rates (78.5%), foreign exchange (11.4%), and credit form the major derivatives,

whereas in the exchange-traded segment, interest rates, government debt, equity index, and stock futures form the major chunk of the derivatives.

In India, Derivatives and New Products Departments (DNPD) of SEBI is concerned with supervising trading at derivatives segments of stock exchanges, introducing new products to be traded and consequent policy changes. A brief discussion of the trading of derivatives products in Indian secondary capital market is discussed in the forgoing paragraphs.

1.2.2.1 Main Features

- India has equity futures contracts in the form of Index Futures as well as Individual Stock Futures on selected stocks.
- The futures contracts are available for three durations (or expiration periods), viz., 1 month (near-month contract), 2 months (next-month contract) and 3 months (distant-month contract).
- If the near-month contract matures in January, it is identified as January Futures. The subsequent ones will be known as February, March Futures, etc.

1.2.2.2 Settlement Day

The settlement of an expiring contract takes place on the last Thursday of the concerned month. As one contract expires, a new 3-month contract is made available from the next day. Thus, at any one time, contracts of three different durations are available for trading.

1.2.2.3 Build Up of Trading

We have traced the build-up of trading in a new contract from its beginning till its expiry. The build-up is very slow during the first two months of a new contract. The contract has very little liquidity and very few participants during this period.

1.2.2.4 Near-Month Contract Dominates Trading

Actually speaking, the great bulk of trading in equity futures remains concentrated in the "near-month" contract, i.e., the contract which is about to mature. The other contracts have very little trading. As a consequence, it is almost impossible to execute a trade during the initial two months of a new contract.

The trading in the "near-month" contract builds up quickly during the first two weeks of this month and then reaches a plateau and finally decline in the last week preceding

the contract's expiry. These changes get reflected in the volume of "open interest," as explained below.

1.2.2.5 Open Interest

Open interest refers to the total number of contracts, which remain outstanding at any particular time. When Mr. S sells one contract to Mr. B, open interest equal to one contract will be created. In market parlance, Mr. S (the seller) is said to have a "short position and Mr. B (the buyer) will be having a "long" position.

As trading builds up with the selling of more contracts, the open interest also goes on increasing. The bulk of such open interest relates to the near-month contract.

When the contract's expiry date draws near, the open interest falls sharply because the market players square up their positions by reversing the trades.

Many of them take a position in the subsequent month's contract. At the beginning of the month and for many days into the month, the open positions are almost wholly for the near-month contract. The "next month" and the "distant month" have only a small volume of open positions.

As open positions for the expiring month are squared up, new positions are opened for the subsequent month. By rolling over their open positions from near-month contract to next-month contract and so on, the traders can maintain their total open positions for almost any length of time. The bulk of open positions get rolled over in this way.

Typically, out of the monthly total trading volume in stock futures, roughly 70-80% is accounted for by the near-month contract. The pattern of open positions as well as of trading volume indicates very high concentration in the near-month contracts.

1.2.2.6 Day Trading

The great bulk of trading in stock futures is day trading and the holding period is rarely more than a few days of, at the most, a few weeks till contact expiry.

If we look at open positions in each of the three contracts on the same stock at the beginning of any month, the near-month contact typically accounts for around 99% of the combined open positions in all the three futures contracts available on a stock. In any case, the near-month contract always overwhelmingly dominates the futures open positions.

1.2.2.7 Rolling Over of Position to Next Month

The process of rolling over of open positions by traders from the near-month into the following month gathers momentum only a few days before the contract expiry date. As the month progresses, while the open position of the near-month contract decline, the open position of the other two contracts (especially that of the next-month contract) increases.

1.2.2.8 Upper Limit to Futures Price

It may be noted that the futures contract price may exceed the spot price up to a certain limit. This limit is set by the cost of carrying. In the case of commodities, the warehousing and insurance costs could be an important part of the carrying costs, in addition to the interest costs on the funds locked up in holding stocks of commodities. Our discussion has indicated that the futures price is normally higher than the cash market price. Also, the price of the more distant futures contract will be higher that the price of the futures maturing earlier.

Under abnormal conditions or due to special factors, the futures contract price may lie below the spot price. In the case of commodities, it is often due to seasonal factors. The phenomenon of the futures price being lower than the spot price is called backwardation.

1.2.3 Role of Arbitrage in Aligning the Future and Cash Market

Arbitrage is basic to pricing of derivatives. Infact, pricing of derivatives is done by arbitrage. In other words, there are basic economics that dictates relationship between the price of the spot and the price of futures. If this relationship is violated, then an arbitrage opportunity is available, and when people exploit this opportunity, the price reverts to its economic value.

Without arbitrage, there would be no market efficiency in the derivatives market - prices would stay away from fair value all the time. Indeed, a basic fact about derivatives is that the market efficiency of the derivatives market is inversely proportional to the transactions costs faced by arbitrageurs in that market.

When arbitrage is effective, market efficiency is obtained, which improves the attractiveness of the derivatives from the viewpoint of users such as hedgers or speculators.

In most countries, there are bigger arbitrage opportunities in the early days of the futures market. As larger resources and greater skills get brought into the arbitrage business, these opportunities tend to vanish.

1.2.3.1 Examples of Arbitrage

We assume the following:

Prevailing Share Price of X Ltd. on 01-03-2010
= Rs. 600 per share

Prevailing Futures Price of the share = Rs. 615

Expiration Date = 27-03-2010

If the Interest Rate is 1.0% per month, the cost of carry (interest plus depository/warehousing charges) for the period involved will be approximately Rs. 6. Arbitrage operation between spot and futures will be as follows:

(a) Buy the share on spot basis at Rs. 600 by borrowing Rs. 600 at 1% p.m.
(b) Sell futures expiring around the month-end at the prevailing price of Rs. 615.
(c) Hold the shares till expiry date of futures (i.e. 27-03-2010).
(d) Settle the futures by giving delivery and receiving the price of Rs. 615.

Computation of net from arbitrage:

Spot purchase price	=	Rs. 600
Add carrying cost	=	Rs. 6
Total cost	=	606
Prevailing futures price	=	615
Hence, Net Profit (615 - 606)	=	9

1.2.4 Relationship of Futures Price to Cash price

The cash price of an asset at the present time and its price in the future at a given time are closely linked to each other by the cost of carry, i.e., the cost incurred in holding the asset from the present moment till the given future date.

1.2.5 Basis

Normally, the futures price of a stock of a stock is higher that the cash price by an amount approximately representing the carrying cost. Such carrying cost includes interest cost and warehousing costs. In other words:

Futures Price = Cash market price + interest cost +

a. Depositary / warehousing charges for
b. The holding period till the contract's expiry

If the equation given above were not satisfied (i.e., the futures price is higher or lower than what is justified), it would indicate that there is a discrepancy between the futures market and the cash market.

The difference between the futures price and the cash market price goes on narrowing and finally disappears on the expiration date. On the contract expiry date, the futures price and the cash price must converge, i.e. become identical.

The difference between futures price and cash price is known as "basis" in market parlance. If the difference is more than what is justified by the carrying cost, as defined above, and then market forces in the form of arbitrage operations would come into play and rectify the anomaly, as illustrated below. For example, in cash segment rate of TATA Steel is Rs. 616/- per share whereas in future segment it is Rs. 619/- per share. This difference of rupees 3 is basis.

1.2.6 Contango and Backwardation

The futures price is normally higher that the spot (i.e. cash) price by the amount of carrying cost. This kind of situation is described as *Contango* in market parlance. If the futures price is lower than the spot price, the situation is described as backwardation and is regarded as abnormal.

We have explained above that the operations of arbitrageurs are helpful in ensuring proper alignment between the futures market and the cash market.

So long as arbitrage operation can yield a profit, the futures price and the cash price are not fully aligned to each other. Hence, arbitrageurs will continue to take advantage of this situation. As a result, the discrepancy between the futures and the cash market prices will go on narrowing and will ultimately be removed. The arbitrage activity will cease when it ceases to be profitable.

1.2.7 Cash Market is the Anchor

It is the cash market, which determines the direction of the futures market for an asset. In an efficiently functioning market, the fundamental forces of demand and supply determine the price. If the cash price rises, the futures price will also generally rise to a similar extent under normal conditions. The prices of futures are kept aligned with cash market prices by the possibility of profitable arbitrage, as explained earlier.

1.3 Mechanism of Futures Trading

For buyers or sellers futures trading is an agreement between a buyer and a seller obligating the seller to deliver a specified asset of specified quality and quantity to a buyer on a specified date at a specified place and the buyer, in turn, is obligated to pay to the seller a pre-negotiated price in exchange of the delivery. However, for speculators futures trading is a process under which sellers make promises to deliver something they don't have; and buyers promise to accept delivery of something they don't want- and both legally break their promises. Here profit maximization is the prime objective of the speculator while loss minimization is hedger's aim. Both speculators and hedgers seldom allow future contracts to mature, by nullifying the contract with reverse sale or purchase of contracts. The main features of the mechanism of future trading in India are discussed below.

1.3.1 The Futures Segment

For futures or derivatives trading, the stock exchange has to create a separate segment, as required by SEBI regulations. This segment is called Futures & Options (F&O) segment.

1.3.2 The Clearing Corporation

In the modern system, the Clearing Corporation serves as a crucial part of the mechanism of futures market for ensuring its smooth functioning and it guarantees that all the participating traders will honor their obligations. It serves this role by interposing itself as counterparty to every trade-it adopts the position of buyer to every seller, and the position of seller to every buyer but does not itself trade. It is a passive partner in the trading system. Every trader in the futures market has obligations only to the Clearing Corporation with regard to payments as well as deliveries.

Actually, the number of contracts bought will always be exactly equal to the number of contracts sold. Hence, for every party expecting to receive delivery, the opposite trading party must be prepared to make delivery. Such matching is carried out through the Clearing Corporation and nay difference has to be immediately resolved.

1.3.3 Stringent Requirements of the Futures Market

The futures market is subject to more stringent requirements than is the case with the cash market. The brokers/members of the erstwhile stock exchanges neither were nor automatically made members of the futures (derivatives) segment. This is because much stricter *eligibility* conditions with regard to net-worth were laid down for admission to the futures segment to the stock exchange compared to the cash segment.

1.3.4 Clearing and Non-Clearing Members

In order to somewhat ease the constraint on participation due to high net-worth requirement, the L.C. Gupta Committee on Derivatives had suggested a two-level system of members, to be called *Clearing Members and Non-clearing Members*. The non-clearing members are now called Trading Members. The net-worth requirement for the Clearing Members is higher than for trading members. The Trading Members can trade their own behalf and on behalf of their clients but they have to depend on the Clearing Members for settlement of trades. The Clearing Members take the responsibility for the Trading Member's position so far as the Clearing Corporation is concerned. The Clearing Members are thus the guarantors for the Trading Members. An investor accesses the market through a broker/member who may be a clearing member or a non-clearing member.

All the members of the derivatives exchange are compulsorily require collecting initial and mark-to-market margins from their clients. The mark-to-market margins (which are explained below) have to be collected before the next day's trading starts. This is necessary because of the high leverage and therefore high risk involved in derivatives trading.

1.3.5 Mark-to-Market System

Every transaction involves two parties, viz., the buyer and the seller. Any price-change affects the buyer and the seller in opposite ways. In market parlance, the buyer has a "long" position, and the seller has a "short" position. If price rises subsequent to purchasing of futures, the buyer will gain and the seller will lose. On the other hand, if

price falls, the buyer will lose and the seller will gain. Gains made by a person are credited to his margin account, while losses are debited. Daily mark-to-market means that gains and losses are settled every day by actual payment before the next day's trading starts.

1.3.6 Eligibility for Listing on Derivatives Segment

The number of shares, which are allowed to be traded in the futures segment, is only a fraction of the shares traded in the cash market because of much stricter eligibility criterion. Shares for inclusion in derivatives trading are chosen from amongst the top 500 stocks in terms of average *daily market capitalization* and average daily traded value.

1.3.7 Contract Size and Lot Size

The minimum contract size in the futures segment in India is Rs. 2 lakhs. The minimum contract value can be converted into lot size, i.e., the number of shares represented by one contract. The lot size is determined at the time of introducing a contract and is based on the then prevailing share price. For example, if shares of XYZ Ltd. are quoted at Rs. 1000 each and the contract size is Rs. 2 lakh, the lot size will be 200 shares (i.e. 200, 000÷1000). Such lot sizes are adjusted based on the market price of underlying so as to maintain the value close to Rs. 2 lakh.

1.3.8 Low Initial Margins, High Leverage

A person who buys a futures contract has to pay only the initial margin on the contract. This margin varies from one share to another, depending on the volatility of the security. The initial margins are fixed by the stock exchanges in such a manner that they are large enough to cover the worst case of one-day loss with 99% probability over a specified time horizon.

1.4 History of Options

Although options have existed for a long time, they were traded OTC, without much knowledge of valuation. The first trading in options began in Europe and the US as early as the seventeenth century starting for Tulip Bulb. It was only in the early 1900s that a group of firms set up what was known as the put and call Broker and Dealers Association with the aim of providing a mechanism for bringing buyers and sellers together. If someone wanted to buy options, he or she would contact one of the member firms. The firm would then attempt to find a seller or writer of the options

either from its own clients of those of other member firms. If no seller could be found, the firm would undertake to write the options itself in return for a price.

The market for options developed so rapidly that by early '80s, the number of shares underlying the options contract sold each day exceeded the daily volume of shares traded on the NYSE. Since then, there has been no looking back.

1.4.1 New Products in the F & O Segment

The Year 2008 witnessed the launch of new products in the F&O segment of NSE. The Mini derivative (Futures and Options) contracts on S&P CNX Nifty were introduced for trading on January1, 2008. The Mini contracts have smaller contract size than the normal Nifty contract and extend greater affordability to individual investors and help the individual investor to hedge risks of a smaller portfolio. The Long Term Options Contracts on S&P CNX Nifty were launched on March 3, 2008. The long term options have a life cycle of maximum 5 years duration (w.e.f. 28/05/2010) over a longer duration, without needing to use a combination of shorter term options contracts.

Besides these, on March 18th, 2010 an ETF by the name of Hang Seng Bees was listed over NSE. It is the first ETF listed over NSE to give international exposure to Indian investors. Hang Seng NSE BeES will track Hang Seng Index adjusted for exchange rate. More than 55% holding are in Chinese companies and is idle for diversification as companies relation with Nifty Index is less than 0.64%.

Also, NSE and CME Group, entered in to a cross-listing arrangements, including license agreements covering benchmark indexes for U.S. and Indian equities. They have also entered into a Memorandum of Understanding with respect to other areas of potential cooperation, including related to development and distribution of financial products and services. Under the cross-listing arrangements, the S&P CNX Nifty Index will be made available to Chicago Mercantile Exchange (CME), for the creation and listing of U.S. dollar denominated futures contracts for trading on CME, and the rights to the S&P 500® and Dow Jones Industrial Average™ (DJIA®) will also be made available to NSE for the creation and (subject to regulatory approval) listing of Rupee-denominated futures contracts for trading on NSE. The license to the Nifty 50 from NSE's affiliate India Index Services & Products Ltd. (IISL), which is exclusive to CME Group within the Americas and Europe, is in addition to the existing licensing arrangement between Singapore Exchange Ltd. (SGX) and IISL.

The sublicenses to the S&P 500 and DJIA indexes, which are exclusive to NSE for Rupee-denominated futures contracts traded within India, are being made available via sublicenses from CME Group and each of Standard & Poor's and Dow Jones, respectively.

On March 10th, 2010, National Stock Exchange of India Limited (NSE) and Singapore Exchange (SGX) have signed a Memorandum of Understanding (MOU) to cooperate in the development of a market for India-linked products. Under the MOU, both exchanges aim to explore future collaboration in the expansion, development and promotion of India-linked products and services to be listed on SGX. Subject to regulatory approval, these products may include equity products and other asset classes. The two exchanges also will look into a bilateral securities trading link to enable investors in one country to seamlessly trade on the other country's exchange.

1.4.2 Options Pricing - How Much Cost You Can Pay?

Risk cannot be averted fully. However, risk can be transferred to another party having appetite for the same for a price. Therefore, a question comes 'How much cost you can pay'.

A verity of factors determines the price of options. Once of the main considerations in the value of an options is the behaviour of the underlying stock. Because investors will have veering opinions about how the stock will behave in the future. Individual options traders may also disagree about the value of any given options.

In addition, the value of an option is highly dependent on the amount of time left before the option expires. Because options have a limited lifetime, they are considered wasting assets. In other words, their value decreases as their expiration date approaches.

1.4.3 Intrinsic Value

Part of an options price is composed of intrinsic value; intrinsic value is how far an option is in-the-money. It is calculated by subtracting the options strike price from the stock's market price. An out-of-the-money option has an intrinsic value of zero. For example if RPL is trading at Rs. 58 and the June 55 call is trading at Rs. 4, to calculate the intrinsic value subtracts Rs. 55 from 58, leaving you with Rs. 3 of Intrinsic vale. The remaining Rs. 1 is known as extrinsic or time value.

1.4.4 Time Value

Time value or extrinsic value as it is sometimes called is the amount over intrinsic value that a buyer pays for the options. When buying time value, an options purchaser is buying the possibility that the options will increase in value before it expires. As the option nears expiration its time value decreases toward zero. This will be further explained in the section on theoretical value immediately below.

1.4.5 Theoretical Value

To calculate the theoretical value of options, the Black-Scholes model considers the price of the stock, the options' strike price, the time remaining before expiration, the volatility of the underlying stock, the stock's dividends, and the current interest rate.

Although options may trade for more or less than its theoretical value, the market views theoretical value as the objective standard of an options' value. Because of this, the price of all options will tend toward their theoretical value over time. Formula explained in *Sub-Section 1.4.7.*

1.4.6 The Components of Theoretical Value

- **Volatility -** The volatility of the underlying stock is one of the key factors in determining the value of an option. Often, though not always, as the volatility of a stock increases, so do its options' prices. The difficulty of predicting the behaviour of a volatile stock allows the options seller to command a higher price for the additional risk.
- There are two types of volatility, historical and implied. Historical volatility is a measurement of the stock's movement based on how it has behaved in the past. By contrast, implied volatility is calculated using options prices. In other words, implied volatility is a measurement of the stock's movement as implied by how the market is currently pricing options.
- **Strike Price & Stock Price -** The strike price and the stock price are relevant to the formula since the more in-the money an options is, the more intrinsic value it has. In addition, the more in-the money an options is, the greater the chance it will finish in-the-money, affecting value to the options premium.
- **Dividends -** Dividends are important since the owner of a call options can always exercise his/her right to the stock and receive any dividend it might pay.

- **Interest Rate -** If you buy an options rather than a stock, you invest less money upfront. For example if you buy the RPL June 35 calls for Rs. 5 you only pay Rs. 500 for the right to the stock. If you buy 100 shares of stock for Rs. 38 you invested Rs. 3,800. You can take the Rs. 3,300 that you did not invest in RPL and invest it elsewhere. If you put it in short -term bonds, then you would earn interest. Since you might pay up to Rs. 3299 to save Rs. 3,300, the interest savings is calculated in the value of the options.
- **Days Until Expiration -** As explained above, an option is a wasting asset. Since it wastes a little as each day elapses, the amount of days left in its life is used in the calculation of its remaining value.

1.4.7 The Black-Scholes Options Pricing Formula

The Black-Scholes formulas for the prices of European calls and puts on a non-divided paying stock are:

$$C = SN(d_1) - Xe^{-rt} N(d_2)$$

$$P = Xe^{-rt} N(-d_2) – SN(-d_1)$$

$$\text{Where, } d_1 = \text{In } s/x + (r+ \sigma^2/ 2) T / \sigma \sqrt{T}$$

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

The Black-Scholes equation is done in continuous time. This requires continuous compounding. The `r' that figures in this in In(1 + r).

For example, if the interest rate per annum is 12%, one needs to use In 1.12 or 0.1133, which is the continuously compounded equivalent of 12 % per annum. “N” is the cumulative normal distribution. N(d1) is called the delta of the options which is a measure of change in options price with respect to change in the price of the underlying asset. “q” as measure of volatility, is the annualized standard deviation of continuously compounded returns on the underlying. When daily sigma is given, they need to be converted into annualized sigma.

Sigma annual = sigma daily X Number of trading days per year.

On an average there are 250 trading days in a year.

“x” is the price, “s” the spot price and “t” the time to expiration measured in years.

For example, let’s assume that the price of a stock is Rs. 50, the exercise price is Rs. 45 and the risk-free rate of interest is 6% per annum and that an ex-dividend

adjustment of 2.5 will occur 0.1644 years hence. The volatility of the stock is 20%. The discount rate on dividends is also taken to be 6%. We now have two call options, a long-maturity call options with a maturity of 0.25 years, which can be exercised on the expiration date, and a short-maturity call options with a maturity of 0.166 years which can be exercised just before the ex-dividend date. We will now value both these options.

The details of the long options are: T-0.25, r=0.06, D=2.5, S=50, X=45 and Sd = S - D/(1+r) T = 47.52. The stock price to be used in the Black & Scholes options pricing formula is Sd, the adjusted price of the stock after deducting the present value of the dividends. Using these vales, we get the price of the long options as Rs. 3.84.

The details of the short options are: T=0.166, r=0.06, D=2.5, S=50 and X=45. Note that in this case since the options are exercised just before the stock goes ex-dividend, the unadjusted stock price of Rs. 50 is used. Using these values, we get the price of the short options as Rs. 5.56.

Thus, using the above approximation, the American options on the dividend paying stock would be valued at the higher of the two options, i.e. at Rs. 5.58.

1.4.8 How to Use Options

There are two main reasons for the use options, i.e., to speculate and to hedge. A brief discussion of both is in the next two sub-sections.

1.4.8.1 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 you may have a view that shares prices will fall in the near future. To protect the value of your portfolio from falling below a particular level, buy the right number of put options with the strike price depending upon risk appetite. So when stock prices falls below the strike price, put options will start gaining profit. Consequently value of portfolio and the put options together will not fall below the level of strike price is opted.

1.4.8.2 Speculation: Bullish on Security, Buy Calls or Sell Puts

There are times when investors believe that security prices are going to rise. Using options there are two ways one can do to take length of the reduction:

- Buy call options; or
- Sell put options

The downside to the buyer of the call options is limited to the options premium he pays for buying the options. His upside however is potentially unlimited. Suppose you have a hunch that the price of a particular security is going to rise in a month's 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 options premium.

Which of these strikes 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 upwards not come about.

1.4.9 Settlement of Options Contracts

Options contracts have three types of settlements, daily premium settlement, exercise settlement, interim exercise settlement in the case of options contracts on securities and final settlement.

1.4.9.1 Daily Premium Settlement

Buyer of options is obligated to pay the premium towards the options purchased by him. Similarly, the seller of options is entitled to receive the premium for the options 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 options contract.

1.4.9.2 Exercise Settlement

Although most options buyers and sellers close out their options positions by an offsetting closing transaction, an understanding of exercise can help an options buyer determine whether exercise might be more advantageous that an offsetting sale of the options. There is always a possibility of the options seller being assigned an exercise. Once an exercise of an options has been assigned to an options seller, the options seller is bound to fulfill his obligation (meaning, pay the cash settlement amount in the case of a cash-settled options) even though he may not yet have been notified of the assignment.

1.4.9.3 Interim Exercise Settlement

Interim exercise settlement takes place only for options contracts on securities. An investor can exercise his in the money options at any time during trading hours, through his trading member, interim exercise settlement is effected for such options at the close of the trading hours, on the day of exercise. Valid exercised options contracts are assigned to short positions in the options contracts with the same series (i.e. having the same underlying, same expiry date and same strike price), on a random basis at the client level. The CM who has exercised the options receives the exercise settlement value per unit of the options from the CM who has been assigned the options contract.

1.4.9.4 Final Exercise Settlement

Final exercise settlement is effected for all open in the money strike price options existing at the close of trading hours, on the expiration day of an options contract. All such long positions are exercised and automatically assigned to short positions in options 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 options from the investor who has been assigned the options contract.

1.5 Techniques / Instruments / Ways of risk-mitigation/Minimization

The risk managers follow the heterogeneous types of instruments as techniques to hedge the probable uncertainties pertaining to the situations and requirements. One of the most used and prescribed mechanism is the “Derivative Contracts”. Before reviewing the literature on the issue of research, the researcher plans to delineate on hedging the risk and the concept of derivatives.

1.5.1 Hedging the Risk

In the arena of investment market, the investment managers embrace the techniques of mitigating the probable/expected loss/losses (i.e. risk) and calculate various Greek indicators in the backdrop of hedging the risk. These are:

- Delta
- Gamma
- Theta
- Rho

Delta - In options trading, Delta is the measure of how the value of an option changes with respect to changes in the value of underlying contract. It is typically noted by Greek letter-Delta. Delta (in absolute values, ignoring negative signs) can also be

taken as an approximation of the probability that the options will finish in-the-money. Delta of a call options must be between 0 and 1. Thus,

- Since the value of a call options does not change more quickly than the value of the underlying, the maximum value of delta is 1
- A call options does not move in opposite direction of the underlying, hence delta cannot be negative
- Deep in the money call options have delta at or close to 1
- Far out of money options have delta approximately 0
- At the money cal options have delta value close to 0.5
- Put options have always have negative delta between 0 and –1
- An underlying contract always has delta of 1

Delta Neutral **–** Delta is said to be Neutral when the total delta of the portfolio transaction is 0. Total delta position of the portfolio is the aggregate of the transaction delta and position with offsetting positive and negative deltas. Neutral is also in the sense that the portfolio position is unbiased in terms of direction of any price movement of the underlying contract. If a delta neutral position is maintained by adjusting hedge ratio, the value arbitrage depends on the volatility of the underlying, not the future price action. Thus, it is betting on volatility and not price.

Further, if a portfolio's total delta position is negative then it indicates a downward bias for the underlying future contract price. A negative delta can be considered equivalent to being short in the underlying market, hence exposed to the same directional price risk. Conversely, if a portfolio's total delta position is positive then it indicates an upward price bias. A positive delta can be considered equivalent to being long in the underlying market, hence exposed to the same directional price risk.

In order to establish a neutral or unbiased hedge, for options purchased one must also sell an appropriate number of underlying contracts. The approximate number of contracts is determined by the delta or hedge ratio. This is the basis for delta hedging. Also, if the factor affecting the options valuation changes then the delta of the position will also change. Hence, the delta of options changes as market conditions changes. In order to compensate for this during the life of the options, adjustments need to be made to the underlying futures positions if the portfolio is to be kept delta neutral.

Hedge Ratio - Hedge Ratio is at times used as the term to describe risk management elements other than Delta Hedges (e.g. the amount of an exposure that has been

hedged). The Hedge Ratio (the delta) gives the appropriate ratio of underlying contracts to options required to maintain a neutral hedge. In order to maintain a position near 'delta neutral' level, delta is of zero.

Frequency of Adjustment of the Delta Hedge

Advantage to Professional trader/dealer –It involves lower transaction cost if one can buy at the 'bid rate' and sell at the 'ask rate' but, still some level of transactions cost for commissions or operating costs are involved. Also, degree of precision in infrequent hedge ratio adjustment is observed.

Advantages to Arbitragers – Arbitragers are in a position to arrive at Fair Value (theoretical) Vs. Market Price. However, multiple bets are necessary to reach theoretical fair value.

Techniques of practical trading of Delta

1) Adjusting the hedge ratio by rebalancing the portfolio at regular intervals
2) Using gamma to estimate how delta position is changing
3) The options transaction and associated delta hedges are typically closed-out by:
    a. Selling any options that is in-the-money (or exercising the options into a futures contract and selling the futures)
    b. Trading conventions may differ between exchanges
    c. Any out-of-the money options expiring worthless
4) Liquidating any open futures used for the delta hedge
5) The positions do not necessarily have to be held until maturity, but can be closed out any time based on profit situation of the position and new market expectations

Obstacles and Flaws

Problem in ascertaining transaction costs of hedge ratio adjustments

1) It is having very simplifying assumptions of the options valuation models

Vega – It is measures effect on premium of a change in perceptions of future volatility. Vega is also referred to as Kappa. Thus, it is the degree of change in options value relative to a change in the price volatility of the underlying asset. Traders closely follow Vega since trading options is viewed as trading volatility.

Gamma – Gamma is the rate of change of Delta. It is an indicator of how stable Delta is? If a position or portfolio has a high Gamma, it suggests the degree of volatility in underlying.

Theta – It measures effect on premium of a change in time to expiry. Thus, the degree of change in options value in relation to a change in the time to expiry is Theta. It becomes more important closer to expiry as time value decreases at a faster rate as options expiry date is approached.

Rho – It is the degree of change in options value in relation to a change in interest rates. It is of more importance in very long-term options.

1.5.2 Risk Management - Hedging through Futures

There are a great variety of situations in which a person may feel the need to hedge the price risk through futures. Hedging means protection against some specific risk. We shall give a few simple examples here.

1.5.2.1 Hedging the Risk of Price Decline

If a person holds an inventory of equities, he is exposed to the risk of decline in the market value of his equity holdings. In normal times, most investors are prepared to face this kind of risk. At other times, the risk can be really serious, either due to some important impending economic or political development, or due to the investor's personal financial situation. In such circumstances, the investor may like to hedge the risk.

Suppose that the holder of equities is particularly concerned about uncertainty of equity prices over the next one month. He can hedge the risk of price decline by *selling equity index futures* of one month's maturity. In this way, he can lock-in the prevailing equity prices. Such hedge can be effective in eliminating the price risk, provided the composition of the investment portfolio held by him is at least broadly similar to the composition of the equity index underlying the futures contract used for hedging. If the composition of his portfolio is very different from that of the equity index, the hedge may not be effective at all.

1.5.2.2 Hedging the Risk of Price Rise

We now consider an altogether different kind of situation. Suppose that you are anticipating purchase of equities in a month's time out of the lump sum of around Rs. 200000, which you will be receiving on your retirement. The risk faced by you in such a situation is that, by the time the money becomes available for purchasing equities, the equity prices might raise. If you have to pay higher prices for investing your money, the rate of return, which you will earn on the investment, will come down.

In order to hedge this kind of risk, you can buy equity index futures. How this hedge will work is as follows. In the event of equity prices rising, you will make a profit on the futures contract bought before the equity prices actually raised. This is because the value of the futures contract is linked to the value of the underlying asset, viz., equity shares. If equity share prices rise, the contract's value will also rise.

Hence, the contract's settlement price on its expiry date will be higher that the purchase price paid by you earlier. You will thus earn a profit on the futures contract.

This will help to meet the increase in the cost of the investments, which you had planned to purchase with your retirement funds. This is elaborated below:

You have bought Equity Index Futures contracts at the prevailing price for a sum of Rs. 200000 as a hedge against increase in equity prices. Suppose that the equity prices rise subsequently by 10% on the contract's maturity date. Hence the Equity Index futures contracts held by you will rise in value from Rs. 2, 00,000 to Rs. 2, 20,000. Your gain on the futures contracts will be Rs. 20,000. The cost of purchasing the same portfolio of shares as you had planned will rise from Rs. 2, 00,000 to Rs. 2, 20,000. This additional cost of Rs. 20,000 can be met from the profit of Rs. 20,000 on the futures contracts. You have thus hedged your risk.

1.5.2.3 Hedge in Case of Equities

The hedge will work as follows:

If equity prices over the next one month decline by, say 20% he will lose this much on his equity holdings. At the same time, he will make a profit of 20% on the futures contract which he had locked-in at the higher earlier price. Thus, loss on the equity portfolio will be cancelled out by profit on the equity index futures contract. The whole purpose of hedging is to provide protection against loss.

Similarly, producers of agricultural commodities, such as wheat, very often need hedging the risk of price decline. A wheat farmer, for example, may sell wheat futures at a given price well before the harvest in order to lock-in the prevailing price.

1.6 Problems in Options Trading

Indian financial history can be divided into two periods, Pre- 2001 issues when derivatives not introduced and Post- 2001 issues when derivatives were introduced.

1.6.1 Pre- 2001 Issues

The only Derivative trading available in Indian stock market was in the form of BADLA trading, where in case of specified shares the buyer or the seller could carry

over his trade by pay-in nominal charges, which was used to known as BADLA charges which was generally payable by the buyer of the securities to the seller.

In very rare case, there may be ULTA BADLA whether premium was paid by the seller to the buyer. The problem in the system was:

- There were no financial limits up to, which an individual investor could carry over his trade.
- Similarly, there was no time limit up to, which this trade could be carried out.
- Therefore, these transactions were capable of going forward for years to years.
- Even at the time of book closure there used to be BADLA, which enable the buyer/seller to carry over the trade for next year.
- It was observed that under its process almost 90% the buyer paid BADLA charges to the seller. So the sellers were in a position to inherent strength advantageous position whether they were holding the shares or not could not be matched with their actual positions.
- Although BADLA charges were designed in the form of interest to the seller because of deferment of his payment. Yet rate per settlement period use to vary from ½% to 5%. Thus, it was apparent that these changes were not dependent upon interest but upon the buyers and sellers Net position who wanted to carry over and were totally against small investors who typically buy the shares.
- Determinations of charges from ½% to 5% were done in non-transparent manner and it was not possible for investors or institutions to participate in the BADLA process.
- There was no mechanism of stock lending and borrowing.

1.6.2 Post- 2001 Issues

Volume of options in India in terms of number of contracts and value of contracts, is showing a positive trend yet, these are not comparable to international volume and constitute a minor position of total derivatives volume even in India.

In the quarter ending March 2008, volume in index futures was 45905581(number of contracts) with value of US Million 258412, whereas, in index options it was 12967291(number of contracts) with value of US Million 77644 almost 28.25% in terms of contracts and 30.05% in terms of value of the underlying security.

Similarly, in case of stock futures, volume was 54354423 (number of contracts) with value of US Million 356320, whereas, in stock options number of contracts traded were 1876544 with value of US Million 13627 almost 3.45% in terms of contracts and 3.82% in terms of volume of underlying security.

During the quarter ending March 2009, volume in options in index surpassed the volume of index future. Volume in index future was 53943461 (number of contracts) with US Million 159221 in value, whereas, in index options it was 74138957 (number of contracts) and in value terms it was US Million 235327. In case of stock futures, volume in terms of contracts was 50155198 and, in terms of value was US Million 153403, whereas, in stock options it was 4105432 contracts and US Million 14365 value.

During the quarter ending March 2010, volume of index futures on NSE was 36490936 (number of contracts) with turnover of US Million 198664, whereas, in index options, it was 94253263 number of contracts and notional turnover was US Million 530281, which was 258.29% of the underlying security in terms of number of contracts and 266.92% in terms of value. Similarly, during the same period, volume on stock futures in NSE was 34693093 numbers of contracts, turnover US Million 267541, whereas, in stock options number of contracts were 4054924 and notional turnover was US Million 32031, which was 11.69% of the underlying security in terms of number of contracts and 11.97% in terms of value.

Thus, it is apparent that since introduction, derivatives including options have shown a considerable and steady growth and options in index have started matching the volume of index futures. These were resulted because of:

1) 2008 global melting carried the Sensex from 21078 (January 2008) to 8047.17 (March 2009), a correction of over 62%. This correction was not limited to India but was all pervasive across Europe, America and, other Asian countries. This huge erosion of money forced the investors to think fresh for risk management and hedging techniques of their portfolio. The shortage of investible resources created the need of leveraged trading and, instead of buying the securities, investors' tool to buy right in securities and not the securities.

2) In India, Govt. rationalized the Securities Transaction Tax (STT) and, it was amended to levy on the value of actual premiums and, not on the notional values. This was a substantial reduction in cost.
3) SEBI, NSE also started changing its fee/ charges based on actual value of options instead of notional value.
4) Brokers were also instructed to charge options brokerage on the actual premium and not on notional value.
5) Govt. also allowed trading in interest rate futures and currency futures with four foreign currencies i.e. Euro, British Pound, US Dollar and Yen. This increased the avenues for in-land and overseas hedging.

Index Options:

Thus, with average quarterly volume in terms of number of contracts of 8661 with value of US $ 44 Million in June 2001, it was 55438 numbers of contracts with value US $ 274 Million in June 2002. In June 2005, it increased to 2146302 numbers of contracts with value of US $ 9820 Million. In March 2010, average was 18126963 numbers of contracts with value of US $ 530281 Million. Thus, trend is moving upward continuously.

The same is the case with Stock Options which is also showing positive trend since start in 2001 to 2010.

Despite all these positive initiatives, the options trading could not be adopted by Indian players as a risk management technique. Therefore, the object of this study was *"Risk Management through Options Trading in Indian Market"* with the sub-objectives of:

(i) To measure the acceptability of Derivatives Trade as an alternative to Cash Market.
(ii) Acceptability of options trade as Derivative Product.
(iii) To identify the barriers in options trading.
(iv) Co-relation and Arbitrage opportunities in Cash and Derivatives Market.
(v) Cost of transaction involved in these two markets from investors' point of view.

1.6.3 Comparison with International Market

(i) Number of Contracts *(Index Futures- Appendix-II)* - During quarter ended June 2009, number of contracts traded in India in Equity Index were 51487857 against global all market trade of 581504000 which constitute almost 8.85% of volume, and has shown a steady positive trend.

(ii) Number of Contracts *(Index Options- Appendix-III)* - During quarter ended June 2009, number of contracts traded in India in Equity Index were 72567153 against global all market trade of 1064775000 which constitute almost 6.82% of volume, and has shown a steady positive trend.

(iii) Number of Contracts *(Stock Options- Appendix-IV)* - Despite encouraging and positive trend in volume of derivatives, volume in stock options is very minimal as compared to international volumes. Since, March 2002 to March 2010, stock options contracts volume has not reached even one half percent (0.5%) of the global volume in stock options. In terms of number of contracts volume for the quarter ended June 2009 in India was 2334550 as against global volume of 1440412000 which is mere 0.16% of the global market.

(iv) Turnover in terms of value USD Million *(Equity Index Futures- Appendix-V)* - During quarter ended June 2009, turnover in terms of value USD Million in India in Equity Index Futures were 214692 against global all market turnover of 21121892 which constitute almost 1.02% of volume, and has shown a steady positive trend.

(v) Turnover in terms of value USD Million *(Equity Index Options- Appendix-VI)* - During quarter ended June 2009, turnover in terms of value USD Million in India in Equity Index Options were 317766 against global all market turnover of 22300463 which constitute almost 1.42% of volume, and has shown a steady positive trend.

1.6.4 Impediments in Acceptability of Options Trading in India

It is always argued that options trading are risky or options trading are a high risk investment vehicle and in turn the risk associated with it is blamed for over all less acceptability as hedging/investment tools, here in Indian trading community.

However, the quantum of growth in turnover and number of contracts in both index options and stock options revel different story.

A tremendous growth in options trade has been observed since its introduction in 2001-2002 FY. As shown in Table 1.6.1, a 13592 % growth in total options turnover in million USD term and 18474 % growth in number of contracts was observed since

March 2002 to March 2009. However, it must be noted that Index Options has seen more rapid and voluminous growth than Stock Options. In the same period under Index Options, a 120473 % growth in turnover in million USD term and 99010 % growth in number of contracts was observed as compared to 1182 % growth in turnover in million USD term and 811 % growth in number of contracts was recorded by NSE.

Table 1.6.1 - % Growth in NSE Index and Stock Options Segment

March 2002 to March 2009*

Year	Index Options		Stock Options		Total Options		Total Future/Options	
	No. of contracts	Notional Turnover (Million US$)	No. of contracts	Notional Turnover (Million US$)	No. of contracts	Turnover (Million US$)	No. of contracts	Turnover (Million US$)
March 2002 -March 2009	120473	99010	1182	811	18474	13592	15237	10461

1.6.3*Calculated from data released on NSE website

Similarly when compared with other developed and developing nation for the same period, i.e. since March 2002 to March 2009 it was found that India is experiencing extraordinary growth in trading under options segment also (Table 1.6.2).

Table 1.6.2 - Comparison of % Growth in Number of Contract in Options Trade

March 2002- March 2009*

Particulars	% Growth
Equity Index Options	
India	120473
All markets	133
North America	237
Europe	87
Asia and Pacific	145
Other Markets	9
Equity Stock Options	
India	1182
US	234
Other markets	58

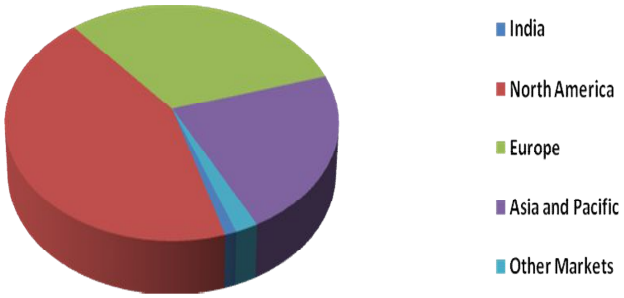
*Compiled from data Released on NSE & BIS Website

However, when compared with rest of the world, the quantum of trade is still lagging behind even Asian and Pacific Region which is shown in Table 1.6.3 and figure 1.6.1 below-

Table 1.6.3: Share of India in World in Turnover (USD Million) of Equity Index Future - June 2009

India	214692
North America	9254934
Europe	6722128
Asia and Pacific	4723207
Other Markets	421623

Fig 1.6.1: Share of India in World in Turnover (USD Million) of Equity Index Future - June 2009



CHAPTER-II
REVIEW OF LITERATURE

After giving the introduction to the options and trading thereof in chapter I, the second step taken by the researcher was the review of the literature pertaining to the derivatives market in India as well as offshore derivative market. The review of literature is required for various purposes like determining the logic of the research work, objective of the study, and application of analytical tools and the modus operandi of interpretation of research. The research survey goes through the following pages.

2.1 Studies on world-over Derivatives Market Literature:

In a study relating to equity index options, Backus, Chernov and Martin (2009) quantify the impact of extreme events on asset returns. An extreme event, according to them, was the departures from normality of the log of the pricing kernel. They showed that high-order cumulants like skewness, kurtosis etc., are quantitatively important in both representative-agent models with disasters and in a statistical pricing model estimated from equity index options. Through their analysis they proved that the impact of options prices provides independent confirmation of the impact of extreme events on asset returns, but they imply a more modest distribution of them.

Ewald (2009) contradicted on Black (1976) options pricing model. He studied forward prices and prices of European call options written on a renewable resource, the price of which was assumed to follow the inverse of a geometric mean reverting process. It was also assumed that the resource is not tradable, until the options matures at time T and evidenced that forward prices do not evolve according to a geometric Brownian motion, but follows a more complex process. He demonstrated that the Black formula needs to be adapted in such a way, that the normal distribution is replaced by a reciprocal – Γ (gamma) distribution, to get at least a very good approximation of the true options price. He was able to derive pricing formulas for options written on forward contracts, and showed how forward contracts can be hedged under the assumption that there is a spanning asset.

Dail & Sundaresan (2009) developed a model of hedge fund returns, which reflect the contractual relationships between a hedge fund, its investors and its prime brokers. These relationships were modeled as short options positions held by the hedge fund, wherein the funding options reflected the short options position with prime brokers and the redemption options reflected the short options position with the investors. Given an alpha producing human capital, the hedge fund's ability to deploy leverage to magnify its alpha is shown to be sharply constrained by the presence of these short options, which have a high probability of being exercised either due to poor performance or due to macroeconomic developments that are performance independent. They showed that the hedge funds typically had an optimal level of leverage that trades off rationally the ability to increase alpha with the risk of early exercise of short options, which may precipitate the liquidation of the fund. Optimal leverage was shown to differ across hedge funds reflecting their de-levering costs, Sharpe ratios, correlation of assets, secondary market liquidity of their assets, and the volatility of the assets. Using a minimum level of unencumbered cash level as a risk limit, they showed how a hedge fund can optimally choose aggregate risk capital and then allocate its risk capital across different risk-taking units to maximize alpha in the presence of these short options positions. They also claimed that their framework can be easily modified to study portfolio selection problem facing any fund, which has granted redemption rights to its investors.

Jessen & Poulsen (2009) in their paper entitled, "Empirical Performance of Models for Valuation and Risk-Management of Barrier Options" studied the empirical performance of alternative models for barrier options valuation and risk management. Five commonly used models are compared namely the Black-Scholes model, the constant elasticity of variance model, the Heston stochastic volatility model, the Merton jump-diffusion model, and the infinite activity Variance Gamma model. They employed time-series data from the USD/EUR exchange rate market, and used plain vanilla options prices as well as a unique data-set of observed market values of barrier options. The different models are calibrated to the plain vanilla options prices and cross-sectional and predicted pricing errors for both plain vanilla and barrier options are investigated. They showed that for the plain vanilla options the Heston model had superior performance both in cross section and for prediction horizons of up to one month, with its closest competitors being the Merton and the Variance Gamma models. For the barrier options, the Heston model had a slightly, but not significantly,

better performance than the continuous alternatives Black-Scholes and constant elasticity of variance, while both models with jumps (Merton and Variance Gamma) perform markedly worse.

Bekkuma, Penningsb and Smit (2009) from Tinbergen Institute, Netherland in their paper showed that the conditionality of investment decisions in R&D had a critical impact on portfolio risk, and implied that traditional diversification strategies should be re-evaluated when portfolio are constructed. According to them the risk of a portfolio depends on the correlation between projects and a portfolio of conditional R&D projects with real options characteristics has a fundamentally different risk than a portfolio of unconditional projects. They concluded that when conditional R&D projects are negatively correlated; diversification only slightly reduces portfolio risk. However, when projects are positively correlated, diversification proves more effective than conventional tools predict.

The use of options and future in risk management especially the liquidity risk was well analyzed by Muller and Panaretou (2008). Their main contribution was to provide a rationale for the use of futures and options in imperfect capital markets for risk management purposes by a risk-averse firm that faces joint price and liquidity risk. The analytical results showed that there was a hedging role for options on futures and the additional exposure to price risk created by the options position is partly offset by an adjustment of the futures position. Numerical results showed that the existence of liquidity risk reduces the optimal futures hedge ratio and that options are not normally used before a liquidity need actually arises.

Millo & MacKenzie (2008) in their paper, “The usefulness of inaccurate models: the emergence of financial risk management” argued that the remarkable success of today’s financial risk management methods should be attributed primarily to their communicative and organizational usefulness and less to the accuracy of the results they produced. This paper traced the intertwined historical paths of financial risk management and financial derivatives markets. Spanning from the late 1960s to the early 1990s, the paper analyzed the social, political and organizational factors that underpinned the exponential success of one of today’s leading risk management methodologies, the applications based on the Black-Scholes-Merton options pricing model. Using primary documents and interviews, the paper showed how financial risk management became part of central market practices and gained reputation among the different organizational market participants. Ultimately, the events in the aftermath of

the market crash of October 1987 showed that the practical usefulness of financial risk management methods overshadowed the fact that when financial risk management was critically needed the risk model was inaccurate.

Chan, Jha and Kalimipalli (2008) in their paper, "The Economic Value of Using Realized Volatility in Forecasting Future Implied Volatility" examined the economic benefits of using realized volatility to forecast future implied volatility for pricing, trading, and hedging in the S&P 500 index options market. They proposed an encompassing regression approach to forecast future implied volatility and hence future options prices by combining historical realized volatility and current implied volatility. The analysis of delta-neutral straddle and naked and delta-hedged options positions showed that the statistical superiority of historical realized volatility demonstrated in the encompassing regressions and options pricing errors does not translate into economic gains, when trading and hedging in the options markets, after considering trading costs.

Dash, Babu and Vivekanand (2008) in his paper entitled, "An Empirical Study of Forex Risk Management Strategies" argued that there are a variety of strategies which are designed to manage foreign exchange risk which are constructed under specific assumptions, for a specific risk profile and it was often the case that several strategies are applicable to a given scenario. However, which strategy would be expected to yield the best results in a given scenario was addressed by them empirically, using a set of simulated foreign exchange cash flows to compare the profits resulting from the use of different foreign exchange risk management strategies. The risk management strategies considered for the study included forward currency contacts, currency options, and cross-currency hedges. The study analyzed and evaluated these foreign exchange risk management strategies and suggested appropriate strategies for particular situations.

In a study on the Qualitative Effect of Volatility and Duration on Prices of Asian Options, Carr, Ewald and Xiao (2008) proved that under the Black Scholes assumption the price of an arithmetic average Asian call options with fixed strike increases with the level of volatility. They exhibited that an increase in the length of duration over which the average is sampled also increases the price of an arithmetic average Asian call options, if the discounting effect is taken out. For this they modeled use the result on volatility and re-parameterized time corresponds to a change in volatility in the Black-Scholes model. Both results are important not only

for the risk management purpose but also for risk assessment of portfolios that include Asian options.

Benzoni, Dufresne and Goldstein (2007) argued in their paper entitled, “Explaining Pre- and Post-1987 Crash Asset Prices within a United General Equilibrium Framework” that the 1987 stock market crash occurred with minimal impact on observable economic variables (e.g., consumption), yet dramatically and permanently changed the shape of the implied volatility curve for equity index options. With this assumption they proposed a general equilibrium model that captured many salient features of the U.S. equity and options markets before, during, and after the crash. They identified a realistic calibration of the model that matched the prices of short maturity at-the-money and deep out-of-the-money S&P 500 put options, as well as the prices of individual stock options. The result of their model generated a steep shift in the implied volatility `smirk' for S&P 500 options after the 1987 crash. They successfully concluded that their model implications were consistent with the empirical properties of dividends, the equity premium, as well as the level and standard deviation of the risk-free rate. Their findings showed that it was possible to reconcile the stylized properties of the equity and options markets in the framework of rational expectations, consistent with the notion that the two markets are integrated.

The central premise of the Black and Scholes (1973) and Merton (1973) options pricing theory is that is that there exists a self-financing dynamic trading policy of the stock and risk free accounts that render the market dynamically complete which requires that the market be complete and perfect. Contradicting, Constantinides, Jackwerth and Perrakis (2006) studied the cases in their paper, “Options Pricing: Real and Risk-Neutral Distributions” in which dynamic trading breaks down either because the market is incomplete or because it is imperfect due to the presence of trading costs, or both. There result illustrated theory in a series of market setups, beginning with the single period model, the two-period model and general multi-period model, with or without transaction costs. They also reviewed related empirical results that document widespread violations of some imposed restrictions.

Balyeat and Erturk (2005) in their paper “Options Prices as Predictors of Aggregate Stock Returns” used the relative prices of S&P 500 index call and put options to convey information regarding the future return of the S&P 500 index realized over the life of the options. They concluded that the natural log of the ratio of the out-of-the-money call price to the equally out-of-the-money put price at differing money-ness

levels and maturities is positively related to the return of the index realized over the life of the options. They also claimed that their predictability is robust to controls for the cost of carry, past returns, implied volatility, and upper moments of the underlying. Further, they successfully demonstrated that portfolios of the underlying formed when the log ratio of the options prices is positive (when call options are more expensive) statistically outperform portfolios similarly formed when the log ratio is negative (when put options are more expensive).

Prior to the stock market crash of 1987, Black-Scholes implied volatilities of S&P 500 index options were relatively constant across money-ness. Since the crash, however, deep out-of the money S&P 500 put options have become 'expensive' relative to the Black-Scholes benchmark. Pierre, Dufrense and Goldstein in their paper entitled, "Can Standard Preferences Explain the Prices of Out-of-the-Money S&P 500 Put Options?" have argued that such prices cannot be justified in a general equilibrium setting if the representative agent has 'standard preferences' and the endowment is an independent and identically distributed process. In their paper they also investigated that whether within a standard preference framework the stark regime change in the volatility smirk had maintained since the 1987 market crash or not. To this end, they extended the model to Bayesian setting in which the agent updated her beliefs about the average jump size in the event of a jump. They noted that such beliefs only update at crash dates, and hence can explain why the volatility smirk had not diminished over the last eighteen years. They found that the model can capture the shape of the implied volatility curve both pre- and post-crash while maintaining reasonable estimates for expected returns, price-dividend ratios, and risk-free rates.

Bartram (2004) in, "The Use of Options in Corporate Risk Management" investigated the motivations and practice of non-financial firms with regard to using financial options in their risk management activities. The paper provided a comprehensive account of the existing empirical evidence on the use of derivatives in general and options in particular by non-financial corporations across different underlying and countries. The results showed that overall, a significant number of 15%-25% of the firms outside the financial sector use financial options which reflects the fact that options are very versatile risk management instruments that can be used to hedge various types of exposures, linear as well as nonlinear. They concluded that options are useful component of corporate risk management if exposures are uncertain, e.g. due to price and quantity risk and depending on the correlation between price and

quantity risk, the optimal hedge portfolio may consist of a varying combination of linear and nonlinear risk management instruments. They also proved that the accounting treatment as well as liquidity effects can impact the choice of derivative instrument and at the same time, there may be agency-related incentives to use options because of their role to present dual bets on both direction as well as future volatility of the underlying.

Boyer, Christoffersen, Lassere and Paviov (2003) in their paper, "Value Creation, Risk Management and Real Options" reported that the application of the real options approach to decision making in organizations is to create value by capturing the full value of the firm's potential. They discussed how real options approach brings discipline and accuracy of finance into various areas of decision-making. The approach is relevant to a very large array of management and strategic decisions involving uncertainty and irreversibility. The real options approach is a tool that allows bringing intuition in line with the prescriptions of rigorous decision-making procedures and helps in giving a more accurate quantitative content and value to intuitive rules, thus gaining an edge over competitors.

In another work of Fernandies & Santos (2002) in their paper, "Evaluation of Investment Strategies with Options" tried to evaluate the investment strategies with options on indexed FTSE 100 (covered calls at-, in – and out of the money and protective puts at -, in – and out of the money). The results indicate that the new risk measure was more statistical significant than the traditional beta of CAPM, for that the information supplied by the measure of the performance (modified alpha) seemed to be more reliable. On the other hand, the values of modified alphas reveal that these dynamic strategies result in excess returns close to zero (as theoretically expected), denouncing that the market price of these options appears to be in equilibrium (the options seemed to be correctly priced).

Anthony and Hodges (2002) in their paper, "Rational Bounds and the Robust Risk Management of Derivatives" suggested that risk management of derivative portfolios is vulnerable to model error. This paper explored risk management strategies based on no-arbitrage bounds, which are independent of any model. They determined the bounds on the price of a general barrier options given the price of a set of European call options and identified the hedging strategy that enforces the bounds. The strategy puts a floor on the maximum loss that can be incurred by the writer of the barrier options. The result showed that how the strategy can be made dynamic and the floor

rose over time. The distribution of hedge errors under the strategy was compared with that under alternative strategies. It is common for firms to issue or purchase options on the firm's own stock. McDonaldy (2002) in his paper, “The Tax (Dis) Advantage of a Firm Issuing Options On Its Own Stock” ushered examples that included convertible bonds, warrants, call options as employee compensation, and the sale of put options as part of share repurchase programs. The result showed that options positions with implicit borrowing such as put sales and call purchases are tax-disadvantaged relative to the equivalent synthetic options with explicit borrowing. Conversely, options positions with implicit lending such as compensation calls are tax-advantaged. He also showed that firms are better off from a tax perspective issuing bifurcated convertible bonds plus warrants rather than an otherwise equivalent standard convertible. The put options sales which were popular with some firms are like issuing debt with non-deductible interest and thus have a tax cost. They estimated that in 1999 the tax cost to Microsoft of written puts was about $80m per year.

Figlewski (2002) in his paper, “Informationally Passive Benchmark” demonstrated that the value of an active investment strategy is measured by comparing its performance against the benchmark of passively holding the market portfolio with the risk-less asset. He evaluated the marginal contribution of a theoretical derivatives pricing model by comparing its performance against an "informationally passive" alternative model. Rationally priced options satisfy a number of conditions to rule out profitable static arbitrage and the Black-Scholes models were obtained by assuming an equilibrium in which there are no profitable dynamic arbitrage opportunities either. The passive model Figlewski considered incorporated only the fundamental properties of options prices that hold to avoid static arbitrage, but had no theoretical content beyond that. He also reviewed different measures of model performance and applied them to several versions of the Black-Scholes model and his passive model. The result demonstrated that with active portfolio management the classical Black-Scholes model turns out to be less accurate than the passive benchmark.

Penttinen (2001) in his paper, “The sensitivity of Implied Volatility to Expectations of Jumps in Volatility: An Explanation for the Illusory Bias in Implied Volatility as a Forecast” suggested to test that whether unrealized expectations of jumps in volatility could explain the illusory bias in implied volatility as a forecast or not. His findings showed that expectations of infrequently occurring jumps in volatility are priced in implied volatility, which has two important consequences. First, implied volatility

will slightly exceed realized volatility most of the time only to be considerably lower than realized volatility during infrequently occurring periods of very high volatility. Second, the slope coefficient in the classic forecasting regression of realized volatility on implied volatility is very sensitive to the discrepancy between the ex ante expected and ex post realized jump frequencies. If the in sample frequency of positive volatility jumps is lower than ex ante assessed by the market, the slope coefficient will be biased downward and the classic regression test will erroneously reject the hypothesis of no bias even if the market is informationally efficient. Since the inferences of almost all previous studies on the forecasting power of implied volatility have been based on data from a period of historically low volatility, their results provide a rational explanation for the illusory bias in implied volatility.

Jiang and Oomen (2001) in the paper, "Hedging Derivatives Risks" undertook a simulation study to investigate the performance of alternative hedging strategies against various derivatives risks and the impact of model misspecification on hedging performance. The hedging strategies considered included the single-instrument hedge, the delta-neutral hedge, and the *ad hoc* Black-Scholes delta-vega-(rho)-neutral hedge, while the risk factors of the derivatives included the underlying asset return risk, stochastic volatility risk, stochastic interest rate risk, and random jump or market crash risk. In addition, they also investigated the performance of the delta-neutral hedge with the use of potentially traded volatility derivatives. Their simulation results provided guidance for how a risk factor can be hedged based on certain hedging strategies and evidence of how severe model risk can be when hedging strategies are based on miss-specified models.

The paper, "Forecasting Spot Interest Rate Volatility" by Miguel (1999) compares the in-sample and out-of-sample forecasting performance of models of the spot interest rate volatility using French and Germany short-term interest rates, for the period ranging from 1981 to 1997. For a one-week horizon, the volatility forecasts evaluation showed that the model with the best fit does not had the highest forecasting power. The out-of-sample evidence supported that models with only news effect have similar forecasting power and efficiency to models with mixed level and news effect, which had the best fit. Also, sample variance forecasts calculated using exponentially declining weights present forecasting power and efficiency similar to the best volatility models.

Wu and Zhang (1999) in their paper, “Options on the Minimum or the Maximum of Two Average Prices” provided a closed form pricing formula for the options with geometric averaging starting at any time before maturity. They were able to show overwhelming numerical evidence that the variance reduction technique with the help of the above closed-form solution dramatically improves the accuracy of the simulated price of an option with arithmetic averaging. The proposed options are found widely applicable in risk management and in the design of incentive contracts. The paper also discusses some parity relationships within the family of average-rate options and provides the upper and lower bounds for the proposed options with arithmetic averaging.

Ahna, Boudoukhb, Richardsonc and Whitelawd (1998) in their paper, “Optimal Risk Management Using Options” provide an analytical approach to optimal risk management under duel assumption of institution's risk management criterion is VaR and institution's hedging strategy involves options, rather than forwards, futures, or swaps. They found a put options strategy under Black-Scholes framework that minimizes the VaR, given a maximal expenditure for hedging, by determining the optimal tradeoff between the put options' ability to reduce the VaR level and the initial cost of those options. The solution was in the form of the put options' strike prices as a function of the underlying asset value, the mean and volatility of underlying asset, the risk-free rate, and the VaR hedging period. They concluded that optimal strike price was independent of the level of cost; therefore, the cost/VaR frontier was linear. This implies that given the parameters governing the distribution of asset returns and the desired confidence level, an institution faces the choice of increasing the position in an optimal exercise price options, thereby reducing its VaR.

Stulz (1996) in his article of Rethinking Risk Management gave a detailed theoretical framework and attempted to go beyond the variance minimization (i.e., risk downing mechanism) model. He argued that the primary objective of the risk management was to bring down the probability of costly lower tail outcomes to zero levels. Otherwise, these risks would cause financial distress or make a player unable to carry out the investment strategy. He, further, sensed that the risk management could be viewed as the purchase of well out of the money put options designed to downside risk. He also found that the standard finance theory work departing from the actual practice. The risk management mechanism encourages the player of the derivatives market for

hedging by considering the price movements in the times to come. He concluded that the risk management program should be evaluated by the financial managers in detail and at continuum.

2.2 Conclusion of the Studies:

After reviewing the literature on almost all kinds of hedging instruments known as derivatives (options, futures and swaps and other forward contracts) the researcher reached the conclusion that the study on risk management through derivative contracts needs continuous investigations and analysis. Every research project on risk mitigating mechanism is not long lived because of the changes taking place in financial markets. The review of literature made in the project reveals the fact that the volatility management has changed to the large extent as compared to the real share of trans-nationalization of economies. The risk management through financial engineering possibly may not be in the present shape in the time to come. The researcher found the present work more suitable for the Indian capital market in terms of the acceptability of the derivative contract for the purpose of risk shield ornament. The present study is based on the new edifice of options trading and their acceptability as a prescription for risk management. Moreover, the present research work is eloquent in full sense that it dwells upon new aspect of impediments before the options players in the market. The review given above helped the researcher to determine the objectives of the present study.

These ***objectives*** are given below:

- To Measure the acceptability of Derivative Trade as on alternative to Cash Market Trade
- To measure the acceptability of Options Trade as Derivatives Product
- To identify the impediments
- Role of Financial Engineering in Acceptance of Options Trade
- Cost-Benefit Analysis of Options Trading

CHAPTER III
RESEARCH METHODOLOGY

After reviewing the literature pertaining to the topic directly as well as indirectly, research methodology as under was employed. The major concern of the present study is to evaluate the impediments in the acceptability of options trading as risk management tools with special reference to India. First of all, empirical study based on historical secondary database was studied so as to find the exact position of options trading in India.

Options trading have penetrated deeply in Indian trading community since almost last two decade of its introduction, yet when compared to rest of the world it is still far behind them (explained elsewhere in the thesis). It was evident from the prelims study on the data of Options Trade published by NSE and BIS that though there is a tremendous growth in the trade of options but the quantum of turnover as compared within stock options and index options within the country differs quite a lot. Trade of options trade in stocks is far behind the trade of options in index. At the same time it was also marked that despite of such accelerative growth of options trade, India is far behind other developed and developing nation at least in context of turnover.

After getting satisfied from the secondary database study that for proper growth and mass acceptance of options trade for the purpose for which it is tailored made, the researcher conducted a primary study to find the acceptance among the Indian community which is associated directly/indirectly with options trading and to find impediments, if any, in its path and also to suggest remedies based on the findings of the study. Thus, with this a psychological study of the community engaged/affected with options trade, directly or indirectly, was conducted through a sample survey. The detailed statistical analysis of the survey is presented in the Chapter VI of the thesis.

3.1 Period of Study – The period of the sample studied was from March 2000 to March 2010. Though the derivatives trading in India begin in 2000 yet the researcher dwelt upon the period of almost 10 years. Because 10 year span of study is sufficient to extract the result as per objectives (given in Chapter II).

3.2 Area of the Study – NSE attached terminals of almost throughout India is covered through this study. It means it covers whole of the derivative markets.

Secondary as well as primary information in the shape of trading volume, open interest, turnover, total traded contracts of both futures an options pertaining to Indian as well as rest of the world were tabulated and responses of the respondents were collected for a 10 year period (wherever it was applicable). The researchers on the basis of experience as well as yardstick of research, the responses were gleaned on the basis of 'sample" and a "questionnaire" (fabricated on Likert-scale, mentioned on coming pages).

3.3 Sample

Total Brokers in India = 900

Dealing in Derivatives Area = 600 (approx.)

Questionnaires Distributed = 200

Questionnaires Got Back Completed = 200

Questionnaires Effectively Used = 153

Questionnaires Not Effectively Used = 47

Out of 200 samples 47 questionnaires received were not considered. Out of 47 questionnaires 13 were found incomplete in response and in rest multiple ranking were given and hence were rejected.

3.4 Configuration of Sample – The surveyed respondents were selected keeping in view that they are true representative of the whole population (.i.e., from throughout the length and breadth of India).

Table 3.1: Area wise Break-up of Respondents

Type of Respondents	Area			
	North	**South**	**East**	**West**
Broker	10	10	10	20
Trader	20	10	10	10
Investors	20	10	10	10
Institutions	10	10	10	20

NSE has electronic trading mechanism. Electronic trading, sometimes called e-trading, is a method of trading securities electronically. It uses information technology to bring together buyers and sellers through electronic media to create a virtual market place. NASDAQ, NYSE NSE is examples of electronic market places. E-trading is widely believed to be more reliable than older methods of trade processing, but glitches and cancelled trades do occur. Electronic trading makes transactions easier to

complete, monitor, clear, and settle. In India the set up of NSE in 1991 paved the way of e-trading in India.

The increase of e-Trading has had some important implications:

- **Reduced Cost of Transactions -** By automating as much of the process as possible, costs are brought down. The goal is to reduce the incremental cost of trades as close to zero as possible, so that increased trading volumes don't lead to significantly increased costs. This has translated to lower costs for investors.
- **Greater Liquidity -** Electronic systems make it easier to allow different companies to trade with one another, no matter where they are located. This leads to greater liquidity (i.e. there are more buyers and sellers) which increases the efficiency of the markets.
- **Greater Competition -** While e-trading hasn't necessarily lowered the cost of entry to the financial services industry, it has removed barriers within the industry and had a globalisation-style competition effect. A trader doesn't need to go through a broker or pass orders to a trader on the exchange floor.
- **Increased Transparency –** E-trading has meant that the markets are less opaque. It's easier to find out the price of securities when that information is flowing around the world electronically.
- **Tighter Spreads -** The "spread" on an instrument is the difference between the best buying and selling prices being quoted; it represents the profit being made by the market makers. The increased liquidity, competition and transparency means that spread have tightened, especially for commodities, exchange-traded instruments.

For retail investors, financial services on the web offer great benefits. The primary benefit is the reduced cost of transactions for all concerned as well as the ease and the convenience. Web-driven financial transactions bypass traditional hurdles such as logistics.

Thus, the geographical location in an electronic trading mechanism has very little significance participants may participate in the process without their physical presence. However, for the present study, due weight-age was given during sampling that proper representation from among whole of the length and breadth of the economy was there.

3.5 Nature of Sampling - Based on the need of present study, ***Purposive Expert Sampling*** was considered. Purposive sampling starts with a purpose in mind and the sample is thus selected to include people of interest and exclude those who do not suit the purpose. Purposive sampling is non-probability and hence can be subject to bias and error. The basic difference between non-probability and probability sampling is that non-probability sampling does not involve random selection and probability sampling does. It means that non-probability samples cannot depend upon the rationale of probability theory. In general, researchers prefer probabilistic or random sampling methods over non-probabilistic ones, and consider them to be more accurate and rigorous. However, in applied social research there may be circumstances where it is not feasible, practical or theoretically sensible to do random sampling. Here, a wide range of non-probabilistic alternatives are considered.

Non-probability sampling methods can be divided into two broad types: accidental or purposive. Most sampling methods are purposive in nature because here usually one approaches the sampling problem with a specific plan in mind. The most important distinctions among these types of sampling methods are the ones between the different types of purposive sampling approaches.

Purposive sampling can be very useful for situations where one need to reach a targeted sample quickly and where sampling for proportionality is not the primary concern. With a purposive sample, one is likely to get the opinions of the target population, but is also likely to overweight subgroups in your population that are more readily accessible.

Further, there are various subcategories of purposive sampling methods. One might sample for specific groups or types of people as in *modal instance, expert, or quota sampling*. One might sample for diversity as in *heterogeneity sampling*. Or, one might capitalize on informal social networks to identify specific respondents who are hard to locate otherwise, as in *snowball sampling*. In all of these methods it is known that what is needed, i.e., one is sampling with a purpose.

Purposive expert sampling involves the assembling of a sample of persons with known or demonstrable experience and expertise in some area. Often, it is convene such a sample under the auspices of a "panel of experts." There are actually two reasons for which one might do expert sampling. Firstly, it is the best way to elicit the views of persons who might have specific expertise in the related field. In this case, expert sampling is essentially just a specific sub-case of purposive sampling. But the

other reason one might use expert sampling is to provide evidence for the validity of another sampling approach one have chosen. The advantage of doing this is that one has some acknowledged experts to back up the hypothesis one is trying to defend. The disadvantage is that even the experts can be, and often are, wrong. For the present study, first reason was considered appropriate.

3.6 Purpose of the Survey - To track the real hurdles in the acceptability, this might be acting as major impediments in overall booming and flourishing of options trade in India As there are over 10 million investors alone in the country, a complete census was not possible. Therefore, a sample was designed of 200 respondents consisting 50 each of above 4 categories spread over all India, to be picked at random on the basis of available address/ data from Exchanges/ regulator site.

3.7 Survey Technique – The present survey was *Primary Qualitative Questionnaire Based Survey*. Respondents was required to either tick mark their choice over the Questionnaire and/or rank the enlisted impediments. A sample of Questionnaire is given below.

Survey Form

Impediments in Acceptability of Options Trading in India

Personal Information

1	***Name of the Respondent***	*:*	_____	*2*	***Designation***	*:*	_____
3	***Company***	*:*	_____	*4*	***Specialisation***	*:*	_____
5	***Address***	*:*	_____	*6*	***Email***	*:*	_____

Ranking to Major Problems which according to you is major hurdle in the growth of Options Trade in India (*please rank 1 to 14 according to your preference; 1 major problem----------14 minor problem***)**

S. No	Particulates	Ranks
1	Liquidity Problem & Volume	
2	Exchange Turnover Charges	
3	Income Tax	
4	Exercise of Options	
5	Lack of Education	
6	Instead of Risk Management Tool Being Used as Speculative Instrument	
7	Stamp Duty	
8	Lack of Strategic Interest Among Participants	
9	Only American Options Available in Stock	
10	High Premium Cost	
11	Only European Options Available in Index	
12	Operational Issues in using Exotic Models of Options Trading	
13	Lack of Trading Software	
14	High Margin	

3.8 Questionnaire/Response Form Details –The Questionnaire for the survey is designed keeping in view that the respondents surveyed can reply conveniently. So the Questionnaire was kept as simple as possible keeping in mind that purpose of the survey may not be hampered. It was divided into three sub-sections. First sub-section contains personal information about the respondents. Second sub-section includes information relating to future and options trade being undertaken by them. The third and the last sub-section include fourteen variables to be ranked according to the preference of the respondents, which is acting as major hurdle/impediments in the acceptability of options trade in India.

The set of 14 variables *(Appendix VII A)* consisting of 14 major issues for the survey was chosen on the basis of objective of study and after in-depth study of various research papers in this direction as well as detailed discussion with independent researchers, policy makers and regulators.

3.9 Responses: After checking the response forms the incomplete/vague form were rejected. Out of total of 200-response sheet, 153 forms were found to be complete and capable of further processing.

3.10 Scaling – A Likert-type rating scale was designed for ranking the 14 variables. Likert scale is commonly used to measure attitude, providing 'a range of responses to be given questions or statement[1]'. Respondents rank from high to low or best to worst using different levels. For the present study, 14 levels scale is considered from high to low, 1>2>3…….>14.

Basics of Likert Scales – Likert scales were developed in 1932 as the familiar five-point bipolar response that most people are familiar with today[2]. These scales range from a group of categories – least to most – asking people to indicate how much they agree or disagree, approve or disapprove, or believe to be true or false. There's really no wrong way to build a Likert scale. The most important consideration is to include at least five response categories. The ends of the scale often are increased to create a seven-point scale by adding "very" to the respective top and bottom of the five-point scales. The seven-point scale has been shown to reach the upper limits of the scale's reliability[3]. As a general rule, Likert and others recommend that it is best to use as wide a scale as possible. You can always collapse the responses into condensed categories, if appropriate, for analysis. With that in mind, scales are sometimes truncated to an even number of categories (typically four) to eliminate the "neutral" options in a "forced choice" survey scale, Rensis Likert's original paper clearly identifies there might be an underlying continuous variable whose value characterized the respondents' opinions or attitudes and this underlying variable is interval level, at best.

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[1] Cohen L, Manion L, Morrision K. Research Methods in Education. 5th edn. London: Routledger Falmer 2000.

[2] Ulf Jakobosson, "Statistical Presentation and Analysis of Ordinal Data in Nursing Research" Scandinavian Journal of Caring Sciences, Vol 18, 2004, pp. 437-440

[3] Rensis Likert, "A Technique for the Measurement of Attitudes," Archives of Psychology, 1932, Vol. 140, No. 55.

Likert scales fall within the ordinal level of measurement[2-4]. That is, the response categories have a rank order, but the intervals between values cannot be presumed equal, although, Blaikie points out, researchers frequently assume that they are'. However, Cohen et al. contend that it is 'illegitimate' to infer that the intensity of feeling between 'strongly disagree' and 'disagree' is equivalent to the intensity of feeling between other consecutive categories on the Likert scale. The legitimacy of assuming an interval scale for Liker type categories is an important issue, because the appropriate descriptive and inferential statistics differ for ordinal and interval variables[1-5].

As a general rule mean and standard deviation are invalid parameters for descriptive statistics whenever data are on ordinal scales, as are any parametric analyses based on the normal distribution. Nonparametric procedures-based on the rank, median or range-are appropriate for analyzing these data, as are distribution free methods such as tabulations, frequencies, contingency tables and chi-squares statistics.

Further, methodological and statistical texts clear that for ordinal data one should employ the median or mode as the "measure of central tendency[5]" because the arithmetical manipulations required to calculate the mean (open and standard deviation) are inappropriate for ordinal data[3-5], where the numbers generally represents verbal statements. In addition, ordinal data may be described using frequencies, percentages of response in each category. Standard text also advice that appropriate inferential statistics for ordinal data are those employing none-parametric test, such as chi-square tests, spearman rho, or the Mann-Whitney U-Test[1] because parametric test required data of interval or ratio levels[2-5].

3.11 Classification and Tabulation: Since the responses are assumed to follow Likert-Type scaling, hence, the resultant data are Ordinal in nature. The entire statistic collected both from primary as well as secondary source are classified according to the need as vested in the objective of the study and then tabulated. The final tabulated

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[2-4] Pett MA. Non-parametric statistics for Health Care Research. London: SAGE Publications 1997.
Hansen Jp. CAN'T MISS-conquer any number task by making important statistics simple. Part 1. Types of variables, mean, median, variance and standard deviation. J.Health care Quall 2003:25 (4):19-24.

[1-5] Clegg F. SimpleStatistics. Cambridge: Cambridge University Pres 1998.

[3-5] Blaikie N. Analysing Quantitative Data. London: Stage publications 2003.

secondary as well as primary data is mainly the part of appendixes as well as part of Chapter IV, i.e., Result and Analysis.

3.12 Evaluation: After tabulating the valid response from the 153 respondents a composite ranking scale was calculated on the basis which various tables were generated and were further subjected to the following statistical tests:

(a) Chi-Square Goodness of Fit Test

(b) Chi-Square Test for Independence

Along with this a detailed analytic statistics for each of the studied problem was also conducted.

3.13 Analytics: The data which were classified and tabulated were treated by the researcher with well paint statistical techniques (analytical as well as testing) given in the following pages.

Average: An average, central tendency of a data set is a measure of the "middle" or "expected" value of the data set. The most common method is the arithmetic mean.

Arithmetic Mean

Let *x*1… *xn* be the data. The arithmetic mean (or simply *mean*) is:

$$\overline{x} = \frac{1}{n} \sum_{i=1}^{n} x_i \ .$$

The arithmetic mean is the sample estimate of the mean of the associated random variable. If one has a tally sheet of a discrete type data, one can also compute the mean using the absolute frequencies (counts), *nk*, of each distinct value *xk*:

$$\overline{x} = \frac{1}{n} \sum_{k=1}^{n} n_k x_k \quad \text{with} \quad n = \sum_{k=1}^{n} n_k$$

Median

The median of a dataset is that value of the data below which lie 50% of the cases. It is an estimate of the median, med(*X*), of the random variable, *X*, associated to the data, defined as:

$$F_X(x) = \frac{1}{2} \ \Rightarrow \ \text{med}(X),$$

where *FX* (*x*) is the distribution function of *X*.

Using the previous rod analogy for the continuous variable case, the median divides the rod into equal mass halves corresponding to equal areas under the density curve:

$$\int_{-\infty}^{\text{med}(X)} f_X(x) = \int_{\text{med}(X)}^{\infty} f_X(x) = \frac{1}{2}$$

The median satisfies the same linear property as the mean, but not the other properties (e.g. additively). Compared to the mean, the median has the advantage of being quite insensitive to outliers and extreme cases.

If we sort the dataset, the sample median is the central value if the number of the data values is odd; if it is even, it is computed as the average of the two most central values.

Mode

The mode of a dataset is its maximum value. It is an estimate of the probability or density function maximum. For continuous type data one should determine the midpoint of the modal bin of the data grouped into an appropriate number of bins. When a data distribution exhibits several relative maxima of almost equal value, we say that it is a *multi-modal* distribution. In general, mode is the size of the item which has the maximum frequency, but at items such an item may not be mode on account of the effect of the frequencies of the neighbouring items. Like median, mode is a positional average and is not affected by the values of extreme items.

Measures of Spread

The measures of *spread* (or *dispersion*) give an indication of how concentrated a data distribution is. The most usual measure of spread is standard deviation and is presented next.

Standard Deviation

The standard deviation of a dataset is the root square of its variance. It is, therefore, a *root mean square error* (RMSE):

$$s = \sqrt{v} = [\sum_{i=1}^{n} (x_i - \bar{x})^2 / (n-1)]^{1/2}$$

The standard deviation is preferable than the variance as a measure of spread, since it is expressed in the same units as the original data. Furthermore, many interesting

results about the spread of a distribution are expressed in terms of the standard deviation.

Measures of Shape

Skewness

The symbol for skewness is *sk*.

$$sk = n / (n - 1)(n - 2) \Sigma (x_i - \bar{x} / s)^3$$

A continuous symmetrical distribution around the mean, μ, is defined as a distribution satisfying:

$$f_X(\mu + x) = f_X(\mu - x)$$

This applies similarly for discrete distributions, substituting the density function by the probability function.

A useful asymmetry measure around the mean is the *coefficient of skewness*, defined as:

$$\gamma = \mathrm{E}[(X - \mu)^3] / \sigma^3$$

This measure uses the fact that any central moment of odd order is zero for symmetrical distributions around the mean. For asymmetrical distributions γ reflects the unbalance of the density or probability values around the mean. The formula uses a standardization factor, ensuring that the same value is obtained for the same unbalance, independently of the spread. Distributions that are skewed to the right (*positively skewed distributions*) tend to produce a positive value of γ, since the longer rightward tail will positively dominate the third order central moment; distributions skewed to the left (*negatively skewed distributions*) tend to produce a negative value of γ, since the longer leftward tail will negatively dominate the third order central moment. The coefficient γ, however, has to be interpreted with caution, since it may produce a false impression of symmetry (or asymmetry) for some distributions.

Usually we measure skewness in this way:

Skewness = $\bar{X} - Z$ and its coefficient *(j)* is worked out as $j = \bar{X} - Z / \sigma$

In case Z is not well defined, then we work out skewness as under:

Skewness = $3(\bar{X} - M)$ and its coefficient *(j)* is worked out as $j = 3(\bar{X} - M) / \sigma$

It is to be noted that:

- For symmetrical distributions, if the mean exists, it will coincide with the median. Based on this property, one can also measure the skewness using g = (mean − median)/ (standard deviation). It can be proved that $-1 \leq g \leq 1$.
- For asymmetrical distributions, with only one maximum (which is then the mode), the median is between the mode and the mean as shown in Figure 3.1.

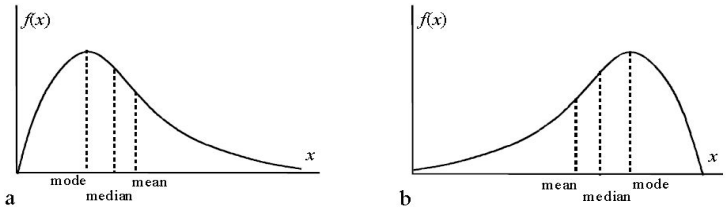


Figure 3.1: Two asymmetrical distributions: a) Skewed to the right (usually with $\gamma > 0$); b) Skewed to the left (usually with $\gamma < 0$).

Kurtosis

Kurtosis is the measure of flat-toppedness of a cure. It is the humpedness of the curve and points to the nature of distribution of items in the middle of a series. The symbol for kurtosis is *ku.*

$$ku = [\, n(n+1) / (n-1)(n-2)(n-3) \, \Sigma \, (x_i - \bar{x} \, / s)^4] - 3(n-1)^2 / (n-2)(n-3)$$

where s is the sample standard deviation (the unbiased estimate of sigma).

The value of *ku* for a normal or mesokurtic distribution is close to 0. A leptokurtic distribution will have a positive value, and the playkurtic distribution will be negative. As with skewness, the larger the absolute value of the index, the more extreme is the characteristic. In the annual percentage unit sales increase example, the kurtosis is calculated as -.29, which suggested a very slight deviation from a normally shaped curve with some flattening contributed by smaller-than-expected frequencies of the value 7 in the example distribution.

3.14 Statistical Tests – As explained elsewhere in the paper**,** a Purposive Expert Sampling of 200 was selected for the present study which is assumed to be a true representative of the whole population. Also, the result thus obtained from the research was tested for its unbiased and that they are independent of each other, statistically. Among the selected sample, four groups were constituted which for the

present study is tested for consistency and unbiased-ness. For test of consistency, the Chi-Square Goodness of Fit was conducted and to test the independence among the groups the Chi-Square Test for Independence was conducted.

The Chi-Square Goodness of Fit Test

The test is being conducted on the collected data of the sample in order to determine that whether sample data are consistent with the hypothesized population or not, i.e., to see whether sample distribution differs significantly from the population.

Assumptions

Before conducting the test the following assumptions are fully met -

- Sampling method is simple random sampling
- Population is above ten times larger than sample
- Variable under study is categorical
- Expected value of each level of variable is not too small

The following four steps are involved while conducting the Chi-Square Goodness of Fit Test-

Stating Hypothesis – Mutually Exclusive null hypothesis (H_0) and alternate hypothesis (H_1) are –

H_0 - The data of the sample is consistent with the population

H_1 - The data of the sample is not consistent with the population

Null hypothesis specifies that the proportion of observations is at each level of categorical variables. Alternate hypothesis states that at least one of the specified proportions is not true.

Formulating Analysis Plan - To accept or reject the null hypothesis the following two things are specified –

Significant level- Any value between 0 and 1 are permitted to be used. For present test 0.01 levels of significance is used.

Test Method – Chi-Square Goodness of Fit test is used to determine whether observed sample frequencies differs significantly from expected frequencies specified in null hypothesis.

Analysing Sample Data – The following parameters are calculated while analysing the sample data –

Degree of Freedom – Degree of Freedom is number of levels (K) of categorical variable minus one.

$$DF = (K-1)$$

Where,

DF = Degree of Freedom

K = Number of levels of categorical variable

Expected Frequency Count – Expected Frequency Count at each level of categorical variable is equal to sample size times the hypothesized proportion from the null hypothesis.

$$E_i = n*P_i$$

Where,

E_i = Expected frequency count at each levels of categorical variables

n = Sample Size

P_i = Hypothesized proportion of Observations in Level "$_i$"

Test Statistic – The following formula is used to test the statistic –

$$\chi^{*2} = \sum_{i=1}^{k} \frac{(O_i - E_i)^2}{E_i}$$

which, has approximately a chi-square distribution with DF = (k – 1) degrees of freedom. The approximation is considered acceptable if the following conditions are met -

For DF = 1, no E_i must be smaller than 5;

For DF > 1, no E_i must be smaller than 1 and no more than 20% of the E_i must be smaller than 5.

Expected absolute frequencies can sometimes be increased, in order to meet the above conditions, by merging adjacent categories. When the difference between observed (O_i) and expected counts (E_i) is large, the value of χ^2 will also be large and the respective tail probability small. For a 0.95 confidence level, the critical region is above $\chi^2_{k-1, 0.95}$.

***p- Value* –** It is the probability of observing a sample statistic as extreme as test statistic.

Result Interpretation – The data thus, collected and arranged in accordance with SPSS 16 version and Chi –Square Goodness of Fit Test was conducted whose result is being analysed in *Section 4.2*. If sample findings are unlikely, null hypothesis is rejected. p – Value is compared to significant levels and if p – Value is less than significant levels null hypothesis is rejected.

Goodness of Fit Test for the Sample Studied

The Chi-Square Test procedure tabulates a variable into categories and tests the hypothesis that the observed frequencies do not differ from their expected values.

Observed Frequency - Here, the observed frequency for each row is simply the average number rank given by each group of respondents across the sample. For example, an average of 873 ranks was given for Liquidity Problem and Volume - 215 by Broker, 168 by Institution, etc. *(Table 4.2.1)*

Expected Value - The expected value for each row is equal to the sum of the observed frequencies divided by the number of rows in the table. In this example, there were 589 observed ranks for the sample respondents, resulting in about 218.3 ranks per group. *(Table 4.2.1)*

Residual - Finally, the residual is equal to the observed frequency minus the expected value. The table shows that according to Institutions have many fewer, and Traders, many more, ranks than an "every Group is equal" assumption would expect. *(Table 4.2.1)* Thus, institutions had given priority to Liquidity Problem and Volume while Traders have given least weight-age to this problem.

Chi-Square Statistic - The obtained chi-square statistic equals 23.90. This is computed by squaring the residual for each group, dividing by its expected value, and summing across all ranks.

df - The term df represents degrees of freedom. In a chi-square test, df is the number of expected values that can vary before the rest are completely determined. For a one-sample chi-square test, df is equal to the number of rows minus 1.

Asymp. Sig. - Asymp. Sig. is the estimated probability of obtaining a chi-square value greater than or equal to 23.9 if ranks are evenly distributed across the group. The low significance value suggests that the average rate of ranks given by the respondents does differ by each group.

Chi- Square Test of Independence

When performing tests of hypotheses one often faces the situation in which a decision must be made as to whether or not two or more variables pertaining to the same population can be considered independent. In order to assess the independency of two variables we use the contingency table formalism which is applied to only one population whose variables can be categorised into two or more categories. The variables can either be discrete (nominal or ordinal) or continuous. In continuous case, suitable categorisations for the continuous variables are chosen.

The $r \times c$ contingency table for this situation is the same as shown in Figure 1. The $r \times c$ contingency table is an obvious extension of the 2×2 contingency table, when there are more than two categories of the nominal (or ordinal) variable involved.

	Class 1	Class 2	. . .	Class c	
Population 1	O_{11}	O_{12}	. . .	O_{1c}	n_1
Population 2	O_{21}	O_{22}	. . .	O_{2c}	n_2
. . .	. . .	. . .	. . .	. . .	. . .
Population r	O_{r1}	O_{r2}	. . .	O_{rc}	n_r
	c_1	c_2	. . .	c_c	

Figure 1: The $r \times c$ contingency table with the sample sizes (ni) and the observed absolute frequencies (counts Oij).

The $r \times c$ contingency table is shown in Figure 1. All samples from the r populations are assumed to be independent and randomly drawn. All observations are assumedly categorised into exactly one of c categories.

The total number of cases is:

$$n = n1 + n2 + ... + nr = c1 + c2 + ... + cc,$$

where the cj are the column counts, i.e., the total number of observations in the jth class:

$$c_j = \sum_{i=1}^{r} O_{ij} \ .$$

Let pij denote the probability that a randomly selected case of population i is from class j. The hypotheses formalised for the $r \times c$ contingency table are a generalisation of the two-sided hypotheses for the 2×2 contingency table.

H0: For any class, the probabilities are the same for all populations:

$$p_{1j} = p_{2j} = \ldots = p_{rj}, \ \forall j.$$

H1: There are at least two populations with different probabilities in one class:

$$\exists\, i, j, pij \neq pkj.$$

The test statistic is:

$$T = \sum_{i=1}^{r} \sum_{j=1}^{c} \frac{\left(O_{ij} - E_{ij}\right)^2}{E_{ij}}, \ \text{with} \ \ E_{ij} = \frac{n_i c_j}{n} \ .$$

If H0 is true, we expect the observed counts Oij to be near the expected counts Eij, estimated as in the above formula, using the row and column marginal counts. The asymptotic distribution of T is the chi-square distribution with $df = (r - 1)\ (c - 1)$ degrees of freedom. As with the chi-square goodness of fit test, the approximation is considered acceptable if the following conditions are met:

1. For $df = 1$, i.e. for 2×2 contingency tables, no Eij must be smaller than 5;
2. For $df > 1$, no Eij must be smaller than 1 and no more than 20% of the Eij must be smaller than 5.

However, the only differences being that whereas in the previous section the rows represented different populations and the row totals were assumed to be fixed, now the rows represent categories of a second variable and the row totals can vary arbitrarily, constrained only by the fact that their sum is the total number of cases.

The test is formalised as:

H0: The event "an observation is in row *i*" is independent of the event "the same observation is in column *j*", i.e.:

$$P(\text{row } i, \text{column } j) = P(\text{row } i) \times P(\text{column } j),\ \forall i, j.$$

H1: The events "an observation is in row *i*" and "the same observation is in column *j*", are dependent, i.e.:

$$\exists\, i, j,\ P(\text{row } i, \text{column } j) \neq P(\text{row } i) \times P(\text{column } j).$$

Let *ri* denote the row totals, such that:

$$r_i = \sum_{j=1}^{c} O_{ij} \text{ and } n = r_1 + r_2 + ... + r_r = c_1 + c_2 + ... + c_c .$$

$$\text{and n} = r1 + r2 + ... + rr = c1 + c2 + ... + cc .$$

As before, we use the test statistic:

$$T = \sum_{i=1}^{r} \sum_{j=1}^{c} \frac{\left(O_{ij} - E_{ij}\right)^2}{E_{ij}}, \text{ with } E_{ij} = \frac{r_i c_j}{n},$$

which has the asymptotic chi-square distribution with $df = (r - 1)(c - 1)$ degrees of freedom. Note, however, that since the row totals can vary in this situation, the exact probability associated to a certain value of *T* is even more difficult to compute than before because there are a greater number of possible tables with the same *T*.

3.15 Software Used for Analysis– For the analysis of surveyed data SPSS 16.0 and advance excel was used.

CHAPTER IV
RESULTS AND DISCUSSION

4.1 Background

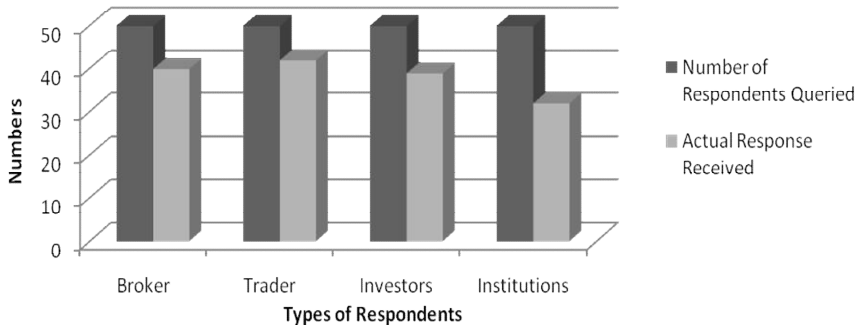
The information and the data pertaining options trading were collected through primary and secondary sources. The collection of information was made in the backdrop of objectives of the study. The collected information was classified, tabulated and analysed stepwise. On the basis of the analytical tools the results were obtained, tested and explained. The results and the explanation thereof are delineated in the following pages.

A total of 200 random selections of respondents were made from among different fields that directly or indirectly related to options trading in India and may have impact over its trading in some way or other. Table 4.1 depicts the break-up of different categories of respondents of the market queried and the number of respondents responded. Category wise number of respondents, who responded, was: Traders (84%), Brokers (80%), Investors (78%) and Institutions (64%). The schedules were sent to 50 respondents of each category mentioned above.

Table 4.1 – Categories of Respondents

Respondents	Respondents Queried	Respondents Received
Brokers	50	40
Investors	50	32
Institutions	50	39
Traders	50	42
Total	**200**	**153**

Chart 4.1: Breakup of Types of Respondents and Actual Reponse Recieved



4.2 Liquidity with its Volume

The respondents were asked about their experiences and knowledge about the liquidity (including its volume) problem in the capital market (particularly in the derivatives segment). The different categories respondents ranked their problem as per their own assessment and work experiences. The researcher analysed the rank of this item (or say variable of 'liquidity') with the help of 'central values' (i.e., mean, median and mode), 'symmetry measurement' (skewness and kurtosis) also called the measurement of shapes of ranks given by the respondents.

After analyzing the ranks statistically, it was obtained that the problem of 'liquidity with its volume' was being experienced and faced more by Traders (X = 6.43) as compared to Brokers (X = 5.95) Investors (5.64%), and Institutions with the mean 5.56 (the minimum one).

Table 4.2: Results of "Liquidity Problem & Volume"

(Composite Ranking 3)

Respondents	Mean	Std. Error of Mean	Median	Mode	Std. Deviation	Variance	Skewness	Std. Error of Skewness	Kurtosis	Std. Error of Kurtosis
Brokers	5.95	0.64	4.00	4.00	4.02	16.15	0.64	0.37	-0.95	0.73
Institutions	5.56	0.78	4.00	3.00	4.38	19.22	1.02	0.41	-0.40	0.81
Investors	5.64	0.67	5.00	1.00	4.20	17.60	0.62	0.38	-0.93	0.74
Traders	6.43	0.65	5.00	2a	4.23	17.86	0.48	0.37	-1.20	0.72
Composite	5.95	0.64	4.00	4.00	4.02	16.15	0.64	0.37	-0.95	0.73

a. Multiple modes exist. The smallest value is shown

Further, as far as kurtosis was concerned about the "Liquidity Problem and Volume", it was found maximum in the case of "Institutions". This peaked-ness of the variable indicates that "Institutions" were of the opinion that the "Liquidity Problem and Volume" were major impediments in the growth of the market.

As per *Table 4.2* the composite ranking given to this problem is given '3' i.e., it is the third biggest impediments in development of market, which is also reaffirmed by the above explanation.

Suggestions **-** Based on the above results the researcher suggests the following measures to overcome the problems relating to liquidity and volume:

To induce liquidity new variant of options are required to be introduced. Although it may intensify the liquidity issue in the existing products in beginning because the same set of participants would try new product at the cost of existing products.

Four new variants of Options are suggested by the researcher which is explained below.

Proposed Variants

1. ***Asian Options***

Pay off is based on average price attained by the underlying asset during the specified period. It can be due by both ways – average price options or average strike options.

2. ***Binary Options***

Under this there is fixed amount if expiration value exceeds the strike price and nil if not exceed. There exists direct linear relationship with European calls valuations. Thus, in short, pay off is full or zero.

3. ***Barrier Options***

Barrier Options either terminate early without value if the asset price hits a pre-specified barrier or would be activated only if the asset price hits a pre-specified barrier.

4. ***Limit Options (Bandhani)***

It limits the maximum cash flow during the life of options and can be used in long dated options

4.3 Exchange Turnover Charges

Charges are also levied on Stock exchange transactions apart from brokerage in the shape of Exchange and SEBI transaction charges. These charges are of great importance when intra-day trading (major volume generator) are concerned as there the margins are wafer thin and these additional cost can become the difference between a winning trade and losing trade.

However, transactions relating to both future and options attract turnover charges on the following basis whose details are depicted in Table 4.3.1 and Table 4.3.2:

Table 4.3.1: SEBI Turnover Charges

Equity Delivery	Equity Intra-Day	Futures	Options
0.0002% of Turnover	0.0002% of Turnover	0.0001% of Turnover and closeout	0.0001% of Premium

Table 4.3.2: Details of Exchange Turnover Charges (NSE)

Equity Delivery	Equity Intra-Day	Futures	Options
0.0035% of Turnover	0.0035% of Turnover	0.002% of Turnover and closeout	0.05% of Premium

Table 4.3.3: Details of Exchange Turnover Charges (BSE)

Equity Delivery	Equity Intra-Day	Futures	Options
0.0035% of Turnover	0.0035% of Turnover	0.002% of Turnover and closeout	0.05% of Premium

The researcher has tried to justify that whether Turnover Charges acts as an impediment in the growth of options and future segment or not. The findings and suggestions are explained below.

Table 4.3.4: Results of "Exchange Turnover Charges" (Composite Ranking 6)

Respondents	Mean	Std. Error of Mean	Median	Mode	Std. Deviation	Variance	Skewness	Std. Error of Skewness	Kurtosis	Std. Error of Kurtosis
Brokers	6.63	0.63	5.50	3a	3.97	15.73	0.47	0.37	-0.96	0.73
Institutions	5.00	0.69	3.50	3.00	3.89	15.16	1.37	0.41	1.04	0.81
Investors	7.15	0.67	6.00	3a	4.16	17.34	0.35	0.38	-1.22	0.74
Traders	6.76	0.61	6.50	2.00	3.97	15.80	0.24	0.37	-1.21	0.72
Composite	6.63	0.63	5.50	3a	3.97	15.73	0.47	0.37	-0.96	0.73

a. Multiple modes exist. The smallest value is shown

Explanation – The results enunciated in the Tale 4.3.3 show that the "Exchange Turnover Charges" by individual participant have been showing the skewness among them ($\overline{X} \neq Z \neq Md$). The skewness in the case of: Brokers = 0.47, Institutions = 1.37, Investors = 0.35 and Traders = 0.24. Also, the composite ranking for the same problem is showing skewness (0.47) among them ($\overline{X} \neq Z \neq Md$). The highest levels of skewness were found in case of "Institutions" in the backdrop of "Exchange Turnover Charges".

As far as kurtosis was concerned about the "Exchange Turnover Charges", was found maximum in the case of “Institutions”. Exception institution other respondents have given if a low ranking (6 to 8).

During the period April to June 2010, the top 10 Companies in cash equity segment of NSE, accounted for about 24% of the turnover and, equity stock futures and options contracts accounted for about 38% of the turnover. Client level delivery percentage in cash equity at NSE was about 36% and, daily intra-day square off turnover in futures and Options segment accounted for about 67% of the total turnover. The top 25 trading members of NSE accounted for about 42% and 43% of the cash equity and equity stock futures and options turnover respectively during the period April to June 2010.

Suggestions:

At present, three contracts are available in futures with monthly duration i.e. for Current Month, for Next Month and, for Next-to-Next Month. In other words, no future contract is available for more than three months (except in some cases where very long-term option contracts are allowed but, which are not active). Out of these three contracts, almost 60-70% volume remains in the first month contract only. Therefore, these contracts have to be rolled-over compulsorily. On compulsorily roll-over, a full amount of STT, as well as, Exchange Turnover Charges, Stamp Duty, Service Tax, everything is payable which increases the cost tremendously.

Therefore, it is suggested that the initial contract must be entered into, for at least two months which will facilitate 50% reduction in the cost. It can also be facilitated by charging 50% of nominal charges in roll-over which will further prevent the participants from entering into a contract for more than one month and also, not causing them to pay full amount of charges on roll-over.

4.4 Income Tax

Income is like a straightforward concept, but little about taxation is straightforward. The money one make as a day trader falls into different categories, with different tax rates and different allowed deductions. Currently, Income Tax Act imposes STT beside Capital Gain Tax over the income generated from transactions in Stocks and Futures. Presently, following taxes are levied on transaction in securities known as Securities Transactions Tax (Table 4.4.1)

a) Rs. 1750 per crore to be borne by the seller on Futures

b) Rs. 1750 per crore to be borne by the seller on Options value and Rs. 12500 on Options if this result in settlement of Options at the time of excise.

Table 4.4.1: Securities Transactions Tax

Equity Delivery	Equity Intra-Day	Futures	Options
0.125% of Turnover	0.025% of Turnover on SELL transactions	0.017% of Turnover on SELL transactions	0.017% of Option Premium on Sell transactions and 0.125% of Settlement Value where Option is exercised

The detailed break-up of STT charged is given in Table 4.2.2 below.

Table 4.4.2: Details of Securities Transaction Tax (STT)

Product	Transaction	Rate	Service Tax	Effective Rate	Charged On
Equity Delivery	Purchase	0.13%	-	0.13%	Turnover
	Sell	0.13%	-	0.13%	Turnover
Equity Intra-day	Purchase	-	-	-	
	Sell	0.03%	-	0.03%	Turnover
Future	Purchase	-	-	-	
	Sell	0.02%	-	0.02%	Turnover
Option	Purchase	0.13%	-	0.13%	Settlement price, on exercise
	Sell	0.02%	-	0.02%	Premium

Beside STT, tax is also imposed over capital gain. A capital gain occurs in case of securities are sold for a profit. The figure of the capital gains tax is the difference between the "basis" in the stock and the sales price. This difference is the profit or loss. The basis is usually what is paid for the stock, however if one inherit the stock, the basis is the price of the stock on the day the owner died. If the difference between the basis and the sales price is negative it is capital loss, which one can use to offset capital gains.

There are two types of capital gains:

a) Long-term Capital Gains

b) Short-term Capital Gains

For Long-term Capital Gains one must hold the stock for at least one full year to qualify for the long-term capital gains rates. On the other hand, Short-term Capital Gains arises when one holds a stock for less than one year before selling it.

For short-term capital gains, one is to be taxed at concessional rate of 15%.

For long term capital gains, one is to be taxed 20%. But if the transaction was levied with STT, one need not have to pay any tax on the gain.

Table 4.4.3: Results of "Income Tax"

(Composite Ranking 13)

Respondents	Mean	Std. Error of Mean	Median	Mode	Std. Deviation	Variance	Skewness	Std. Error of Skewness	Kurtosis	Std. Error of Kurtosis
Brokers	10.23	0.41	10.00	9.00	2.57	6.59	-0.13	0.37	-1.02	0.73
Institutions	7.00	0.24	7.00	7.00	1.34	1.81	2.55	0.41	7.44	0.81
Investors	8.92	0.43	8.00	7.00	2.70	7.28	0.68	0.38	-0.92	0.74
Traders	11.00	0.36	11.00	13.00	2.32	5.37	-0.52	0.37	-0.64	0.72
Composite	10.23	0.41	10.00	9.00	2.57	6.59	-0.13	0.37	-1.02	0.73

a. Multiple modes exist. The smallest value is shown

Explanation **–** The results enunciated in the Tale 4.4.3 show that the "Income Tax" by individual participant have been showing the skewness among them including "Composite" ($\overline{X} \neq Z \neq Md$) but excluding "Institutions" (2.55) which is not showing skewness ($\overline{X} = Z = Md$). The skewness in the case of: Brokers = -0.13, Institutions = 2.55, Investors = 0.68 and Traders = -0.52. The highest levels of skewness were found in case of "Institutions" in the backdrop of "Income Tax".

As far as kurtosis was concerned about the "Income Tax", was found maximum in the case of "Institutions" (7.44). Issue of Income Tax was found of low priority amongst the respondents, which can be explained by most of the investors, the facts brokers or traders have just started options trading and concentration is on how to use this opportunity instead going into issue of taxation.

Suggestions: In the proposed Direct Tax Code (DTC) Govt. has proposed calibration of STT to a lower level and re-introduction of tax on long-term gains as well as short term. It is suggested that no tax should be levied on financial transactions because it distorts the price discovery mechanism and the increase the impact cost. Similarly, to

canalise the domestic savings into productive assets it is suggested that exemption from long term capital gain tax be continued.

4.5 Exercise of Option

Presently, in India only two types of options products are introduced, viz., American in Stock Options and European in Index Options. However, all these are cash settled and no physical delivery can be given or obtained. This problem is highlighted by majority of the participants in the survey and is acting as a major impediment.

Table 4.5: Results of "Exercise of Options"

(Composite Ranking 2)

Respondents	Mean	Std. Error of Mean	Median	Mode	Std. Deviation	Variance	Skewness	Std. Error of Skewness	Kurtosis	Std. Error of Kurtosis
Brokers	5.40	0.57	5.00	5.00	3.58	12.81	0.45	0.37	-1.07	0.73
Institutions	4.28	0.41	4.00	4.00	2.34	5.50	1.67	0.41	5.20	0.81
Investors	6.85	0.67	7.00	4.00	4.20	17.61	0.25	0.38	-1.10	0.74
Traders	6.26	0.52	6.00	8.00	3.36	11.27	0.38	0.37	-0.47	0.72
Composite	5.40	0.57	5.00	5.00	3.58	12.81	0.45	0.37	-1.07	0.73

a. Multiple modes exist. The smallest value is shown

Explanation **–** The results enunciated in the Tale 4.5 show that the "Exercise of Options" by Brokers, Institutions and Composite have not been showing the skewness among them ($\overline{X}$=Z=Md). However, “Investors” and “Traders” are skewed ($\overline{X} \neq Z \neq Md$) in the case of “Excise of Options”. The skewness in the case of: Brokers = 0.45, Institutions = 1.67, Investors = 0.25 and Traders = 0.38. The highest levels of skewness were found in case of “Institutions” in the backdrop of "Exercise of Options".

As far as kurtosis was concerned about the "Exercise of Options", was found maximum in the case of “Institutions” (5.20). The peaked-ness of the variable indicates that “Institutions” were of the opinion that the "Exercise of Options" was major impediments in the growth of the market. Results are given in *Table 4.5*. The same observation can be explained by the fact that under the present system options are cash settled and neither the delivery be called or put regulator or exchange have to explore the system where exercise of options are settled by delivery and not by cash difference.

Suggestions: The Exchanges and the SEBI should consider introduction of physical delivery settlement in this segment so that prices are synchronized further with the cash market. Based on the study, researcher is also suggesting for physical settlement of the futures rather than cash settlement. In the time to come when the market becomes more mature options can also be settled in physical instead of cash.

4.6 Lack of Education

Although Derivatives have been introduced in India for almost 10 years, yet there is not much awareness and literacy amongst the participants. These are leveraged products and if these increase chances of profit they also multiply the chances of losses.

Table 4.6: Results of "Lack of Education"

(Composite Ranking 1)

Respondents	Mean	Std. Error of Mean	Median	Mode	Std. Deviation	Variance	Skewness	Std. Error of Skewness	Kurtosis	Std. Error of Kurtosis
Brokers	6.90	0.57	7.00	7.00	3.61	13.07	0.06	0.37	-1.02	0.73
Institutions	3.97	0.60	3.00	2.00	3.40	11.58	1.98	0.41	3.02	0.81
Investors	5.21	0.56	4.00	3.00	3.52	12.38	1.05	0.38	-0.11	0.74
Traders	5.86	0.53	6.00	4.00	3.45	11.93	0.49	0.37	-0.58	0.72
Composite	6.90	0.57	7.00	7.00	3.61	13.07	0.06	0.37	-1.02	0.73

a. Multiple modes exist. The smallest value is shown

Explanation – The results enunciated in the Tale 4.6 show that the "Lack of Education" by all individual participants including Composite have been showing the skewness among them ($\overline{X} \neq Z \neq Md$). The skewness in the case of: Brokers = 0.06, Institutions = 1.98, Investors = 1.05 and Traders = 0.49. The highest levels of skewness were found in case of “Institutions” in the backdrop of "Lack of Education".

Table 4.6 (A) Year Wise Flow of Funds in the Settlement of Index/Stock Options*

Month/Year	Index/Stock Options		Net Out Flow
	Premium Settlement	Exercise Settlement	
2001-2002	1647.58	939.46	708.12
2002-2003	3312.11	1958.83	1353.28
2003-2004	8589	4761	3828
2004-2005	9410.64	4558.7	4851.94
2005-2006	15205.8	8178.4	7027.4
2006-2007	31943.8	11888.4	20055.4
2007-2008	67601.7	37922.6	29679.1
April-Aug 08	42735.2	10510.1	32225.1

***Source: NSE Monthly Newsletter Aug 2008**

As far as kurtosis was concerned about the "Lack of Education", was found maximum in the case of “Institutions” (3.02). Except Brokers all other categories of respondents have found this as the worst impediments. As explained in *Table 4.6(A)* in 89 months out of the value of premium paid for buying of options always exceeded the exercise or settlement value of options. In other words buyer of options are continuously loosing mainly because of lack of education: Options are being used as speculative products instead of risk managing tools. For lack of education, ‘how to value the options’ is very different for most of the respondents. By employing exotic options, investors can reduce their cost (Butterfly etc.) though maintaining almost the same level of probable profitability. Hedgers also are not aware of techniques like Delta hedging or hedge ratio.

Lack of proper educational & training and exposure to trading softwares is again a major hindrance, as latest exotic options could not be employed which reduce the cost and increase the profitability.

Suggestions: The Exchanges, Regulator and the Intermediaries have to embark upon financial literacy programme in a massive way percolating down up to school and college students. There should be wider association between exchanges and universities so that new curriculum can be designed for financial literacy, inclusion and expertise. Similarly, the brokers, service providers and products distributors can also take initiative in financial education.

4.7 Instead of Risk Management Being Used as Speculative Instrument

Options products were designed for the purpose of offsetting the risk arising from the trade taken on behalf of futures, i.e., to say for hedging purpose. However, it is common practice of the trader to create positions in options not for heading but either for profit motive or for purely speculative purpose.

Table 4.7: Results of

"Instead of Risk Management Being Used as Speculative Instrument"

(Composite Ranking 5)

Respondents	Mean	Std. Error of Mean	Median	Mode	Std. Deviation	Variance	Skewness	Std. Error of Skewness	Kurtosis	Std. Error of Kurtosis
Brokers	6.30	0.60	6.00	5.00	3.77	14.22	0.36	0.37	-0.71	0.73
Institutions	5.53	0.64	5.00	5.00	3.61	13.03	0.85	0.41	0.16	0.81
Investors	6.28	0.67	5.00	1.00	4.20	17.68	0.42	0.38	-1.16	0.74
Traders	6.40	0.59	5.00	4a	3.82	14.59	0.42	0.37	-1.01	0.72
Composite	6.30	0.60	6.00	5.00	3.77	14.22	0.36	0.37	-0.71	0.73

a. Multiple modes exist. The smallest value is shown

Explanation – The results enunciated in the Tale 4.7 show that except "Institutions" ($\overline{X}$=Z=Md) in case of "Instead of Risk Management Being Used as Speculative Instrument" by all individual participants including Composite have been showing the skewness among them ($\overline{X} \neq Z \neq Md$). The skewness in the case of: Brokers = 0.36, Institutions = 0.85, Investors = 0.42 and Traders = 0.42. The highest levels of skewness were found in case of "Institutions" in the backdrop of "Lack of Education". As far as kurtosis was concerned about the "Instead of Risk Management Being Used as Speculative Instrument", was found maximum in the case of "Institutions" (0.16). The peaked-ness of the variable indicates that "Institutions" were of the opinion that the "Lack of Education" was major impediments in the growth of the market. Results are given in Table 4.7 Detailed explanation of this observation has been mentioned in above paragraph of explanation of *Section 4.6*.

Suggestions: The speculation is always considered the blood line of financial market. Therefore, there should not be any restriction on the speculation but efforts be made to encourage well calculated speculation based on understanding of products as a risk management technique or leveraged products to multiply the profits. Therefore, the financial education should be encouraged further so that the entire stake holders can take a balanced view.

4.8 Stamp Duty

Different States in India have different rates for Stamp Duty, different rules for jurisdiction for levying the Stamp Duty. In some cases, it is based on the registered address of the client (like Maharashtra) whereas in other states it is based on execution of Contract Notes. Similarly, some states like Maharashtra, Gujarat & Rajasthan had made record of transaction taxable in addition to the contract notes.

This has resulted charges of stamp duty on all trades including non-client trades (PRO) which has escalated the cost. Ambiguity still exists on levy on stamp duty on digital contract notes. Stamp Duty rated in Delhi & Maharashtra are given below:

Table 4.8.1: Stamp Duty

Equity Delivery	Equity Intra-Day	Futures	Options
0.01% of Turnover	0.002%of Turnover	0.002% of Turnover and closeout	0.002% of Premium and Notional value for Exercise/Assignment

Table 4.8.2 Results of "Stamp Duty"

(Composite Ranking 14)

Respondents	Mean	Std. Error of Mean	Median	Mode	Std. Deviation	Variance	Skewness	Std. Error of Skewness	Kurtosis	Std. Error of Kurtosis
Brokers	9.70	0.43	10.00	6.00	2.74	7.50	0.06	0.37	-1.24	0.73
Institutions	12.44	0.25	12.00	14.00	1.41	2.00	-0.85	0.41	1.38	0.81
Investors	11.41	0.36	12.00	12.00	2.26	5.09	-1.04	0.38	0.27	0.74
Traders	10.48	0.37	11.00	12.00	2.42	5.87	-0.31	0.37	-1.00	0.72
Composite	9.70	0.43	10.00	6.00	2.74	7.50	0.06	0.37	-1.24	0.73

a. Multiple modes exist. The smallest value is shown

Explanation – The results enunciated in the Tale 4.8.3 show that in case of "Stamp Duty" by all individual participants including Composite have been showing the skewness among them ($\overline{X} \neq Z \neq Md$). The skewness in the case of: Brokers = 0.06, Institutions = -0.85, Investors = -1.04 and Traders = -0.31. The highest levels of skewness were found in case of “Brokers” and ‘Composite” in the backdrop of "Stamp Duty".

Lowest attention was given by the participants on this aspect and got the lowest ranking. It can be explained by the fact that when volume would be more then only consideration would more towards cost components.

Suggestions: Researcher is of the opinion that:

1. There should be uniforms rates of stamp duty across India and preferably and there should not be any tax on financial transaction as it effect the impact cost.
2. The basis of payment and jurisdiction be standardized and be uniform.
3. Stamp Duty should be collected by the Exchanges from Brokers and be deposited directly with the respective states to smoothen the collection process.

4.9 Lack of Strategic Interest among Participants

Options are considered to be riskiest among the future and options space. The probability of investment in options turning to zero is always there while in future or cash segment it is not so. Due to this there exists less strategic interest among the participants.

Table 4.9: Results of "Lack of Strategic Interest among Participants"

(Composite Ranking 4)

Respondents	Mean	Std. Error of Mean	Median	Mode	Std. Deviation	Variance	Skewness	Std. Error of Skewness	Kurtosis	Std. Error of Kurtosis
Brokers	6.00	0.61	5.50	2.00	3.83	14.67	0.44	0.37	-1.06	0.73
Institutions	5.66	0.71	5.00	5.00	4.02	16.17	0.99	0.41	0.19	0.81
Investors	6.64	0.59	6.00	5.00	3.71	13.76	0.42	0.38	-0.84	0.74
Traders	6.10	0.59	5.00	3.00	3.79	14.38	0.54	0.37	-0.82	0.72
Composite	6.00	0.61	5.50	2.00	3.83	14.67	0.44	0.37	-1.06	0.73

a. Multiple modes exist. The smallest value is shown

Explanation **–** The results enunciated in the Tale 4.1.8 show that except "Institutions" in case of "Lack of Strategic Interest among Participants" by all individual participants including Composite have been showing the skewness among them ($\overline{X} \neq Z \neq Md$). The skewness in the case of: Brokers = 0.44, Institutions = 0.99, Investors = 0.42 and Traders = 0.54. The highest levels of skewness were found in

case of “Institutions” in the backdrop of "Lack of Strategic Interest among Participants".

As far as kurtosis was concerned about the "Lack of Strategic Interest among Participants", was found maximum in the case of “Institutions” (0.19). The peaked-ness of the variable indicates that “Institutions” were of the opinion that the "Lack of Strategic Interest among Participants" was major impediments in the growth of the market. Results are given in Table 4.1.8.

This observation can be explained by the fact that interest is dependent on total market efficiency, volume and liquidity. Thus, it is showing a cumulative effect of all the market impediments.

Suggestions: Interest among the participants will be generated only if participants will learn the real use of options. Options are tools used to safeguard the open position in cash as well as future segment and not as a speculative instrument to be used for profit generation. Thus, researcher is of the view that proper training and adequate education base in this direction will cater the need properly.

4.10 American Options Available in Stocks

American Options are options that can be exercised anytime during its life. Since investors have the freedom to exercise their American options at any point during the life of the contract, they are more valuable than European options which can only be exercised at maturity.

Table 4.10: Results of "American Options Available in Stocks"

(Composite Ranking 7)

Respondents	Mean	Std. Error of Mean	Median	Mode	Std. Deviation	Variance	Skewness	Std. Error of Skewness	Kurtosis	Std. Error of Kurtosis
Brokers	8.35	0.58	9.00	13.00	3.66	13.36	-0.45	0.37	-0.89	0.73
Institutions	6.34	0.41	6.50	6a	2.32	5.39	-1.02	0.41	0.11	0.81
Investors	6.51	0.59	6.00	6a	3.68	13.52	-0.01	0.38	-1.00	0.74
Traders	7.05	0.56	7.00	9.00	3.64	13.27	-0.24	0.37	-1.02	0.72
Composite	8.35	0.58	9.00	13.00	3.66	13.36	-0.45	0.37	-0.89	0.73

a. Multiple modes exist. The smallest value is shown

Explanation – The results enunciated in the Tale 4.10 show that except “Institutions” and “Investors” ($\overline{X}$ =Z=Md) in case of "Only American Options Available in Stocks" by all individual participants including Composite have been showing the skewness among them ($\overline{X} \neq Z \neq Md$). The skewness in the case of: Brokers = -0.45, Institutions = -1.02, Investors = -0.01 and Traders = -0.24. The highest levels of skewness were found in case of “Investors” in the backdrop of “American Options Available in Stocks".

As far as kurtosis was concerned about the "American Options Available in Stocks", was found maximum in the case of “Institutions” (0.11). The peaked-ness of the variable indicates that “Institutions” were of the opinion that the "Only American Options Available in Stocks" was major impediments in the growth of the market. Results are given in Table 4.10.

Suggestions: American options entered the holder of options to exercise his options at any time during the currency of the options period. These options are exercised at the closing price of that day in the underlying segment (in Indian context, in CM Segment) and are settled on next day in cash. Seller of options is informed only after the closure of day trading, therefore, cannot square off his position on the same day. It has to be squared off next day at their prevailing price by the seller. Therefore, seller are be given an options to put the deliveries instead of cash difference. Without deliveries mechanism, American system cannot infuse the efficiency in the market. Thus, as discussed above by the researcher, physical settlement must be permitted for overcoming such problems.

4.11 High Premium Costs

In case of future and option context premium cost has different connotation. For futures the gap between the cash price of the underlying commodity or index and the futures price. For options per share amount the buyer pays to the seller as determined by the market is premium. Due to low liquidity in most of the tradable options especially in stocks segment have premium on higher side. Besides high premium costs exchanges levies transaction charges over buying and selling whose details are depicted in Table 4.11.1 and 4.11.2.

Table 4.11.1: Transaction Charges

Equity Delivery	Equity Intra-Day	Futures	Options
0.0034% of Turnover in BSE and 0.0035% of Turnover in NSE	0.0034% of Turnover in BSE and 0.0035% of Turnover in NSE	0.002% of Turnover	0.05% of Premium

Table 4.11.2: Details of Transaction Charges

Product	Transaction	Rate	Service Tax	Effective Rate	Charged On
Equity Delivery	Purchase	0.00350000%	12.36%	0.00393260%	Turnover
	Sell	0.00350000%	12.36%	0.00393260%	Turnover
Equity Intra-day	Purchase	0.00350000%	12.36%	0.00393260%	Turnover
	Sell	0.00350000%	12.36%	0.00393260%	Turnover
Future	Purchase	0.00200000%	12.36%	0.00224720%	Turnover
	Sell	0.00200000%	12.36%	0.00224720%	Turnover
Option	Purchase	0.05000000%	12.36%	0.05618000%	Premium
	Sell	0.05000000%	12.36%	0.05618000%	Premium

Table 4.11: Results of "High Premium Costs"

(Composite Ranking 8)

Respondents	Mean	Std. Error of Mean	Median	Mode	Std. Deviation	Variance	Skewness	Std. Error of Skewness	Kurtosis	Std. Error of Kurtosis
Brokers	7.90	0.69	8.50	13.00	4.39	19.27	-0.11	0.37	-1.34	0.73
Institutions	9.06	0.73	10.00	11.00	4.10	16.83	-0.76	0.41	-0.23	0.81
Investors	6.69	0.60	7.00	9.00	3.72	13.85	0.07	0.38	-1.06	0.74
Traders	6.79	0.60	7.00	10.00	3.87	15.00	0.15	0.37	-1.03	0.72
Composite	7.90	0.69	8.50	13.00	4.39	19.27	-0.11	0.37	-1.34	0.73

a. Multiple modes exist. The smallest value is shown

Explanation – The results enunciated in the Tale 4.11.3 show that in case of "High Premium Costs" by all individual participants including Composite have been showing the skewness among them ($\overline{X} \neq Z \neq Md$). The skewness in the case of: Brokers = -0.11, Institutions = -0.76, Investors = 0.07 and Traders = 0.15. The highest levels of skewness were found in case of “Traders” in the backdrop of "High Premium Costs".

As far as kurtosis was concerned about the "High Premium Costs", was found maximum in the case of “Institutions” (0.41). The peaked-ness of the variable indicates that “Institutions” were of the opinion that the "High Premium Costs" was major impediments in the growth of the market. Results are given in Table 4.11.3.

Suggestions: Premium will be reduced if we are able to increase the liquidity in the exchanges. To increase the liquidity again, new hybrid products are to be introduced. Details of such suggested products have been given elsewhere in the report. Also, lack of education is one of the other factors and has been explained in the preceding paragraph above relating to lack of education *(Table 4.6)*. The exchange should also reduce the transaction charges.

4.12: Only European Options available in Index

European options are options that can only be exercised at the end of its life, at its maturity. European options tend to sometimes trade at a discount to its comparable American option. This is because American options allow investors more opportunities to exercise the contract. A buyer of a European option that does not want to wait for maturity to exercise it can sell the option to close the position.

Table 4.12: Descriptive Statistics of Problem Entitled "Only European Options Available in Index"

(Composite Ranking 9)

Respondents	Mean	Std. Error of Mean	Median	Mode	Std. Deviation	Variance	Skewness	Std. Error of Skewness	Kurtosis	Std. Error of Kurtosis
Brokers	7.30	0.59	7.00	6a	3.75	14.06	-0.05	0.37	-1.16	0.73
Institutions	9.28	0.65	10.00	10.00	3.67	13.43	-1.21	0.41	0.80	0.81
Investors	7.31	0.60	8.00	10.00	3.74	14.01	-0.35	0.38	-0.98	0.74
Traders	7.48	0.62	7.00	3a	4.01	16.06	0.17	0.37	-1.15	0.72
Composite	7.30	0.59	7.00	6a	3.75	14.06	-0.05	0.37	-1.16	0.73

a. Multiple modes exist. The smallest value is shown

Explanation – The results enunciated in the Tale 4.12 show that in case of "Only European Options Available in Index" by all individual participants including Composite have been showing the skewness among them ($\overline{X} \neq Z \neq Md$). The skewness in the case of: Brokers = -0.05, Institutions = -1.21, Investors = -0.35 and Traders = 0.17. The highest levels of skewness were found in case of “Traders” in the backdrop of "Only European Options Available in Index".

As far as kurtosis was concerned about the "Only European Options Available in Index", was found maximum in the case of “Institutions” (0.80). The peaked-ness of the variable indicates that “Institutions” were of the opinion that the "Only European Options Available in Index" was major impediments in the growth of the market. Results are given in Table 4.12. These phenomenons have already been explained in table 4.9 above.

Suggestions: Already been discussed in section of American Options in stocks above by the researcher in details.

4.13: Operational Issues in Using Exotic Models of Options Trading

An Exotic Option is an option that differs from common American or European options in terms of the underlying asset or the calculation of how or when the investor receives a certain payoff. These options are more complex than options that trade on an exchange. For example, one type of exotic option is known as a chooser option. This instrument allows an investor to choose whether the options are a put or call at a certain point during the option's life. Because this type of option can change over the holding period, it is not be found on a regular exchange, which is why it is classified as an exotic option. Other types of exotic options include: barrier options, Asian options, digital options and compound options, among others.

Table 4.13: Results of "Operational Issues in Using Exotic Models of Options Trading"

(Composite Ranking 11)

Respondents	Mean	Std. Error of Mean	Median	Mode	Std. Deviation	Variance	Skewness	Std. Error of Skewness	Kurtosis	Std. Error of Kurtosis
Brokers	9.55	0.68	11.00	14.00	4.30	18.46	-0.71	0.37	-0.75	0.73
Institutions	8.88	0.47	9.00	9.00	2.67	7.15	-1.46	0.41	1.83	0.81
Investors	8.64	0.63	9.00	4a	3.93	15.45	-0.21	0.38	-1.22	0.74
Traders	8.10	0.74	9.00	1.00	4.80	23.06	-0.32	0.37	-1.44	0.72
Composite	9.55	0.68	11.00	14.00	4.30	18.46	-0.71	0.37	-0.75	0.73

a. Multiple modes exist. The smallest value is shown

Explanation **–** The results enunciated in the Tale 4.13 show that except “Institutions” ($\overline{X}$=Z=Md) in case of "Operational Issues in Using Exotic Models of Options Trading" by all individual participants including Composite have been showing the skewness among them ($\overline{X} \neq Z \neq Md$). The skewness in the case of: Brokers = -0.71,

Institutions = -1.46, Investors = -0.21 and Traders = -0.32. The highest levels of skewness were found in case of “Investors” in the backdrop of "Operational Issues in Using Exotic Models of Options Trading".

As far as kurtosis was concerned about the "Operational Issues in Using Exotic Models of Options Trading", was found maximum in the case of “Institutions” (1.83).

Suggestions: Low priority to this issue can be explained by the reason that a very low percentage of market participants have started using exotic markets of Options Trading, therefore operational issue such as permission for software, cross margining, spread margining are of less relevance. Therefore, researcher is suggesting for spread of education and technical know-how in this field which is also the outcome of the present study.

4.14 Lack of Trading Software

For a trade to be effective it is necessary that proper tools for it is available with accurate and timely data base attached with it. In India when it comes to future and options trading software, or software for analysing different strategies for both options and futures technically, it is very hard to find them. Even if available they are too costly for a trader or even a broker.

Table 4.14: Results of "Lack of Trading Software"

(Composite Ranking 12)

Respondents	Mean	Std. Error of Mean	Median	Mode	Std. Deviation	Variance	Skewness	Std. Error of Skewness	Kurtosis	Std. Error of Kurtosis
Brokers	8.83	0.67	10.00	14.00	4.26	18.15	-0.39	0.37	-1.14	0.73
Institutions	10.97	0.25	11.00	10a	1.40	1.97	0.21	0.41	-0.01	0.81
Investors	7.97	0.68	8.00	2a	4.25	18.03	-0.15	0.38	-1.34	0.74
Traders	9.76	0.58	10.50	14.00	3.74	13.99	-0.73	0.37	-0.12	0.72
Composite	8.83	0.67	10.00	14.00	4.26	18.15	-0.39	0.37	-1.14	0.73

a. Multiple modes exist. The smallest value is shown

Explanation **–** The results enunciated in the Tale 4.1.13 show that in case of "Lack of Trading Software" by all individual participants including Composite have been showing the skewness among them ($\overline{X} \neq Z \neq Md$). The skewness in the case of: Brokers = -0.39, Institutions = 0.21, Investors = -0.15 and Traders = -0.73. The highest levels of skewness were found in case of “Institutions” in the backdrop of "Lack of Trading Software".

This phenomenon akin to previous one has been explained under Table 4.1.12.

Suggestions: Researcher is suggesting that exchange should take initiative in this field and attract venture capitalists and software development companies for development and educating and or implementation of such developed products to the mass users.

4.15 High Margin

Presently the exchanges are charging various types of margins in future trading based on VaR methodology. It consists of initial margin, MTM based margin atoxes specific margin. The margins are also increased based on open interest position. It is very difficult for the participants to understand a SPAN based margining system.

Table 4.15: Descriptive Statistics of Problem Entitled "High Margin"

(Composite Ranking 10)

Respondents	Mean	Std. Error of Mean	Median	Mode	Std. Deviation	Variance	Skewness	Std. Error of Skewness	Kurtosis	Std. Error of Kurtosis
Brokers	5.98	0.62	5.00	3.00	3.92	15.36	0.59	0.37	-0.64	0.73
Institutions	11.03	0.37	11.00	13.00	2.09	4.35	-0.20	0.41	-1.26	0.81
Investors	9.77	0.55	10.00	14.00	3.43	11.76	-0.73	0.38	0.01	0.74
Traders	6.55	0.62	6.00	6.00	4.05	16.40	0.40	0.37	-0.99	0.72
Composite	5.98	0.62	5.00	3.00	3.92	15.36	0.59	0.37	-0.64	0.73

a. Multiple modes exist. The smallest value is shown

Explanation – The results enunciated in the Tale 4.15 show that except in case of "High Margin" by all individual participants including Composite have been showing the skewness among them ($\overline{X} \neq Z \neq Md$). The skewness in the case of: Brokers = 0.59, Institutions = -0.20, Investors = -0.73 and Traders = 0.40. The highest levels of skewness were found in case of “Brokers” and “Composite” in the backdrop of "High Margin".

As far as kurtosis was concerned about the "High Margin", was found maximum in the case of “Investors” (0.01). The peaked-ness of the variable indicates that “Institutions” were of the opinion that the "High Margin" was major impediments in the growth of the market. Results are given in Table 4.15.

Suggestions: It is suggested that margining system should be simplified and reduced based on the experience in the market.

4.16 Discussion

If this result exists for a long period of time it means that market participants like brokers, institutions, individuals and traders are not experiencing the efficient market. The skewness among the participants ranges in between -1.46 to 2.55 and kurtosis in between -1.44 to 7.44 (Table 4.16).

Table 4.16 – Group wise Skewness and Kurtosis

	Skewness		Kurtosis	
Group	Minimum	Maximum	Minimum	Maximum
Brokers	-0.71	0.64	-1.34	-0.64
Institutions	-1.46	2.55	-1.26	7.44
Investors	-1.04	1.05	-1.34	0.27
Traders	-0.73	0.54	-1.44	-0.12
Composite	-0.71	0.64	-1.34	-0.64

The same kind of result has not obtained by any researcher in the yester period therefore it is a median result of the present research work.

To avoid such kind of impediments the market participants as well as market regulators should do something to minimise the liquidity problem in the options trading segment, therefore researcher is of the opinion that heterogeneous types of additional forms of options should be introduced in the market. Though initially it will aggravate liquidity problem but in the long run it would escalate the liquidity in the derivative markets. In addition to it, it is suggested that the forms of new options products such as under should be introduced.

4.17 Discussion and Interpretation of Results – Chi-Square Goodness of Fit Test

Table 4.17.1: Chi-Square Goodness of Fit Test - Liquidity Problem & Volume Frequencies

Group

Group	Observed N	Expected N	Residual
Broker	215	218.3	-3.3
Institutions	168	218.3	-50.3
Investors	220	218.3	1.8
Traders	270	218.3	51.8
Total	873		

Test Statistics

	Group
Chi-Square	23.903[a]
Df	3
Asymp. Sig.	.000

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 218.3.

Observations

An average of 873 ranks was given for Liquidity Problem and Volume - 215 by Broker, 168 by Institution, etc.

There were 873 observed ranks for the sample respondents, resulting in about 218.3 ranks per group.

The table shows that Institutions have many fewer, and Traders, many more, ranks than an "every Group is equal" assumption would expect. Thus, institutions had given priority to “Liquidity Problem and Volume” while Traders have given least weight-age to this problem.

The obtained chi-square statistic equals 23.90 with df 3.

The low significance value suggests that the average rate of ranks given by the respondents does differ by each group.

Table 4.17.2: Chi-Square Goodness of Fit Test - Exchange Turnover Charges

Frequencies

Problem

Group	Observed N	Expected N	Residual
Broker	235	240.5	-5.5
Institutions	160	240.5	-80.5
Investors	279	240.5	38.5
Traders	288	240.5	47.5
Total	962		

Test Statistics

	Problem
Chi-Square	42.615[a]
Df	3
Asymp. Sig.	.000

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 240.5.

Observations

An average of 962 ranks was given for “Exchange Turnover Charges” - 235 by Broker, 160 by Institution, etc.

There were 962 observed ranks for the sample respondents, resulting in about 240.5 ranks per group.

The table shows that Institutions have many fewer, and Traders, many more, ranks than an "every Group is equal" assumption would expect. Thus, institutions had given priority to “Exchange Turnover Charges” while Traders have given least weight-age to this problem.

The obtained chi-square statistic equals 42.61 with df 3.

The low significance value suggests that the average rate of ranks given by the respondents does differ by each group.

Table 4.17.3: Chi-Square Goodness of Fit Test - Income Tax

Frequencies

Problem

Group	Observed N	Expected N	Residual
Broker	234	317.0	-83.0
Institutions	224	317.0	-93.0
Investors	348	317.0	31.0
Traders	462	317.0	145.0
Total	1268		

Test Statistics

	Problem
Chi-Square	118.372
Df	3
Asymp. Sig.	.000

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 317.0.

Observations

An average of 1268 ranks was given for “Income Tax” - 234 by Broker, 224 by Institution, etc.

There were 1268 observed ranks for the sample respondents, resulting in about 317 ranks per group.

The table shows that Institutions have many fewer, and Traders, many more, ranks than an "every Group is equal" assumption would expect. Thus, institutions had given priority to “Income Tax” while Traders have given least weight-age to this problem.

The obtained chi-square statistic equals 118.37 with df 3.

The low significance value suggests that the average rate of ranks given by the respondents does differ by each group.

Table 4.17.4: Chi-Square Goodness of Fit Test - Exercise of Options

Frequencies

Problem

Group	Observed N	Expected N	Residual
Broker	230	225.5	4.5
Institutions	137	225.5	-88.5
Investors	267	225.5	41.5
Traders	268	225.5	42.5
Total	902		

Test Statistics

	Problem
Chi-Square	50.470[a]
Df	3
Asymp. Sig.	.000

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 225.5.

Observations

An average of 902 ranks was given for “Excise of Options” - 230 by Broker, 137 by Institution, etc.

There were 902 observed ranks for the sample respondents, resulting in about 225.5 ranks per group.

The table shows that Institutions have many fewer, and Traders, many more, ranks than an "every Group is equal" assumption would expect. Thus, institutions had given priority to “Excise of Options” while Traders have given least weight-age to this problem.

The obtained chi-square statistic equals 50.47 with df 3.

The low significance value suggests that the average rate of ranks given by the respondents does differ by each group.

Table 4.17.5: Chi-Square Goodness of Fit Test - Lack of Education

Frequencies

Problem

Group	Observed N	Expected N	Residual
Broker	245	205.3	39.8
Institutions	127	205.3	-78.3
Investors	203	205.3	-2.3
Traders	246	205.3	40.8
Total	821		

Test Statistics

	Problem
Chi-Square	45.646[a]
Df	3
Asymp. Sig.	.000

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 205.3.

Observations

An average of 821 ranks was given for “Lack of Education” - 245 by Broker, 127 by Institution, etc.

There were 821 observed ranks for the sample respondents, resulting in about 205.3 ranks per group.

The table shows that Institutions have many fewer, and Traders, many more, ranks than an "every Group is equal" assumption would expect. Thus, institutions had given priority to “Lack of Education” while Traders have given least weight-age to this problem.

The obtained chi-square statistic equals 45.64 with df 3.

The low significance value suggests that the average rate of ranks given by the respondents does differ by each group.

Table 4.17.6: Chi-Square Goodness of Fit Test - Instead of Risk Management Tool Being Used as Speculative Instrument

Frequencies

Problems

Group	Observed N	Expected N	Residual
Broker	261	238.8	22.3
Institutions	177	238.8	-61.8
Investors	245	238.8	6.3
Traders	272	238.8	33.3
Total	955		

Test Statistics

	Problems
Chi-Square	22.839[a]
Df	3
Asymp. Sig.	.000

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 238.8.

Observations

An average of 955 ranks was given for “Instead of Risk Management Tool Being Used as Speculative Instrument” - 261 by Broker, 177 by Institution, etc.

There were 955 observed ranks for the sample respondents, resulting in about 238.8 ranks per group.

The table shows that Institutions have many fewer, and Traders, many more, ranks than an "every Group is equal" assumption would expect. Thus, institutions had given priority to “Instead of Risk Management Tool Being Used as Speculative Instrument” while Traders have given least weight-age to this problem.

The obtained chi-square statistic equals 22.83 with df 3.

The low significance value suggests that the average rate of ranks given by the respondents does differ by each group.

Table 4.17.7: Chi-Square Goodness of Fit Test - Stamp Duty

Frequencies

Problems

Group	Observed N	Expected N	Residual
Broker	273	389.0	-116.0
Institutions	398	389.0	9.0
Investors	445	389.0	56.0
Traders	440	389.0	51.0
Total	1556		

Test Statistics

	Problems
Chi-Square	49.548[a]
Df	3
Asymp. Sig.	.000

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 389.0.

Observations

An average of 1556 ranks was given for “Stamp Duty” - 273 by Broker, 398 by Institution, etc.

There were 1556 observed ranks for the sample respondents, resulting in about 389 ranks per group.

The table shows that Broker have many fewer, and Investor, many more, ranks than an "every Group is equal" assumption would expect. Thus, Brokers had given priority to “Stamp Duty” while Investors have given least weight-age to this problem.

The obtained chi-square statistic equals 49.54 with df 3.

The low significance value suggests that the average rate of ranks given by the respondents does differ by each group.

Table 4.17.8: Chi-Square Goodness of Fit Test - Lack of Strategic Interest among Participants

Frequencies

Problems

Group	Observed N	Expected N	Residual
Broker	283	245.3	37.8
Institutions	191	245.3	-54.3
Investors	259	245.3	13.8
Traders	248	245.3	2.8
Total	981		

Test Statistics

	Problems
Chi-Square	18.613[a]
Df	3
Asymp. Sig.	.000

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 245.3.

Observations

An average of 981 ranks was given for "Lack of Strategic Interest among Participants" - 283 by Broker, 191 by Institution, etc.

There were 981 observed ranks for the sample respondents, resulting in about 245.3 ranks per group.

The table shows that Institutions have many fewer, and Brokers, many more, ranks than an "every Group is equal" assumption would expect. Thus, Institutions had given priority to "Lack of Strategic Interest among Participants" while Brokers have given least weight-age to this problem.

The obtained chi-square statistic equals 18.61 with df 3.

The low significance value suggests that the average rate of ranks given by the respondents does differ by each group.

Table 4.17.9: Chi-Square Goodness of Fit Test - Only American Options Available in Stock

Frequencies

Problems

Group	Observed N	Expected N	Residual
Broker	302	263.8	38.3
Institutions	203	263.8	-60.8
Investors	254	263.8	-9.8
Traders	296	263.8	32.3
Total	1055		

Test Statistics

	Problems
Chi-Square	23.844[a]
Df	3
Asymp. Sig.	.000

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 263.8.

Observations

An average of 1055 ranks was given for “American Options Available in Stock” - 302 by Broker, 203 by Institution, etc.

There were 1055 observed ranks for the sample respondents, resulting in about 263.8 ranks per group.

The table shows that Institutions have many fewer, and Brokers, many more, ranks than an "every Group is equal" assumption would expect. Thus, Institutions had given priority to “American Options Available in Stock” while Brokers have given least weight-age to this problem.

The obtained chi-square statistic equals 23.84 with df 3.

The low significance value suggests that the average rate of ranks given by the respondents does differ by each group.

Table 4.17.10: Chi-Square Goodness of Fit Test - High Premium Cost

Frequencies

Problems

Group	Observed N	Expected N	Residual
Broker	322	289.5	32.5
Institutions	290	289.5	.5
Investors	261	289.5	-28.5
Traders	285	289.5	-4.5
Total	1158		

Test Statistics

	Problems
Chi-Square	6.525[a]
Df	3
Asymp. Sig.	.089

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 289.5.

Observations

An average of 1158 ranks was given for “High Premium Cost” - 322 by Broker, 290 by Institution, etc.

There were 1158 observed ranks for the sample respondents, resulting in about 289.5 ranks per group.

The table shows that Investors have many fewer, and Brokers, many more, ranks than an "every Group is equal" assumption would expect. Thus, Investors had given

priority to “High Premium Cost” while Brokers have given least weight-age to this problem.

The obtained chi-square statistic equals 6.52 with df 3.

The low significance value suggests that the average rate of ranks given by the respondents does differ by each group.

Table 4.17.11: Chi-Square Goodness of Fit Test - Only European Options Available in Index

Frequencies

Problem

Group	Observed N	Expected N	Residual
Broker	340	309.0	31.0
Institutions	297	309.0	-12.0
Investors	285	309.0	-24.0
Traders	314	309.0	5.0
Total	1236		

Test Statistics

	Problem
Chi-Square	5.521[a]
Df	3
Asymp. Sig.	.137

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 309.0.

Observations

An average of 1236 ranks was given for “Only European Options Available in Index” - 340 by Broker, 297 by Institution, etc.

There were 1158 observed ranks for the sample respondents, resulting in about 309 ranks per group.

The table shows that Investors have many fewer, and Brokers, many more, ranks than an "every Group is equal" assumption would expect. Thus, Investors had given priority to “Only European Options Available in Index” while Brokers have given least weight-age to this problem.

The obtained chi-square statistic equals 5.52 with df 3.

The low significance value suggests that the average rate of ranks given by the respondents does differ by each group.

Table 4.17.12: Chi-Square Goodness of Fit Test - Operational Issues in using Exotic Models of Options Trading

Frequencies

Problem

Group	Observed N	Expected N	Residual
Broker	371	333.0	38.0
Institutions	284	333.0	-49.0
Investors	337	333.0	4.0
Traders	340	333.0	7.0
Total	1332		

Test Statistics

	Problem
Chi-Square	11.742[a]
Df	3
Asymp. Sig.	.008

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 333.0.

Observations

An average of 1322 ranks was given for “Operational Issues in using Exotic Models of Options Trading” - 371 by Broker, 284 by Institution, etc.

There were 1132 observed ranks for the sample respondents, resulting in about 333 ranks per group.

The table shows that Institutions have many fewer, and Brokers, many more, ranks than an "every Group is equal" assumption would expect. Thus, Institutions had given priority to “Operational Issues in using Exotic Models of Options Trading” while Brokers have given least weight-age to this problem.

The obtained chi-square statistic equals 11.72 with df 3.

The low significance value suggests that the average rate of ranks given by the respondents does differ by each group.

Table 4.17.13: Chi-Square Goodness of Fit Test - Lack of Trading Software

Frequencies

Problems

Group	Observed N	Expected N	Residual
Broker	380	363.0	17.0
Institutions	351	363.0	-12.0
Investors	311	363.0	-52.0
Traders	410	363.0	47.0
Total	1452		

Test Statistics

	Problems
Chi-Square	14.727[a]
Df	3
Asymp. Sig.	.002

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 363.0.

Observations

An average of 1452 ranks was given for “Lack of Trading Software” - 380 by Broker, 351 by Institution, etc.

There were 1452 observed ranks for the sample respondents, resulting in about 363 ranks per group.

The table shows that Investors have many fewer, and Traders, many more, ranks than an "every Group is equal" assumption would expect. Thus, Investors had given priority to “Lack of Trading Software” while Traders have given least weight-age to this problem.

The obtained chi-square statistic equals 14.72 with df 3.

The low significance value suggests that the average rate of ranks given by the respondents does differ by each group.

Table 4.17.14: Chi-Square Goodness of Fit Test - High Margin

Frequencies

Problems

Group	Observed N	Expected N	Residual
Broker	403	352.0	51.0
Institutions	353	352.0	1.0
Investors	381	352.0	29.0
Traders	271	352.0	-81.0
Total	1408		

Test Statistics

	Problems
Chi-Square	28.420[a]
Df	3
Asymp. Sig.	.000

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 352.0.

Observations

An average of 1408 ranks was given for “High Margin” - 403 by Broker, 353 by Institution, etc.

There were 1408 observed ranks for the sample respondents, resulting in about 352 ranks per group.

The table shows that Trade have many fewer, and Broker, many more, ranks than an "every Group is equal" assumption would expect. Thus, Trader had given priority to “Lack of Trading Software” while Brokers have given least weight-age to this problem.

The obtained chi-square statistic equals 28.42 with df 3.

The low significance value suggests that the average rate of ranks given by the respondents does differ by each group.

FINDINGS

Chi-Square determines whether the observed frequencies markedly differ from the frequencies that is expected by chance. The chi-square statistic is the sum of the contributions from each of the individual cells. Every cell in a table contributes something to the overall chi-square statistic. If a given cell differs markedly from the expected frequency, then the contribution of that cell to the overall chi-square is large. If a cell is close to the expected frequency for that cell, then the contribution of that cell to the overall chi-square is low. A large chi-square statistic indicates that somewhere in the table, the observed frequencies differ markedly from the expected frequencies. It does not tell which cell (or cells) is causing the high chi-square, only that they are there.

Table 4.18: Problems And Their Preferences by the Respondents

Problems	More Weight-age	Least Weight-age	Chi-Square
Liquidity Problem & Volume	Institutions	Traders	23.9
Exchange Turnover Charges	Institutions	Traders	42.61
Income Tax	Institutions	Traders	118.37
Exercise of Options	Institutions	Traders	50.47
Lack of Education	Institutions	Traders	45.64
Instead of Risk Management Tool Being Used as Speculative Instrument	Institutions	Traders	22.83
Stamp Duty	Brokers	Investors	49.54
Lack of Strategic Interest Among Participants	Institutions	Brokers	18.61
Only American Options Available in Stock	Institutions	Brokers	23.84
High Premium Cost	Investors	Brokers	6.52
Only European Options Available in Index	Investors	Brokers	5.52
Operational Issues in using Exotic Models of Options Trading	Institutions	Brokers	11.72
Lack of Trading Software	Investors	Traders	14.72
High Margin	Traders	Brokers	28.42

Chi-Square Test for Independence

In order to test that whether -

✓ the respondents are independent in their views relating to the Impediments in Acceptability of Options Trading in India, and

✓ the associated problems are also independent, the Chi-Square Test for Independence was conducted.

For this the following hypothesis was constructed-

H_0 = the respondents are independent of the response and the response are independent among themselves.

H_1 = the respondents are not independent of the response and the response are also not independent among themselves. Hence, the sample is from same population.

Problems * Group Cross-tabulation

Problems		Group				
		Broker	Institutions	Investors	Traders	Total
Liquidity Problem & Volume	Count	40	31	39	42	152
	Expected Count	39.7	31.8	38.7	41.7	152.0
	% within Problems	26.3%	20.4%	25.7%	27.6%	100.0%
	% within Group	7.1%	6.9%	7.1%	7.1%	7.1%
	% of Total	1.9%	1.4%	1.8%	2.0%	7.1%
Exchange Turnover Charges	Count	40	32	39	43	154
	Expected Count	40.3	32.2	39.3	42.3	154.0
	% within Problems	26.0%	20.8%	25.3%	27.9%	100.0%
	% within Group	7.1%	7.1%	7.1%	7.3%	7.2%
	% of Total	1.9%	1.5%	1.8%	2.0%	7.2%
Income Tax	Count	40	32	39	42	153
	Expected Count	40.0	32.0	39.0	42.0	153.0
	% within Problems	26.1%	20.9%	25.5%	27.5%	100.0%
	% within Group	7.1%	7.1%	7.1%	7.1%	7.1%
	% of Total	1.9%	1.5%	1.8%	2.0%	7.1%
Exercise of Options	Count	40	32	39	42	153
	Expected Count	40.0	32.0	39.0	42.0	153.0
	% within Problems	26.1%	20.9%	25.5%	27.5%	100.0%
	% within Group	7.1%	7.1%	7.1%	7.1%	7.1%
	% of Total	1.9%	1.5%	1.8%	2.0%	7.1%
Lack of Education	Count	40	32	39	42	153
	Expected Count	40.0	32.0	39.0	42.0	153.0
	% within Problems	26.1%	20.9%	25.5%	27.5%	100.0%
	% within Group	7.1%	7.1%	7.1%	7.1%	7.1%
	% of Total	1.9%	1.5%	1.8%	2.0%	7.1%
Instead of Risk Management Tool Being Used as Speculative Instrument	Count	40	32	39	43	154
	Expected Count	40.3	32.2	39.3	42.3	154.0
	% within Problems	26.0%	20.8%	25.3%	27.9%	100.0%
	% within Group	7.1%	7.1%	7.1%	7.3%	7.2%
	% of Total	1.9%	1.5%	1.8%	2.0%	7.2%
Stamp Duty	Count	40	32	39	42	153
	Expected Count	40.0	32.0	39.0	42.0	153.0
	% within Problems	26.1%	20.9%	25.5%	27.5%	100.0%
	% within Group	7.1%	7.1%	7.1%	7.1%	7.1%
	% of Total	1.9%	1.5%	1.8%	2.0%	7.1%
Lack of Strategic Interest Among	Count	40	33	39	41	153
	Expected Count	40.0	32.0	39.0	42.0	153.0
	% within Problems	26.1%	21.6%	25.5%	26.8%	100.0%

Problems		Group				
		Broker	Institutions	Investors	Traders	Total
Participants	% within Group	7.1%	7.4%	7.1%	7.0%	7.1%
	% of Total	1.9%	1.5%	1.8%	1.9%	7.1%
Only American Options Available in Stock	Count	40	32	39	42	153
	Expected Count	40.0	32.0	39.0	42.0	153.0
	% within Problems	26.1%	20.9%	25.5%	27.5%	100.0%
	% within Group	7.1%	7.1%	7.1%	7.1%	7.1%
	% of Total	1.9%	1.5%	1.8%	2.0%	7.1%
High Premium Cost	Count	40	32	39	42	153
	Expected Count	40.0	32.0	39.0	42.0	153.0
	% within Problems	26.1%	20.9%	25.5%	27.5%	100.0%
	% within Group	7.1%	7.1%	7.1%	7.1%	7.1%
	% of Total	1.9%	1.5%	1.8%	2.0%	7.1%
Only European Options Available in Index	Count	40	32	39	42	153
	Expected Count	40.0	32.0	39.0	42.0	153.0
	% within Problems	26.1%	20.9%	25.5%	27.5%	100.0%
	% within Group	7.1%	7.1%	7.1%	7.1%	7.1%
	% of Total	1.9%	1.5%	1.8%	2.0%	7.1%
Operational Issues in using Exotic Models of Options Trading	Count	40	32	39	42	153
	Expected Count	40.0	32.0	39.0	42.0	153.0
	% within Problems	26.1%	20.9%	25.5%	27.5%	100.0%
	% within Group	7.1%	7.1%	7.1%	7.1%	7.1%
	% of Total	1.9%	1.5%	1.8%	2.0%	7.1%
Lack of Trading Software	Count	40	32	39	42	153
	Expected Count	40.0	32.0	39.0	42.0	153.0
	% within Problems	26.1%	20.9%	25.5%	27.5%	100.0%
	% within Group	7.1%	7.1%	7.1%	7.1%	7.1%
	% of Total	1.9%	1.5%	1.8%	2.0%	7.1%
High Margin	Count	40	32	39	41	152
	Expected Count	39.7	31.8	38.7	41.7	152.0
	% within Problems	26.3%	21.1%	25.7%	27.0%	100.0%
	% within Group	7.1%	7.1%	7.1%	7.0%	7.1%
	% of Total	1.9%	1.5%	1.8%	1.9%	7.1%
Total	Count	560	448	546	588	2142
	Expected Count	560.0	448.0	546.0	588.0	2142.0
	% within Problems	26.1%	20.9%	25.5%	27.5%	100.0%
	% within Group	100.0%	100.0%	100.0%	100.0%	100.0%
	% of Total	26.1%	20.9%	25.5%	27.5%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.132[a]	39	1.000
Likelihood Ratio	.132	39	1.000
Linear-by-Linear Association	.013	1	.910
N of Valid Cases	2142		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 31.79.

Pearson has a value of 0.13 with a significance of 1.00.This significance value is above the alpha level of 0.05 and is thus insignificant.

The difference between the observed value and expected value is small hence the value of X^2 is small and the respective tail probability large.

The minimum expected cell frequency is 32, which is > 5 and therefore no violation of main assumptions of chi-square.

Thus, it can be concluded that the respondents across the sample are not independent in respect of the response (the concerned problems) X^2 (39, N=2142) = 0.13, p > 0.05. Hence, the null hypothesis is rejected and the respondents may be considered sample from the same population.

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Appendix – I (A)						
Business Growth in Index Derivatives Segment of NSE from June 2000 to March 2010*						
	Index Futures		**Index Options**		**Average**	
Month/ Year	**No. of contracts**	**Turnover (Million US$)**	**No. of contracts**	**Notional Turnover (Million US$)**	**Average*1**	**Average*2**
Sep.2000	11460	70	0	0	11460	0
Dec.2000	25488	142	0	0	18474	0
Mar.2001	52441	306	0	0	29796	0
Jun.2001	50127	247	8661	44	34879	8661
Sep.2001	275921	1216	48415	227	83087	28538
Dec.2001	362467	1624	69697	315	129651	42258
Mar.2002	337073	1687	49127	251	159282	43975
Jun.2002	267461	1289	55438	274	172805	46268
Sep.2002	419341	1850	79537	358	200198	51813
Dec.2002	617904	2801	130376	591	241968	63036
Mar.2003	822057	3827	176890	831	294704	77268
Jun.2003	1127092	5028	260073	1170	364069	97579
Sep.2003	3308091	19021	469276	2679	590533	134749
Dec.2003	5299784	38066	426178	3082	926908	161243
Mar.2004	7456701	61096	576887	4806	1362227	195880
Jun.2004	6869157	50160	768564	5796	1277088	239932
Sep.2004	5238176	37454	758283	5498	1914161	276957
Dec.2004	3790748	31955	708375	6007	2018416	305718
Mar.2005	5737368	52019	1058336	9798	2214150	352757
Jun.2005	10504620	47394	2146302	9820	2628674	458260
Sep.2005	12432287	66023	2784345	14818	3095513	587487
Dec.2005	18700939	108636	4151256	24366	3804850	775053
Mar.2006	16900040	114337	3853213	26211	4374206	928961
Jun.2006	21950942	156696	5056179	37595	5106570	1125496
Sep.2006	16435511	119469	4871431	35880	5559728	1295765
Dec.2006	14999734	127343	4921425	42107	5922805	1453403
Mar.2007	28101237	160841	10308403	60397	6744228	1822361
Jun.2007	32010296	146840	13271135	61137	7646588	2280312
Sep.2007	38562542	190897	15281690	76330	8712655	2780365

Appendix – I (A)						
Business Growth in Index Derivatives Segment of NSE from June 2000 to March 2010*						
	Index Futures		**Index Options**		**Average**	
Month/ Year	**No. of contracts**	**Turnover**	**No. of contracts**	**Notional**	**Average[*1]**	**Average[*2]**
Dec.2007	40120160	252889	13845922	87580	9759572	3190201
Mar.2008	45905581	258412	12967291	77644	10925572	3539382
Jun.2008	41166469	205707	24008627	126964	11870600	4245218
Sep.2008	54189466	239117	52123776	251318	13152990	5841170
Dec.2008	61128707	189313	61817084	215613	14564041	7646845
Mar.2009	53943461	159221	74138957	235327	15689167	9724723
Jun.2009	51487857	214692	72567153	317766	16683575	11629039
Sep.2009	48196264	233702	85396641	437573	17535269	13798675
Dec-09	42131832	227251	89162466	498372	18182547	15951926
Mar-10	36490936	198664	94253263	530281	18651993	18126963

[*1] Cumulative Moving Quarterly Average of Contracts of Index Futures ***Source - www.nseindia.com**

[*2] Cumulative Moving Quarterly Average of Contracts of Index Options

Note - Rupee Crores was converted into its corresponding Dollar amount in Millions by dividing the rupee Amount by 45 (the Dollar Rupee rate) multiplied by 10.

Appendix – I (B)						
Business Growth in Stock Derivatives Segment of NSE from June 2000 to March 2010*						
	Stock Futures		**Stock Options**		**Average**	
Month/ Year	**No. of contracts**	**Turnover (Million US$)**	**No. of contracts**	**Notional Turnover (Million US$)**	**Average*1**	**Average*2**
Sep.2000	0	0	0	0	0	0
Dec.2000	0	0	0	0	0	0
Mar.2001	0	0	0	0	0	0
Jun.2001	0	0	0	0	0	0
Sep.2001	0	0	167131	781	0	167131
Dec.2001	435701	2295	386173	1801	435701	276652
Mar.2002	1522155	9153	484225	3010	978928	345843
Jun.2002	1774472	10494	518931	3188	1244109	389115
Sep.2002	2215651	12575	664224	3991	1486995	444137
Dec.2002	3045054	18268	1106144	6984	1798607	554471
Mar.2003	3641666	22336	1233763	8088	2105783	651513
Jun.2003	4340579	24224	1470302	8752	2425040	753862
Sep.2003	8025755	61262	1712465	13782	3125129	860373
Dec.2003	9565756	93282	1191460	12554	3840754	893482
Mar.2004	10436752	111441	1208844	13181	4500354	922151
Jun.2004	10277485	64903	957479	6553	5025548	925095
Sep.2004	10838863	66827	1209400	7934	5509991	946965
Dec.2004	12498680	89912	1499235	11290	6047582	986413
Mar.2005	13428038	108148	1378998	11742	6574758	1012585
Jun.2005	14475455	84912	1292806	8003	7101471	1030099
Sep.2005	20657229	149199	1342710	10006	7948706	1048488
Dec.2005	20351032	158044	1209971	9687	8678254	1057459
Mar.2006	25421777	228222	1395289	12360	9608450	1075239
Jun.2006	25344960	247534	1084650	10845	10436687	1075710
Sep.2006	21788491	161590	1270949	9697	11004278	1085007
Dec.2006	27730509	224236	1463303	11792	11800765	1102202
Mar.2007	30091441	217966	1464408	10732	12632159	1117950

Appendix – I (B)

Business Growth in Stock Derivatives Segment of NSE from June 2000 to March 2010*

	Stock Futures		Stock Options		Average	
Month/	**No. of**	**Turnover**	**No. of**	**Notional**	**Average[*1]**	**Average[*2]**
Jun.2007	38286516	255120	2088252	13852	13747566	1158380
Sep.2007	52340013	408380	2908226	23215	15355585	1228374
Dec.2007	58607000	657638	2587609	29714	17085641	1280652
Mar.2008	54354423	356320	1876544	13027	18519056	1302722
Jun.2008	51449737	242900	2546175	12963	19738711	1347131
Sep.2008	59902581	230964	3586646	15376	21173135	1424356
Dec.2008	60070464	145987	3057717	8236	22514422	1478801
Mar.2009	50155198	153403	4105432	14365	23435781	1563531
Jun.2009	30514469	309821	2334550	24965	23664126	1587625
Sep.2009	41771274	288247	3634626	26151	24229974	1649656
Dec-09	38612404	288890	3992170	29313	24665805	1718553
Mar-10	34693093	267541	4054924	32031	24960726	1785307

[*1] Cumulative Moving Quarterly Average of Contracts of Stock Futures ***Source - www.nseindia.com**

[*2] Cumulative Moving Quarterly Average of Contracts of Stock Options

Note - Rupee Crores was converted into its corresponding Dollar amount in Millions by dividing the rupee Amount by 45 (the Dollar Rupee rate) multiplied by 10.

Appendix – II												
Equity Index Future Contracts In International Market March 2002 to March 2010*												
Month/ Year	**India**	**% India v/s All markets**	**All markets**		**North America**		**Europe**		**Asia and Pacific**		**Other Markets**	
			Total	**Equity index**	**Total**	**Equity index**	**Total**	**Equity index**	**Total**	**Equity index**	**Total**	**Equity index**
Sep.2000	11460	0.02	242751000	51666000	73069000	14398000	114918000	20631000	31524000	12985000	23241000	3652000
Dec.2000	25488	0.04	253552000	63313000	84220000	18670000	114157000	25566000	31785000	15066000	23390000	4011000
Mar.2001	52441	0.07	350768000	73922000	117210000	23402000	171408000	30210000	36690000	16281000	25460000	4028000
Jun.2001	50127	0.07	342976000	77083000	119628000	26537000	163766000	31092000	34495000	15951000	25086000	3503000
Sep.2001	275921	0.31	345958000	87877000	113600000	26225000	168058000	39726000	38531000	18158000	25769000	3768000
Dec.2001	362467	0.37	403994000	98237000	133247000	31748000	178461000	39769000	41162000	20721000	51125000	5999000
Mar.2002	337073	0.34	384074000	97791000	140928000	35740000	179194000	39375000	38537000	19028000	25415000	3647000
Jun.2002	267461	0.23	409253000	115229000	161658000	48219000	177079000	44234000	39709000	19455000	30807000	3320000
Sep.2002	419341	0.27	486394000	157524000	188719000	65548000	229690000	65386000	44788000	23040000	23198000	3550000
Dec.2002	617904	0.39	445588000	160059000	181805000	72601000	199365000	56658000	44476000	27438000	19942000	3363000
Mar.2003	822057	0.45	566011000	183133000	227827000	70538000	260028000	73661000	54216000	35377000	23940000	3558000
Jun.2003	1127092	0.64	614729000	176035000	278835000	73345000	253050000	65461000	54839000	33200000	28005000	4030000
Sep.2003	3308091	1.81	603447000	183239000	264307000	79093000	247945000	63900000	58078000	35872000	33117000	4375000
Dec.2003	5299784	2.89	577198000	183436000	254277000	75199000	226594000	62217000	62240000	41539000	34088000	4481000
Mar.2004	7456701	3.59	681274000	207992000	292248000	85558000	277591000	74283000	64443000	42924000	46992000	5227000
Jun.2004	6869157	3.42	715359000	200674000	338573000	84096000	260753000	67665000	66202000	43416000	49830000	5498000
Sep.2004	5238176	2.78	693315000	188328000	344165000	79408000	244796000	64133000	58431000	37523000	45923000	7264000
Dec.2004	3790748	1.83	700867000	207515000	326335000	82280000	258107000	64534000	72901000	53996000	43524000	6705000
Mar.2005	5737368	2.89	767450000	198419000	360184000	89335000	301282000	67774000	56908000	35976000	49075000	5334000
Jun.2005	10504620	4.79	812992000	219209000	392459000	97357000	309462000	75152000	61223000	39471000	49848000	7229000
Sep.2005	12432287	5.60	755381000	222104000	350389000	88810000	278482000	80296000	71863000	44783000	54647000	8216000
Dec.2005	18700939	6.70	836247000	278993000	384434000	133162000	311605000	81097000	80005000	55231000	60202000	9503000
Mar.2006	16900040	6.29	969398000	268761000	458569000	109305000	357251000	92453000	87048000	57895000	66530000	9108000
Jun.2006	21950942	6.20	1104593000	354106000	527552000	149438000	408287000	126220000	99811000	64992000	68943000	13455000
Sep.2006	16435511	5.64	1016479000	291597000	498943000	116073000	352407000	104425000	91988000	57515000	73142000	13584000
Dec.2006	14999734	4.70	995510000	319209000	465946000	129057000	350608000	108539000	100955000	67535000	78001000	14079000
Mar.2007	28101237	6.80	1225883000	412985000	539794000	143476000	448537000	148228000	140545000	102436000	97007000	18845000
Jun.2007	32010296	7.44	1285175000	430199000	569269000	144925000	439810000	147764000	157348000	118042000	118747000	19467000
Sep.2007	38562542	6.88	1523537000	560520000	690967000	202643000	533013000	188664000	187534000	145660000	112023000	23553000
Dec.2007	40120160	7.62	1325334000	526517000	610720000	191120000	444695000	170362000	181351000	145142000	88568000	19894000
Mar.2008	45905581	7.57	1526101000	606286000	684470000	228429000	577305000	226813000	166988000	130176000	97338000	20869000

Appendix – II

Equity Index Future Contracts In International Market March 2002 to March 2010*

Month/ Year	India	% India v/s All markets	All markets		North America		Europe		Asia and Pacific		Other Markets	
			Total	Equity index	Total	Equity index	Total	Equity index	Total	Equity index	Total	Equity index
Jun.2008	41166469	8.03	1324174000	512413000	583580000	187494000	481700000	179943000	150800000	119107000	108095000	25870000
Sep.2008	54189466	8.28	1432158000	654090000	619450000	242242000	531560000	238158000	180965000	149115000	100184000	24574000
Dec.2008	61128707	8.79	1202142000	695126000	485771000	260464000	441771000	240311000	193699000	172906000	80900000	21445000
Mar.2009	53943461	8.96	1119096000	601755000	449574000	220322000	413782000	216781000	165626000	142478000	90114000	22175000
Jun.2009	51487857	8.85	1161763000	581504000	460965000	193756000	419755000	211391000	185582000	151093000	95461000	25263000

***Source -** NSE Website and BIS Website

Note - Total under each sub heading includes number of contracts of Index Future, Currency Future and Interest Rate Future

Appendix – III												
Equity Index Options Contracts In International Market - March 2002 to March 2010												
Month/ Year	**India**	**% India v/s All markets**	**All markets**		**North America**		**Europe**		**Asia and Pacific**		**Other Markets**	
			Total	**Equity Index**	**Total**	**Equity Index**	**Total**	**Equity Index**	**Total**	**Equity Index**	**Total**	**Equity Index**
Sep.2000	0	0.00	137687000	113448000	23920000	11365000	46079000	36334000	55854000	55091000	11832000	10659000
Dec.2000	0	0.00	177503000	149447000	30890000	15466000	50749000	40357000	81355000	80726000	14509000	12898000
Mar.2001	0	0.00	204354000	163895000	40301000	16408000	57884000	44435000	93046000	92361000	13122000	10692000
Jun.2001	8661	0.00	260057000	213470000	45160000	16108000	61520000	46427000	140062000	139426000	13314000	11508000
Sep.2001	48415	0.01	391704000	334638000	49955000	15026000	77686000	58430000	250939000	250335000	13124000	10847000
Dec.2001	69697	0.02	502107000	436184000	56580000	15457000	78909000	57477000	350217000	349744000	16401000	13506000
Mar.2002	49127	0.01	479058000	421138000	52494000	15364000	70371000	54455000	339544000	338890000	16649000	12429000
Jun.2002	55438	0.01	562100000	500769000	60386000	17790000	60822000	47651000	426912000	426099000	13981000	9229000
Sep.2002	79537	0.01	663211000	592342000	67881000	22837000	81177000	59458000	501156000	500396000	12996000	9650000
Dec.2002	130376	0.02	787536000	721226000	58408000	20177000	77440000	53520000	637954000	637253000	13735000	10275000
Mar.2003	176890	0.02	830765000	751760000	59803000	20506000	95713000	59878000	663877000	663164000	11373000	8213000
Jun.2003	260073	0.03	900915000	810391000	70058000	20292000	91350000	54383000	724493000	723588000	15014000	12128000
Sep.2003	469276	0.06	845958000	765337000	64326000	20128000	91262000	59750000	676529000	675725000	13841000	9734000
Dec.2003	426178	0.05	972819000	906434000	60336000	22095000	80565000	56665000	817342000	816443000	14577000	11230000
Mar.2004	576887	0.08	827419000	731455000	74054000	25138000	111466000	69085000	626071000	625085000	15830000	12148000
Jun.2004	768564	0.09	953200000	851049000	89527000	25540000	92358000	58934000	757655000	756706000	13659000	9869000
Sep.2004	758283	0.11	759289000	666777000	85789000	25401000	85921000	58442000	571652000	570658000	15927000	12276000
Dec.2004	708375	0.10	814210000	730841000	82936000	29627000	81710000	56077000	630216000	629397000	19348000	15740000
Mar.2005	1058336	0.16	793795000	679636000	105281000	32217000	97832000	61816000	569889000	569036000	20794000	16568000
Jun.2005	2146302	0.32	793878000	672931000	113694000	36524000	107154000	68890000	551082000	549993000	21949000	17524000
Sep.2005	2784345	0.29	1054896000	944471000	114621000	37828000	92634000	64894000	819735000	818496000	27907000	23252000

Appendix – III

Equity Index Options Contracts In International Market - March 2002 to March 2010

Month/ Year	India	% India v/s All markets	All markets		North America		Europe		Asia and Pacific		Other Markets	
			Total	Equity Index	Total	Equity Index	Total	Equity Index	Total	Equity Index	Total	Equity Index
Dec.2005	4151256	0.49	947441000	842804000	105728000	44575000	94412000	57613000	721714000	720589000	25587000	20027000
Mar.2006	3853213	0.44	1018707000	874177000	135084000	44057000	114979000	70651000	737987000	736101000	30657000	23368000
Jun.2006	5056179	0.61	998164000	835465000	167878000	60137000	130990000	85622000	670761000	668085000	28535000	21621000
Sep.2006	4871431	0.63	926429000	773340000	149930000	52605000	114109000	69556000	630219000	627345000	32171000	23833000
Dec.2006	4921425	0.71	825135000	694489000	137889000	55747000	118771000	81848000	538376000	536472000	30099000	20422000
Mar.2007	10308403	1.09	1105083000	946012000	164676000	68377000	160748000	111921000	742363000	740066000	37297000	25649000
Jun.2007	13271135	1.35	1153281000	985927000	179536000	74045000	156328000	111247000	778377000	775809000	39039000	24826000
Sep.2007	15281690	1.49	1246436000	1022970000	223096000	90007000	197414000	126575000	778826000	776056000	47100000	30332000
Dec.2007	13845922	1.61	1020475000	860649000	168470000	77661000	179619000	128098000	626150000	624372000	46236000	30517000
Mar.2008	12967291	1.51	1074165000	857926000	202078000	85546000	234278000	159167000	584279000	582381000	53530000	30832000
Jun.2008	24008627	2.65	1077312000	905000000	168751000	80904000	204916000	143172000	660663000	659163000	42982000	21762000
Sep.2008	52123776	4.11	1424238000	1269382000	180259000	104428000	231418000	173239000	966531000	965223000	46031000	26491000
Dec.2008	61817084	5.41	1275896000	1141795000	155208000	96431000	236521000	174366000	849688000	849107000	34480000	21890000
Mar.2009	74138957	7.73	1099976000	959050000	127452000	73108000	209903000	140515000	726646000	725937000	35975000	19490000
Jun.2009	72567153	6.82	1216917000	1064775000	134607000	71060000	179972000	117672000	858557000	857298000	43781000	18744000

***Source -** NSE Website and BIS Website

Note- Total under each sub heading includes number of contracts of Index Options, Currency Options and Interest Rate Options

Appendix – IV					
Stock Options Contracts In International Market March 2002 - March 2010*					
Month/Year	**India**	**% India v/s All markets**	**Total**	**US markets**	**Other markets**
Sep.2000	0	0.00	237499000	155313000	82186000
Dec.2000	0	0.00	281886000	187892000	93994000
Mar.2001	0	0.00	323600000	199566000	124034000
Jun.2001	0	0.00	318991000	190582000	128409000
Sep.2001	167131	0.06	293565000	156779000	136786000
Dec.2001	386173	0.12	325960000	175618000	150342000
Mar.2002	484225	0.14	351529000	177815000	173713000
Jun.2002	518931	0.15	346870000	174525000	172345000
Sep.2002	664224	0.20	335197000	179812000	155385000
Dec.2002	1106144	0.33	332953000	177632000	155321000
Mar.2003	1233763	0.35	347953000	174051000	173902000
Jun.2003	1470302	0.37	393445000	208050000	185395000
Sep.2003	1712465	0.41	422051000	205968000	216084000
Dec.2003	1191460	0.26	450087000	241201000	208886000
Mar.2004	1208844	0.21	580763000	291156000	289607000
Jun.2004	957479	0.19	494181000	251729000	242452000
Sep.2004	1209400	0.26	470926000	239840000	231086000
Dec.2004	1499235	0.28	527816000	300746000	227069000
Mar.2005	1378998	0.23	590256000	318615000	271640000
Jun.2005	1292806	0.22	596288000	315076000	281212000
Sep.2005	1342710	0.22	607563000	332961000	274602000
Dec.2005	1209971	0.18	658050000	402396000	255654000
Mar.2006	1395289	0.19	726713000	446506000	280207000

Appendix – IV					
Stock Options Contracts In International Market March 2002 - March 2010*					
Month/Year	**India**	**% India v/s All markets**	**Total**	**US markets**	**Other markets**
Jun.2006	1084650	0.15	740695000	469983000	270712000
Sep.2006	1270949	0.19	668941000	429351000	239590000
Dec.2006	1463303	0.19	757516000	498345000	259171000
Mar.2007	1464408	0.17	860415000	550998000	309417000
Jun.2007	2088252	0.22	937694000	586471000	351223000
Sep.2007	2908226	0.28	1031743000	684924000	346819000
Dec.2007	2587609	0.24	1091588000	769710000	321878000
Mar.2008	1876544	0.14	1357467000	1035641000	321826000
Jun.2008	2546175	0.19	1362788000	1001597000	361191000
Sep.2008	3586646	0.23	1545757000	1177642000	368115000
Dec.2008	3057717	0.24	1290570000	972511000	318059000
Mar.2009	4105432	0.30	1360743000	998547000	362196000
Jun.2009	2334550	0.16	1440412000	1111098000	329314000

***Source -** NSE Webiste and BIS Website

Note - Total includes number of Stock Options Contract under US Market and Other Market

Appendix – V												
Turnover (USD Million) of Equity Index Future in International Markets - March 2002 - March 2010*												
Month/Year	**India**	**% India v/s All markets**	**All markets**		**North America**		**Europe**		**Asia and Pacific**		**Other Markets**	
			Total	**Equity index**	**Total**	**Equity index**	**Total**	**Equity index**	**Total**	**Equity index**	**Total**	**Equity index**
Sep.2000	70	0.00	72220273	5166576	32000944	2802065	26178562	1430709	13132184	905132	908584	28669
Dec.2000	142	0.00	72690882	5485925	37092422	3093384	23817254	1559797	10923559	804889	857647	27855
Mar.2001	306	0.01	112044769	5838702	59930826	3104210	38966868	1836426	12173425	834754	973650	63312
Jun.2001	247	0.00	107667250	5620786	59843926	3084704	36884856	1662170	10034296	825041	904172	48871
Sep.2001	1216	0.02	108748500	5364138	59099692	2710080	37850070	1848819	10960790	763901	837949	41338
Dec.2001	1624	0.03	117545195	5730100	65126581	3010831	40392411	1776832	10224991	874862	1801212	67575
Mar.2002	1687	0.03	119022118	5939263	69745529	3185174	38843342	1808143	9509646	903500	923601	42445
Jun.2002	1289	0.02	124000913	6477522	71906253	3555656	40425417	1929567	10558446	953140	1110797	39159
Sep.2002	1850	0.03	138820218	7191984	74502052	3826730	51709817	2304251	11939675	1031307	668674	29696
Dec.2002	2801	0.04	120130396	7023653	62298922	3862863	48303068	2029163	9023880	1102773	504525	28854
Mar.2003	3827	0.05	139243582	7256358	66122549	3754803	62780793	2368903	9717713	1101023	622526	31629
Jun.2003	5028	0.06	170325193	7956522	88143374	4205045	69670649	2428158	11684294	1278997	826877	44323
Sep.2003	19021	0.23	162604391	8362603	81637565	4302113	67048490	2487133	12868807	1518476	1049530	54882
Dec.2003	38066	0.43	152997077	8917263	74281689	4311951	65764501	2773760	11839077	1758585	1111809	72966
Mar.2004	61096	0.57	189831968	10807618	86134213	5151481	89431972	3674487	12732580	1894310	1533203	87340
Jun.2004	50160	0.48	220024265	10498436	121387241	5118554	83367369	3204483	13696379	2101977	1573275	73423
Sep.2004	37454	0.38	213455436	9827999	122510585	4829705	77727840	3168134	11803649	1745347	1413362	84812
Dec.2004	31955	0.29	208473619	10896437	110708768	5250409	86067969	3558040	10314072	2003647	1382810	84342
Mar.2005	52019	0.44	240658320	11829866	127890870	5802001	99711002	3976046	11033863	1961486	2022585	90333
Jun.2005	47394	0.37	269852921	12657477	155482598	6257128	101194374	4276839	11452993	2019565	1722955	103944
Sep.2005	66023	0.49	249766322	13433158	149281195	6059724	83773582	4741922	14764154	2518044	1947391	113467
Dec.2005	108636	0.70	243808389	15449534	131528896	6685450	95787472	5368760	14307961	3259531	2184060	135792
Mar.2006	114337	0.66	291185651	17311492	166999973	7183183	104268812	6036485	17445800	3909835	2471065	181989

Appendix – V

Turnover (USD Million) of Equity Index Future in International Markets - March 2002 - March 2010*

Month/Year	India	% India v/s All markets	All markets		North America		Europe		Asia and Pacific		Other Markets	
			Total	Equity index	Total	Equity index	Total	Equity index	Total	Equity index	Total	Equity index
Jun.2006	156696	0.79	332166275	19936589	185503355	8837006	122104464	6846685	22056411	3952812	2502045	300086
Sep.2006	119469	0.63	327614726	18865956	186134946	7962965	117797441	6950868	20978796	3652310	2703543	299813
Dec.2006	127343	0.62	310216852	20615673	175183158	8767506	111430384	7742181	20640495	3730443	2962815	375542
Mar.2007	160841	0.59	378020245	27120828	209793871	10554199	139733000	11024511	24762747	4987333	3730627	554784
Jun.2007	146840	0.49	374497307	30247362	201256673	11599621	140725491	12145467	27389384	5774003	5125759	728272
Sep.2007	190897	0.50	457470649	38258133	253024731	15769224	169873089	14220224	29766272	7440903	4806557	827781
Dec.2007	252889	0.70	375898254	36166858	208047999	14865318	137761419	12461886	26005523	7941661	4083313	897993
Mar.2008	258412	0.69	485173407	37392545	261264990	15394473	191780010	14270194	27704053	6960319	4424353	767560
Jun.2008	205707	0.66	428511366	30996650	235739644	12639693	163207547	11234644	24599226	6302214	4964950	820099
Sep.2008	239117	0.68	387292302	34917774	215900067	14998290	144159613	12551586	22851665	6661124	4380958	706774
Dec.2008	189313	0.71	246062862	26776456	137787454	12365971	91635656	8897820	14104522	5170800	2535230	341865
Mar.2009	159221	0.83	241466569	19245990	131817191	9140055	93934204	6284335	12790583	3530914	2924591	290686
Jun.2009	214692	1.02	287484664	21121892	155233903	9254934	113184620	6722128	15905860	4723207	3160281	421623

***Source -** NSE Website and BIS Website

Note- Total includes Equity Index Future, Currency Future and Interest Rate Future Contract

Appendix – VI

Turnover (USD Million) of Equity Index Options in International Markets - March 2002 - March 2010

Month/Year	India	% India v/s All markets	All markets		North America		Europe		Asia and Pacific		Other Markets	
			Total	Equity index	Total	Equity index	Total	Equity index	Total	Equity index	Total	Equity index
Sep.2000	0	0.00	14507635	3974039	9098382	2339874	4200308	862898	1057056	636556	151889	134710
Dec.2000	0	0.00	17062781	4709784	11515458	2951812	4356016	934487	1015988	678518	175319	144967
Mar.2001	0	0.00	26882520	5359391	19374867	3560450	6290075	963081	1035322	722999	182256	112861
Jun.2001	44	0.00	33494833	6392448	24690079	4373823	7386370	917374	1259894	980436	158490	120815
Sep.2001	227	0.00	41904784	6227425	30377506	3658712	9680311	1073224	1700183	1391782	146784	103706
Dec.2001	315	0.00	46088353	7268907	33241913	3818720	10116243	1006174	2538359	2317657	191838	126356
Mar.2002	251	0.00	42800549	7785264	30420307	3821067	9163822	1064377	3035484	2787786	180936	112034
Jun.2002	274	0.00	44986564	8727395	33409989	4009592	7567431	1069698	3847128	3572172	162017	75933
Sep.2002	358	0.00	53469232	9844145	35138342	4772694	14015510	1101614	4180445	3893886	134935	75951
Dec.2002	591	0.01	50065379	10032432	29250775	4278458	15781191	1024397	4898328	4652053	135086	77525
Mar.2003	831	0.01	58540882	9143325	29681063	3868948	24335116	1051711	4411715	4161963	112989	60703
Jun.2003	1170	0.01	75396066	10321275	42765782	4085943	27073124	1061542	5386118	5057817	171042	115973
Sep.2003	2679	0.02	60652652	10897165	30504068	3774516	23871976	1225508	6086393	5804899	190215	92242
Dec.2003	3082	0.02	54582592	12932315	28851908	4027972	17774891	1308855	7749757	7470735	206036	124754
Mar.2004	4806	0.04	82284640	13020866	37208141	4543976	37956579	1814483	6877082	6513192	242839	149215
Jun.2004	5796	0.04	84227313	13277350	50397112	4202920	25848238	1568818	7766966	7384542	214996	121070
Sep.2004	5498	0.05	75025917	11359330	49280226	4165827	19691741	1605516	5791682	5432871	262268	155116
Dec.2004	6007	0.04	70544083	13779294	44618017	5083465	18458157	1701218	7138189	6773812	329721	220800
Mar.2005	9798	0.07	93548475	14993191	59610613	5451328	25809693	1998749	7734710	7287656	393460	255457
Jun.2005	9820	0.06	102461264	15200555	64590990	5804569	29996824	2121501	7466821	7022098	406628	252388
Sep.2005	14818	0.07	107467925	20626566	72697235	5818689	21647668	2382913	12615871	12062291	507151	362673
Dec.2005	24366	0.11	99107125	22041660	57599132	6997900	28457260	2696216	12494735	11992328	555999	355216
Mar.2006	26211	0.11	136442963	24915096	88445893	7357909	32213802	3070060	15065989	14052589	717279	434538
Jun.2006	37595	0.14	152137732	25928134	104395963	9674956	32685821	3100642	14386477	12744822	669472	407715
Sep.2006	35880	0.15	137295293	23999446	90051058	8496971	32822822	3222126	13638306	11825224	783106	455124

Appendix – VI

Turnover (USD Million) of Equity Index Options in International Markets - March 2002 - March 2010

Month/Year	India	% India v/s All markets	All markets		North America		Europe		Asia and Pacific		Other Markets	
			Total	Equity index	Total	Equity index	Total	Equity index	Total	Equity index	Total	Equity index
Dec.2006	42107	0.17	120596952	24488557	78504981	9146013	29294270	4059203	11970744	10845151	826957	438190
Mar.2007	60397	0.18	153947307	33080274	94777576	11439473	41516575	5904957	16551114	15124450	1102042	611394
Jun.2007	61137	0.16	161731124	38087518	101705549	12809479	38805211	6390035	19923768	18200369	1296596	687634
Sep.2007	76330	0.18	223455993	42771005	128431266	14084810	70748018	7096809	22772363	20822766	1504345	766621
Dec.2007	87580	0.23	162974805	38400753	89977624	12337455	52719948	7750658	18588701	17347046	1688532	965594
Mar.2008	77644	0.22	206183905	35102190	106001773	12042698	83229210	8621289	14943035	13518605	2009887	919598
Jun.2008	126964	0.36	171276494	35087047	81600964	11414668	71751100	7889369	16147583	15036235	1776846	746775
Sep.2008	251318	0.62	154748700	40564446	74586681	13677978	59516895	8128064	18964835	18023231	1680289	735173
Dec.2008	215613	0.84	133596324	25636934	61140721	9843790	61517724	5770380	10039599	9614348	898281	408416
Mar.2009	235327	1.31	124636717	17951358	47785480	6171572	67842376	3921598	7980667	7506676	1028195	351512
Jun.2009	317766	1.42	138333743	22300463	57317465	6364320	66999556	3820573	12513139	11684832	1503583	430738

***Source -** NSE Webiste and BIS Website

Note - Total includes Equity Index Options, Currency Options and Interest Rate Options Contract

Appendix VII (A)
List of Variables Studied

S. No	Particulars
1	Liquidity Problem & Volume
2	Exchange Turnover Charges
3	Income Tax
4	Exercise of Options
5	Lack of Education
6	Instead of Risk Management Tool Being Used as Speculative Instrument
7	Stamp Duty
8	Lack of Strategic Interest Among Participants
9	American Options Available in Stock
10	High Premium Cost
11	European Options Available in Index
12	Operational Issues in using Exotic Models of Options Trading
13	Lack of Trading Software
14	High Margin

Appendix VII (B)
Survey Form
Impediments in Acceptability of Options Trading in India

Personal Information

1	***Name of the Respondent***	:	_____	2	***Designation***	:	_____
3	***Company***	:	_____	4	***Specialisation***	:	_____
5	*Address*	:	_____	6	*Email*	:	_____

Ranking to Major Problems which according to you is major hurdle in the growth of Options Trade in India (*please rank 1 to 14 according to your preference; 1 major problem----------14 minor problem***)**

S. No	Particulates	Ranks
1	Liquidity Problem & Volume	
2	Exchange Turnover Charges	
3	Income Tax	
4	Exercise of Options	
5	Lack of Education	
6	Instead of Risk Management Tool Being Used as Speculative Instrument	
7	Stamp Duty	
8	Lack of Strategic Interest Among Participants	
9	Only American Options Available in Stock	
10	High Premium Cost	
11	Only European Options Available in Index	
12	Operational Issues in using Exotic Models of Options Trading	
13	Lack of Trading Software	
14	High Margin	

Appendix VII (C)
Ranking Preference of Different Participants in the Survey Relating to Problem Associated with Options Trading in India

Particulars	Composite Total	Broker	Trader	Investor	Institution
Liquidity Problem & Volume	3	2	5	2	5
Exchange Turnover Charges	6	6	7	8	3
Income Tax	13	14	14	12	8
Exercise of Options	2	1	3	7	2
Lack of Education	1	7	1	1	1
Instead of Risk Management Tool Being Used as Speculative Instrument	5	5	4	3	4
Stamp Duty	14	13	13	14	14
Lack of Strategic Interest Among Participants	4	4	2	5	6
Only American Options Available in Stock	7	10	9	4	7
High Premium Cost	8	9	8	6	10
Only European Options Available in Index	9	8	10	9	11
Operational Issues in using Exotic Models of Options Trading	11	12	11	11	9
Lack of Trading Software	12	11	12	10	12
High Margin	10	3	6	13	13

Appendix VIII (A)
Frequency Table for Rank Given By Traders to 14 Pre-Set Problems

Final Rank	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Particulars	Lack of Education	Lack of Strategic Interest Among Participants	Exercise of Options	Instead of Risk Management Tool Being Used as Speculative Instrument	Liquidity Problem & Volume	High Margin	Exchange Turnover Charges	High Premium Cost	Only American Options Available in Stock	Only European Options Available in Index	Operational Issues in using Exotic Models of Options Trading	Lack of Trading Software	Stamp Duty	Income Tax
R41	3	1	9	6	11	5	2	10	4	13	12	14	8	7
R42	7	13	4	2	3	8	6	5	9	11	1	10	12	14
R43	9	6	3	5	2	7	4	1	10	12	8	11	14	13
R44	12	3	8	4	13	6	5	7	11	2	1	9	10	14
R45	3	5	10	7	8	2	12	9	1	4	6	14	11	13
R46	4	2	7	13	10	5	3	8	6	1	14	12	9	11
R47	2	13	10	6	4	1	7	3	12	11	8	5	14	9
R48	4	9	6	3	12	8	2	1	7	5	14	11	10	13
R49	2	5	8	9	3	4	12	14	11	7	1	6	13	10
R50	9	2	3	5	8	6	10	1	7	13	4	14	11	12
R51	4	3	9	7	2	11	5	10	6	8	1	13	12	14
R52	2	8	7	5	4	1	10	13	9	3	11	14	12	6
R53	4	3	8	13	1	10	6	14	2	5	12	9	7	11
R54	6	12	1	3	5	10	11	4	8	9	7	2	14	13
R55	4	2	8	1	11	7	3	6	9	14	5	12	10	13
R56	2	13	6	11	4	3	8	12	1	5	14	7	9	10
R57	10	8	14	4	5	13	2	6	3	7	1	11	12	9
R58	6	7	2	3	12	1	8	9	5	4	10	14	13	11
R59	7	9	5	4	2	13	6	10	1	3	14	11	8	12

Appendix VIII (A)
Frequency Table for Rank Given By Traders to 14 Pre-Set Problems

Final Rank	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Particulars	Lack of Education	Lack of Strategic Interest Among Participants	Exercise of Options	Instead of Risk Management Tool Being Used as Speculative Instrument	Liquidity Problem & Volume	High Margin	Exchange Turnover Charges	High Premium Cost	Only American Options Available in Stock	Only European Options Available in Index	Operational Issues in using Exotic Models of Options Trading	Lack of Trading Software	Stamp Duty	Income Tax
R60	2	3	6	9	14	8	4	5	10	13	1	11	12	7
R61	4	1	9	10	3	5	14	2	8	11	6	12	7	13
R62	1	11	14	2	8	3	10	6	4	5	13	7	12	9
R63	9	5	8	12	2	4	1	10	7	3	13	14	6	11
R64	1	8	2	5	6	3	11	4	12	10	9	7	13	14
R65	11	1	6	4	5	14	13	3	9	2	12	7	10	8
R66	9	6	5	3	10	2	4	7	11	1	13	14	8	12
R67	6	5	4	14	12	1	3	10	2	8	13	11	7	9
R68	7	3	2	9	4	6	14	13	10	5	1	8	11	12
R69	3	5	10	12	11	2	7	8	1	6	9	4	13	14
R70	7	6	5	1	2	9	13	3	4	11	12	14	8	10
R71	6	5	3	10	4	14	8	2	11	7	9	1	12	13
R72	8	13	1	4	6	12	2	7	9	14	3	5	11	10
R73	4	2	11	6	1	13	10	5	7	3	12	8	9	14
R74	1	8	4	5	2	11	7	3	6	10	12	14	13	9
R75	12	3	5	7	14	2	1	11	13	6	4	10	9	8
R76	14	2	3	1	5	13	8	4	6	9	7	10	12	11
R77	5	4	8	11	3	6	2	10	1	7	13	9	14	12
R78	8	13	2	4	12	6	3	7	5	9	1	14	10	11
R79	12	7	10	5	4	3	11	1	9	14	2	8	13	6
R80	7	10	4	1	14	8	2	11	5	3	12	13	6	9

Appendix VIII (A)
Frequency Table for Rank Given By Traders to 14 Pre-Set Problems

Final Rank	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Particulars	Lack of Education	Lack of Strategic Interest Among Participants	Exercise of Options	Instead of Risk Management Tool Being Used as Speculative Instrument	Liquidity Problem & Volume	High Margin	Exchange Turnover Charges	High Premium Cost	Only American Options Available in Stock	Only European Options Available in Index	Operational Issues in using Exotic Models of Options Trading	Lack of Trading Software	Stamp Duty	Income Tax
R81	2	3	10	12	7	5	4	8	11	6	14	1	9	13
R82	7	8	3	11	1	4	10	2	13	14	5	9	6	12

Appendix VIII (B)
Frequency Table for Rank Given By Investors to 14 Pre-Set Problems

Final Rank	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Particulars	Lack of Education	Liquidity Problem & Volume	Instead of Risk Management Tool Being Used as Speculative Instrument	Only American Options Available in Stock	Lack of Strategic Interest Among Participants	High Premium Cost	Exercise of Options	Exchange Turnover Charges	Only European Options Available in Index	Lack of Trading Software	Operational Issues in using Exotic Models of Options Trading	Income Tax	High Margin	Stamp Duty
R83	8	6	2	3	5	7	1	14	10	13	9	11	4	12
R84	4	2	11	1	9	10	12	5	3	7	14	8	6	13
R85	12	4	5	11	3	7	9	10	6	2	1	14	13	8
R86	11	5	1	6	2	10	3	9	8	4	14	12	13	7
R87	9	1	12	8	11	3	2	4	6	14	13	7	5	10
R88	8	2	3	1	6	9	14	5	12	11	4	10	7	13
R89	6	5	2	11	12	4	1	8	7	3	14	13	9	10
R90	5	1	8	6	3	2	7	4	10	13	9	11	14	12
R91	12	3	4	10	6	5	1	11	8	2	13	7	9	14
R92	10	7	1	8	5	13	2	4	9	14	3	12	11	6
R93	5	2	4	1	9	3	8	6	11	13	7	10	14	12
R94	3	8	9	2	11	13	12	4	1	5	10	14	7	6
R95	4	2	12	13	5	3	8	7	10	1	6	9	11	14
R96	1	5	9	6	13	4	7	3	11	2	14	12	10	8
R97	5	10	3	9	2	13	6	14	1	4	8	12	7	11
R98	10	1	14	4	8	13	2	6	7	3	5	11	9	12
R99	4	10	3	2	7	5	8	1	13	6	9	14	11	12
R100	2	3	1	6	5	9	10	7	4	8	11	14	12	13
R101	3	1	4	6	13	9	5	2	10	12	11	7	8	14

Appendix VIII (B)
Frequency Table for Rank Given By Investors to 14 Pre-Set Problems

Final Rank	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Particulars	Lack of Education	Liquidity Problem & Volume	Instead of Risk Management Tool Being Used as Speculative Instrument	Only American Options Available in Stock	Lack of Strategic Interest Among Participants	High Premium Cost	Exercise of Options	Exchange Turnover Charges	Only European Options Available in Index	Lack of Trading Software	Operational Issues in using Exotic Models of Options Trading	Income Tax	High Margin	Stamp Duty
R102	2	1	5	8	7	11	4	3	12	10	14	6	9	13
R103	1	2	5	8	6	10	4	3	13	9	14	7	11	12
R104	2	7	4	8	5	9	1	3	13	14	12	6	10	11
R105	4	5	1	6	8	9	2	3	10	12	11	7	13	14
R106	2	3	1	8	4	9	7	5	10	12	11	6	14	13
R107	3	4	10	9	14	1	5	6	2	11	8	7	13	12
R108	13	14	5	2	1	7	3	4	8	10	12	6	9	11
R109	5	13	3	6	2	1	4	14	8	10	9	7	11	12
R110	4	5	2	1	3	7	14	13	9	11	10	6	12	8
R111	5	9	14	2	1	3	13	6	10	8	4	7	12	11
R112	2	10	13	4	5	6	7	9	1	11	3	8	14	12
R113	3	11	6	12	8	1	9	10	2	5	4	7	14	13
R114	13	12	9	5	3	2	10	11	1	7	4	6	8	14
R115	2	1	10	8	13	4	14	12	3	6	5	9	7	11
R116	3	1	13	9	12	11	4	2	7	6	10	8	5	14
R117	3	2	12	13	6	5	4	1	7	14	9	8	10	11
R118	4	14	8	7	10	6	11	13	5	2	3	9	1	12
R119	3	12	8	11	5	9	10	14	6	1	4	7	2	13
R120	3	11	6	12	8	1	9	10	2	5	4	7	14	13
R121	4	5	2	1	3	7	14	13	9	10	11	6	12	8

Appendix VIII (C)
Frequency Table for Rank Given By Brokers to 14 Pre-Set Problems

Final Rank	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Particulars	**Exercise of Options**	**Liquidity Problem & Volume**	**High Margin**	**Lack of Strategic Interest Among Participants**	**Instead of Risk Management Tool Being Used as Speculative Instrument**	**Exchange Turnover Charges**	**Lack of Education**	**Only European Options Available in Index**	**High Premium Cost**	**Only American Options Available in Stock**	**Lack of Trading Software**	**Operational Issues in using Exotic Models of Options Trading**	**Stamp Duty**	**Income Tax**
R1	1	2	5	10	7	4	3	9	14	12	13	11	8	6
R2	2	1	8	13	6	3	4	10	9	5	14	12	11	7
R3	9	12	1	8	10	5	13	2	4	6	3	7	14	11
R4	4	11	12	3	6	2	10	1	14	7	13	5	9	8
R5	10	4	1	13	6	7	2	11	3	12	5	8	14	9
R6	5	12	3	4	7	2	10	13	1	11	9	8	6	14
R7	2	7	8	13	6	4	1	10	9	5	3	12	11	14
R8	3	2	4	5	1	10	7	12	9	13	6	8	14	11
R9	1	4	8	6	2	7	5	3	11	13	10	12	14	9
R10	1	6	2	8	9	3	4	11	7	5	10	14	12	13
R11	5	4	3	11	2	1	9	6	13	8	12	14	7	10
R12	1	3	6	2	5	9	7	4	13	10	8	14	11	12
R13	5	7	14	4	1	3	8	6	12	2	11	13	10	9
R14	10	4	9	1	5	12	3	11	7	13	2	14	8	6
R15	5	12	3	4	7	2	10	13	1	11	9	8	6	14
R16	12	3	5	2	11	14	6	4	13	9	7	1	10	8
R17	11	6	1	7	8	14	2	5	3	13	10	4	12	9
R18	5	2	8	3	14	11	7	4	9	12	1	10	13	6
R19	2	5	3	10	9	7	11	1	13	4	14	8	6	12

Appendix VIII (C)
Frequency Table for Rank Given By Brokers to 14 Pre-Set Problems

Final Rank	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Particulars	**Exercise of Options**	**Liquidity Problem & Volume**	**High Margin**	**Lack of Strategic Interest Among Participants**	**Instead of Risk Management Tool Being Used as Speculative Instrument**	**Exchange Turnover Charges**	**Lack of Education**	**Only European Options Available in Index**	**High Premium Cost**	**Only American Options Available in Stock**	**Lack of Trading Software**	**Operational Issues in using Exotic Models of Options Trading**	**Stamp Duty**	**Income Tax**
R20	7	6	9	8	4	12	3	5	13	1	14	2	11	10
R21	10	1	2	3	12	4	8	11	9	6	5	13	7	14
R22	12	14	4	2	3	8	1	7	5	10	13	11	9	6
R23	2	8	7	11	5	1	14	13	4	12	10	3	6	9
R24	11	3	13	4	1	5	8	2	7	10	12	14	9	6
R25	1	2	5	12	10	11	4	9	14	8	3	13	6	7
R26	6	4	14	2	1	12	9	3	7	8	13	5	11	10
R27	4	6	7	1	10	2	12	5	11	3	14	13	8	9
R28	8	14	9	2	3	13	6	7	1	5	4	10	11	12
R29	11	12	4	7	5	3	2	10	6	9	8	1	14	13
R30	5	10	1	12	11	4	7	8	13	3	2	14	6	9
R31	6	3	2	8	14	5	10	12	4	13	1	9	7	11
R32	3	11	13	2	4	5	12	1	8	9	7	14	6	10
R33	2	4	3	8	5	7	9	6	10	1	12	14	13	11
R34	5	1	6	2	4	3	7	11	14	9	10	12	8	13
R35	1	2	4	7	5	8	12	6	3	10	11	14	9	13
R36	2	3	12	4	1	9	8	13	5	11	14	7	6	10
R37	3	4	7	1	8	6	11	9	2	13	5	12	10	14
R38	6	11	3	8	2	14	4	5	1	10	7	13	12	9
R39	10	2	9	6	13	8	5	7	3	4	14	1	11	12
R40	7	10	1	3	9	5	2	6	11	8	14	4	12	13

Appendix VIII (D)
Frequency Table for Rank Given By Institutions to 14 Pre-Set Problems

Final Rank	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Particulars	Lack of Education	Exercise of Options	Exchange Turnover Charges	Instead of Risk Management Tool Being Used as Speculative Instrument	Liquidity Problem & Volume	Lack of Strategic Interest Among Participants	Only American Options Available in Stock	Income Tax	Operational Issues in using Exotic Models of Options Trading	High Premium Cost	Only European Options Available in Index	Lack of Trading Software	High Margin	Stamp Duty
R122	2	7	5	1	3	4	9	6	11	8	10	12	14	13
R123	3	5	6	10	4	14	9	7	2	1	8	11	13	12
R124	13	3	4	5	14	1	2	6	8	7	12	10	9	11
R125	5	4	14	3	13	2	6	7	8	1	9	10	11	12
R126	2	7	5	1	3	4	8	6	10	9	11	12	14	13
R127	3	5	6	10	4	14	9	7	2	8	1	11	13	12
R128	13	3	4	5	14	1	2	6	12	8	7	10	9	11
R129	5	4	14	3	13	2	6	7	9	8	1	10	11	12
R130	3	5	2	4	1	13	6	7	9	11	10	12	8	14
R131	2	4	3	5	1	7	8	6	11	14	12	10	9	13
R132	1	4	3	5	2	6	8	7	10	14	13	9	11	12
R133	2	1	3	4	7	5	8	6	9	12	13	11	10	14
R134	4	2	3	1	5	8	6	7	9	11	10	12	13	14
R135	3	5	1	4	2	13	6	7	9	11	10	12	8	14
R136	2	4	1	5	3	7	8	6	11	14	12	10	9	13
R137	1	4	2	5	3	6	8	7	10	14	13	9	11	12
R138	2	1	7	4	3	5	8	6	9	12	14	13	10	11
R139	2	4	3	1	5	8	6	7	9	11	10	12	13	14

Appendix VIII (D)
Frequency Table for Rank Given By Institutions to 14 Pre-Set Problems

Final Rank	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Particulars	Lack of Education	Exercise of Options	Exchange Turnover Charges	Instead of Risk Management Tool Being Used as Speculative Instrument	Liquidity Problem & Volume	Lack of Strategic Interest Among Participants	Only American Options Available in Stock	Income Tax	Operational Issues in using Exotic Models of Options Trading	High Premium Cost	Only European Options Available in Index	Lack of Trading Software	High Margin	Stamp Duty
R140	4	3	2	5	1	6	7	8	12	9	10	14	13	11
R141	4	2	3	8	5	1	6	7	9	11	10	12	13	14
R142	3	5	1	13	2	4	6	7	9	11	10	12	8	14
R143	2	4	1	7	3	5	8	6	11	14	12	10	9	13
R144	1	4	2	6	3	5	8	7	10	14	13	9	11	12
R145	2	1	7	5	3	4	8	6	9	12	13	11	10	14
R146	2	4	3	8	5	1	6	7	9	11	10	12	13	14
R147	4	2	3	6	1	5	7	8	12	9	10	14	13	11
R148	3	5	6	10	4	14	9	8	7	1	2	11	13	12
R149	13	3	4	1	14	5	2	6	12	7	8	10	9	11
R150	5	4	14	3	13	2	6	11	9	1	8	10	7	12
R151	4	8	13	2	5	3	1	6	10	7	9	11	12	14
R152	10	13	6	14	9	1	2	7	4	3	5	8	12	11
R153	2	7	9	13	10	5	4	12	3	6	1	11	14	8

Appendix VIII (E)

Frequency Table of Composite Ranks to 14 Pre-Set Problems by the Respondents

Final Rank	3	6	13	2	1	5	14	4	7	8	9	11	12	10
Particulars	Liquidity Problem & Volume	Exchange Turnover Charges	Income Tax	Exercise of Options	Lack of Education	Instead of Risk Management Tool Being Used as Speculative Instrument	Stamp Duty	Lack of Strategic Interest Among Participants	Only American Options Available in Stock	High Premium Cost	Only European Options Available in Index	Operational Issues in using Exotic Models of Options Trading	Lack of Trading Software	High Margin
R1	2	4	6	1	3	7	8	10	12	14	9	11	13	5
R2	1	3	7	2	4	6	11	13	5	9	10	12	14	8
R3	12	5	11	9	13	10	14	8	6	4	2	7	3	1
R4	11	2	8	4	10	6	9	3	7	14	1	5	13	12
R5	4	7	9	10	2	6	14	13	12	3	11	8	5	1
R6	12	2	14	5	10	7	6	4	11	1	13	8	9	3
R7	7	4	14	2	1	6	11	13	5	9	10	12	3	8
R8	2	10	11	3	7	1	14	5	13	9	12	8	6	4
R9	4	7	9	1	5	2	14	6	13	11	3	12	10	8
R10	6	3	13	1	4	9	12	8	5	7	11	14	10	2
R11	4	1	10	5	9	2	7	11	8	13	6	14	12	3
R12	3	9	12	1	7	5	11	2	10	13	4	14	8	6
R13	7	3	9	5	8	1	10	4	2	12	6	13	11	14
R14	4	12	6	10	3	5	8	1	13	7	11	14	2	9
R15	12	2	14	5	10	7	6	4	11	1	13	8	9	3
R16	3	14	8	12	6	11	10	2	9	13	4	1	7	5
R17	6	14	9	11	2	8	12	7	13	3	5	4	10	1

Appendix VIII (E)

Frequency Table of Composite Ranks to 14 Pre-Set Problems by the Respondents

Final Rank	3	6	13	2	1	5	14	4	7	8	9	11	12	10
Particulars	Liquidity Problem & Volume	Exchange Turnover Charges	Income Tax	Exercise of Options	Lack of Education	Instead of Risk Management Tool Being Used as Speculative Instrument	Stamp Duty	Lack of Strategic Interest Among Participants	Only American Options Available in Stock	High Premium Cost	Only European Options Available in Index	Operational Issues in using Exotic Models of Options Trading	Lack of Trading Software	High Margin
R18	2	11	6	5	7	14	13	3	12	9	4	10	1	8
R19	5	7	12	2	11	9	6	10	4	13	1	8	14	3
R20	6	12	10	7	3	4	11	8	1	13	5	2	14	9
R21	1	4	14	10	8	12	7	3	6	9	11	13	5	2
R22	14	8	6	12	1	3	9	2	10	5	7	11	13	4
R23	8	1	9	2	14	5	6	11	12	4	13	3	10	7
R24	3	5	6	11	8	1	9	4	10	7	2	14	12	13
R25	2	11	7	1	4	10	6	12	8	14	9	13	3	5
R26	4	12	10	6	9	1	11	2	8	7	3	5	13	14
R27	6	2	9	4	12	10	8	1	3	11	5	13	14	7
R28	14	13	12	8	6	3	11	2	5	1	7	10	4	9
R29	12	3	13	11	2	5	14	7	9	6	10	1	8	4
R30	10	4	9	5	7	11	6	12	3	13	8	14	2	1
R31	3	5	11	6	10	14	7	8	13	4	12	9	1	2
R32	11	5	10	3	12	4	6	2	9	8	1	14	7	13
R33	4	7	11	2	9	5	13	8	1	10	6	14	12	3
R34	1	3	13	5	7	4	8	2	9	14	11	12	10	6
R35	2	8	13	1	12	5	9	7	10	3	6	14	11	4

Appendix VIII (E)

Frequency Table of Composite Ranks to 14 Pre-Set Problems by the Respondents

Final Rank	3	6	13	2	1	5	14	4	7	8	9	11	12	10
Particulars	Liquidity Problem & Volume	Exchange Turnover Charges	Income Tax	Exercise of Options	Lack of Education	Instead of Risk Management Tool Being Used as Speculative Instrument	Stamp Duty	Lack of Strategic Interest Among Participants	Only American Options Available in Stock	High Premium Cost	Only European Options Available in Index	Operational Issues in using Exotic Models of Options Trading	Lack of Trading Software	High Margin
R36	3	9	10	2	8	1	6	4	11	5	13	7	14	12
R37	4	6	14	3	11	8	10	1	13	2	9	12	5	7
R38	11	14	9	6	4	2	12	8	10	1	5	13	7	3
R39	2	8	12	10	5	13	11	6	4	3	7	1	14	9
R40	10	5	13	7	2	9	12	3	8	11	6	4	14	1
R41	11	2	7	9	3	6	8	1	4	10	13	12	14	5
R42	3	6	14	4	7	2	12	13	9	5	11	1	10	8
R43	2	4	13	3	9	5	14	6	10	1	12	8	11	7
R44	13	5	14	8	12	4	10	3	11	7	2	1	9	6
R45	8	12	13	10	3	7	11	5	1	9	4	6	14	2
R46	10	3	11	7	4	13	9	2	6	8	1	14	12	5
R47	4	7	9	10	2	6	14	13	12	3	11	8	5	1
R48	12	2	13	6	4	3	10	9	7	1	5	14	11	8
R49	3	12	10	8	2	9	13	5	11	14	7	1	6	4
R50	8	10	12	3	9	5	11	2	7	1	13	4	14	6
R51	2	5	14	9	4	7	12	3	6	10	8	1	13	11
R52	4	10	6	7	2	5	12	8	9	13	3	11	14	1
R53	1	6	11	8	4	13	7	3	2	14	5	12	9	10

Appendix VIII (E)

Frequency Table of Composite Ranks to 14 Pre-Set Problems by the Respondents

Final Rank	3	6	13	2	1	5	14	4	7	8	9	11	12	10
Particulars	Liquidity Problem & Volume	Exchange Turnover Charges	Income Tax	Exercise of Options	Lack of Education	Instead of Risk Management Tool Being Used as Speculative Instrument	Stamp Duty	Lack of Strategic Interest Among Participants	Only American Options Available in Stock	High Premium Cost	Only European Options Available in Index	Operational Issues in using Exotic Models of Options Trading	Lack of Trading Software	High Margin
R54	5	11	13	1	6	3	14	12	8	4	9	7	2	10
R55	11	3	13	8	4	1	10	2	9	6	14	5	12	7
R56	4	8	10	6	2	11	9	13	1	12	5	14	7	3
R57	5	2	9	14	10	4	12	8	3	6	7	1	11	13
R58	12	8	11	2	6	3	13	7	5	9	4	10	14	1
R59	2	6	12	5	7	4	8	9	1	10	3	14	11	13
R60	14	4	7	6	2	9	12	3	10	5	13	1	11	8
R61	3	14	13	9	4	10	7	1	8	2	11	6	12	5
R62	8	10	9	14	1	2	12	11	4	6	5	13	7	3
R63	2	1	11	8	9	12	6	5	7	10	3	13	14	4
R64	6	11	14	2	1	5	13	8	12	4	10	9	7	3
R65	5	13	8	6	11	4	10	1	9	3	2	12	7	14
R66	10	4	12	5	9	3	8	6	11	7	1	13	14	2
R67	12	3	9	4	6	14	7	5	2	10	8	13	11	1
R68	4	14	12	2	7	9	11	3	10	13	5	1	8	6
R69	11	7	14	10	3	12	13	5	1	8	6	9	4	2
R70	2	13	10	5	7	1	8	6	4	3	11	12	14	9
R71	4	8	13	3	6	10	12	5	11	2	7	9	1	14

Appendix VIII (E)

Frequency Table of Composite Ranks to 14 Pre-Set Problems by the Respondents

Final Rank	3	6	13	2	1	5	14	4	7	8	9	11	12	10
Particulars	Liquidity Problem & Volume	Exchange Turnover Charges	Income Tax	Exercise of Options	Lack of Education	Instead of Risk Management Tool Being Used as Speculative Instrument	Stamp Duty	Lack of Strategic Interest Among Participants	Only American Options Available in Stock	High Premium Cost	Only European Options Available in Index	Operational Issues in using Exotic Models of Options Trading	Lack of Trading Software	High Margin
R72	6	2	10	1	8	4	11	13	9	7	14	3	5	12
R73	1	10	14	11	4	6	9	2	7	5	3	12	8	13
R74	2	7	9	4	1	5	13	8	6	3	10	12	14	11
R75	14	1	8	5	12	7	9	3	13	11	6	4	10	2
R76	5	8	11	3	14	1	12	2	6	4	9	7	10	13
R77	3	2	12	8	5	11	14	4	1	10	7	13	9	6
R78	12	3	11	2	8	4	10	13	5	7	9	1	14	6
R79	4	11	6	10	12	5	13	7	9	1	14	2	8	3
R80	14	2	9	4	7	1	6	10	5	11	3	12	13	8
R81	7	4	13	10	2	12	9	3	11	8	6	14	1	5
R82	1	10	12	3	7	11	6	8	13	2	14	5	9	4
R83	6	14	11	1	8	2	12	5	3	7	10	9	13	4
R84	2	5	8	12	4	11	13	9	1	10	3	14	7	6
R85	4	10	14	9	12	5	8	3	11	7	6	1	2	13
R86	5	9	12	3	11	1	7	2	6	10	8	14	4	13
R87	1	4	7	2	9	12	10	11	8	3	6	13	14	5
R88	2	5	10	14	8	3	13	6	1	9	12	4	11	7
R89	5	8	13	1	6	2	10	12	11	4	7	14	3	9

Appendix VIII (E)

Frequency Table of Composite Ranks to 14 Pre-Set Problems by the Respondents

Final Rank	3	6	13	2	1	5	14	4	7	8	9	11	12	10
Particulars	Liquidity Problem & Volume	Exchange Turnover Charges	Income Tax	Exercise of Options	Lack of Education	Instead of Risk Management Tool Being Used as Speculative Instrument	Stamp Duty	Lack of Strategic Interest Among Participants	Only American Options Available in Stock	High Premium Cost	Only European Options Available in Index	Operational Issues in using Exotic Models of Options Trading	Lack of Trading Software	High Margin
R90	1	4	11	7	5	8	12	3	6	2	10	9	13	14
R91	3	11	7	1	12	4	14	6	10	5	8	13	2	9
R92	7	4	12	2	10	1	6	5	8	13	9	3	14	11
R93	2	6	10	8	5	4	12	9	1	3	11	7	13	14
R94	8	4	14	12	3	9	6	11	2	13	1	10	5	7
R95	2	7	9	8	4	12	14	5	13	3	10	6	1	11
R96	5	3	12	7	1	9	8	13	6	4	11	14	2	10
R97	10	14	12	6	5	3	11	2	9	13	1	8	4	7
R98	1	6	11	2	10	14	12	8	4	13	7	5	3	9
R99	10	1	14	8	4	3	12	7	2	5	13	9	6	11
R100	3	7	14	10	2	1	13	5	6	9	4	11	8	12
R101	1	2	7	5	3	4	14	13	6	9	10	11	12	8
R102	1	3	6	4	2	5	13	7	8	11	12	14	10	9
R103	2	3	7	4	1	5	12	6	8	10	13	14	9	11
R104	7	3	6	1	2	4	11	5	8	9	13	12	14	10
R105	5	3	7	2	4	1	14	8	6	9	10	11	12	13
R106	3	5	6	7	2	1	13	4	8	9	10	11	12	14
R107	4	6	7	5	3	10	12	14	9	1	2	8	11	13

Appendix VIII (E)

Frequency Table of Composite Ranks to 14 Pre-Set Problems by the Respondents

Final Rank	3	6	13	2	1	5	14	4	7	8	9	11	12	10
Particulars	Liquidity Problem & Volume	Exchange Turnover Charges	Income Tax	Exercise of Options	Lack of Education	Instead of Risk Management Tool Being Used as Speculative Instrument	Stamp Duty	Lack of Strategic Interest Among Participants	Only American Options Available in Stock	High Premium Cost	Only European Options Available in Index	Operational Issues in using Exotic Models of Options Trading	Lack of Trading Software	High Margin
R108	14	4	6	3	13	5	11	1	2	7	8	12	10	9
R109	13	14	7	4	5	3	12	2	6	1	8	9	10	11
R110	5	13	6	14	4	2	8	3	1	7	9	10	11	12
R111	9	6	7	13	5	14	11	1	2	3	10	4	8	12
R112	10	9	8	7	2	13	12	5	4	6	1	3	11	14
R113	11	10	7	9	3	6	13	8	12	1	2	4	5	14
R114	12	11	6	10	13	9	14	3	5	2	1	4	7	8
R115	1	12	9	14	2	10	11	13	8	4	3	5	6	7
R116	1	2	8	4	3	13	14	12	9	11	7	10	6	5
R117	2	1	8	4	3	12	11	6	13	5	7	9	14	10
R118	14	13	9	11	4	8	12	10	7	6	5	3	2	1
R119	12	14	7	10	3	8	13	5	11	9	6	4	1	2
R120	11	10	7	9	3	6	13	8	12	1	2	4	5	14
R121	5	13	6	14	4	2	8	3	1	7	9	11	10	12
R122	3	5	6	7	2	1	13	4	9	8	10	11	12	14
R123	4	6	7	5	3	10	12	14	9	1	8	2	11	13
R124	14	4	6	3	13	5	11	1	2	7	12	8	10	9
R125	13	14	7	4	5	3	12	2	6	1	9	8	10	11

Appendix VIII (E)

Frequency Table of Composite Ranks to 14 Pre-Set Problems by the Respondents

Final Rank	3	6	13	2	1	5	14	4	7	8	9	11	12	10
Particulars	Liquidity Problem & Volume	Exchange Turnover Charges	Income Tax	Exercise of Options	Lack of Education	Instead of Risk Management Tool Being Used as Speculative Instrument	Stamp Duty	Lack of Strategic Interest Among Participants	Only American Options Available in Stock	High Premium Cost	Only European Options Available in Index	Operational Issues in using Exotic Models of Options Trading	Lack of Trading Software	High Margin
R126	3	5	6	7	2	1	13	4	8	9	11	10	12	14
R127	4	6	7	5	3	10	12	14	9	8	1	2	11	13
R128	14	4	6	3	13	5	11	1	2	8	7	12	10	9
R129	13	14	7	4	5	3	12	2	6	8	1	9	10	11
R130	1	2	7	5	3	4	14	13	6	11	10	9	12	8
R131	1	3	6	4	2	5	13	7	8	14	12	11	10	9
R132	2	3	7	4	1	5	12	6	8	14	13	10	9	11
R133	7	3	6	1	2	4	14	5	8	12	13	9	11	10
R134	5	3	7	2	4	1	14	8	6	11	10	9	12	13
R135	2	1	7	5	3	4	14	13	6	11	10	9	12	8
R136	3	1	6	4	2	5	13	7	8	14	12	11	10	9
R137	3	2	7	4	1	5	12	6	8	14	13	10	9	11
R138	3	7	6	1	2	4	11	5	8	12	14	9	13	10
R139	5	3	7	4	2	1	14	8	6	11	10	9	12	13
R140	1	2	8	3	4	5	11	6	7	9	10	12	14	13
R141	5	3	7	2	4	8	14	1	6	11	10	9	12	13
R142	2	1	7	5	3	13	14	4	6	11	10	9	12	8
R143	3	1	6	4	2	7	13	5	8	14	12	11	10	9

Appendix VIII (E)

Frequency Table of Composite Ranks to 14 Pre-Set Problems by the Respondents

Final Rank	**3**	**6**	**13**	**2**	**1**	**5**	**14**	**4**	**7**	**8**	**9**	**11**	**12**	**10**
Particulars	**Liquidity Problem & Volume**	**Exchange Turnover Charges**	**Income Tax**	**Exercise of Options**	**Lack of Education**	**Instead of Risk Management Tool Being Used as Speculative Instrument**	**Stamp Duty**	**Lack of Strategic Interest Among Participants**	**Only American Options Available in Stock**	**High Premium Cost**	**Only European Options Available in Index**	**Operational Issues in using Exotic Models of Options Trading**	**Lack of Trading Software**	**High Margin**
R144	3	2	7	4	1	6	12	5	8	14	13	10	9	11
R145	3	7	6	1	2	5	14	4	8	12	13	9	11	10
R146	5	3	7	4	2	8	14	1	6	11	10	9	12	13
R147	1	3	8	2	4	6	11	5	7	9	10	12	14	13
R148	4	6	8	5	3	10	12	14	9	1	2	7	11	13
R149	14	4	6	3	13	1	11	5	2	7	8	12	10	9
R150	13	14	11	4	5	3	12	2	6	1	8	9	10	7
R151	5	13	6	8	4	2	14	3	1	7	9	10	11	12
R152	9	6	7	13	10	14	11	1	2	3	5	4	8	12
R153	10	9	12	7	2	13	8	5	4	6	1	3	11	14
Composite Rank	**906**	**988**	**1443**	**883**	**852**	**943**	**1671**	**936**	**1087**	**1152**	**1188**	**1343**	**1425**	**1248**