Risk Management Through Options Trading in Indian Market

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Abstract

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 analyzing 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. The present paper will study and analyze the risk management through options trading in Indian Market.

Keywords: Quantum of Risk, Risk Managing Activity, Options Trading

Introduction

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.

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

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regarded as historical measure of risk. Financial risk may be market-dependent, determined by numerous market factors or operational, resulting from fraudulent behavior 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).

Categories of Risks

- **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.

- **Credit Risk:** Any party that have to receive obligatory payment in future faces this risk of default.

- **Accounting Risk:** Accounting risks basically originate from contravention difference in interpretation of basic accounting postulates and thus consequent effect on Net Profit.

- **Tax Risk:** Tax risk is the risk that the interpretation possibility of taxing a transaction in two different manners creates this risk.

- **Regulating Risk:** Annulment of trade, allegation of manipulating the prices, imposition of penalties, suspension of business, regulatory arbitrage etc. are few examples of regulating risk.

- **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.

- **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 program 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 yields 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%.

- **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.

- **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.

- **Settlement Risk:** can arise out of Bankruptcy, insolvency or fraud of the counter parties. Sometimes it may result due to govt, policies, particularly in case of foreign exchange.

- **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.

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 analyzed 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.

Literature Review

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 ofthese 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.

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 ofthe 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 results 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.

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.

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.

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.

Objectives of the Study

- To examine the application of options as Risk Management Tools
- To analyze the acceptability of options trade as Derivative Product.
- To identify the barriers in options trading.

Methodology

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 ofturnover. 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.

Results

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. 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. 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 SEB1 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.

Discussion

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.

Key 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

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.

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.

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.

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.

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.

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 transaction's 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.

- **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 include

- **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.

- **The Clearing Corporation**

  In the modem 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.

- **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.

- **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.

- **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.

- **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.

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 its self 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.

- **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 value. The remaining Rs. 1 is known as extrinsic or time value.

- **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.

- **Theoretical Value**

   To calculate the theoretical value of options, either Binomial theorem or the Black Scholes model can be used. Binomial theorem only considers the likely outcomes at expiry of period of option, whereas, 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.

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.

- **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.

- **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 fulfil 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.

- **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 affected 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.

- **Final Exercise Settlement**

   Final exercise settlement is affected 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.

Settlement of Option Premium and Option Exercise

Table 1 reveals the correlation between options premium paid and the amount received by the holders of options at maturity / exercise of the premium.

Table 1: Settlement Statistics in Options Segment

Year	Index/Stock Options		Ratio
	Premium Settlement (Rs. Cr)	Exercise Settlement (Rs.Cr)	
2000-01	-	-	-
2001-02	164,76	93,95	1.75
2002-03	331,21	195,88	1.69
2003-04	858,94	476,12	1.80
2004-05	941,06	455,87	2.06
2005-06	1520,58	817,84	1.86
2006-07	3194,38	1188,84	2.69
2007-08	6760,17	3792,26	1.78
2008-09	10960,50	4187,58	2.62

It is apparent that option premium paid are much higher than the value received at exercise settlement and the ratio is moving upward indicating more loss to option buyer. It may be because of

- Options are priced much higher than its real value

- Investors have started using it as risk management technique to hedge the value of portfolio.

Thus, paying premium in this segment, whereas, the profit or loss on underlying portfolio is realized in cash segment.

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.

- **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: 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

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

Vega: It 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

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.

- **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.

- **Hedging the Risk of Price Rise**

  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.

- **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. It would depend, of course, on correlation between movement of price of stock vis-avis movement in index which is called Beta.

- **Trading Risks in Context of**

    Option Risk may be defined as the probability of loss of trading capital. In layman terms, it means the odds of losing money. Option trading, (especially when dealing with stocks option) has been deemed risky mainly because of the possibility of leveraged loss of trading capital due to the leveraged nature of stock options. Many forms of option trading risks can lead to catastrophic losses.

- **Stock Option Trading Risks - Meaning, Nature and Characteristics**

    Micro Risk Factors Associated with Stock Options Trading. Under the micro risks factors comes the individual trader specific risk and instrument specific risk. It explains all the possible risks related directly to the buying and selling of stock options comprehensively

- **Option Trading Risk for Option Buyer**

    The option trading risks pertaining to options buyers are:

- There is always Risk associated with losing the entire investment in a relatively short period of time.

- The risk of losing the entire investment increases as the option goes out of the money (OTM) and as expiration nears.

- European style options which do not have secondary markets on which to sell the options prior to expiration can only realize its value upon expiration.

- Specific exercise provisions of a specific option contract may create risks.

- Regulatory agencies may impose exercise restrictions, which stops option trader from realizing value

- Option Trading Risk for Option Seller

The Option Trading Risks Pertaining to Options Sellers are:

- Options sold may be exercised at any time before expiration.

- Covered Call traders forgo the right to profit when the underlying stock rises above the strike price of the call options sold and continues to risk a loss due to a decline in the underlying stock.

- Writers of Naked Call Write risk unlimited losses if the underlying stock rises.

- Writers of Naked Put Write risk unlimited losses if the underlying stock drops.

- Writers of naked positions run margin risks if the position goes into significant losses. Such risks may include liquidation by the broker.

- Writers of call options can lose more money than a short seller of that stock on the same rise on that underlying stock. This is an example of how the leverage in options can work against the option trader.

- Writers of Naked Call Write are obligated to deliver shares of the underlying stock if those call options are exercised.

- Call options can be exercised outside of market hours such that effective remedy actions cannot be performed by the writer of those options.

Conclusion

Derivatives are invented in response to some fundamental changes in the global financial system. They, if properly handled, should help improve the resilience of the system and bring economic benefits to the users. In this context, they are expected to grow further with financial globalization. However, past credit events exposed many weaknesses in the organization of derivatives trading. The aim is to minimize the risks associated with such trades while enjoying the benefits they bring to the financial system. An important challenge is to design new rules and regulations to mitigate the risks and to promote transparency by improving the quality and quantity of statistics on derivatives markets. India's tryst with derivatives began in 2000 when both the NSE and the BSE commenced trading in equity derivatives. In June 2000, index futures became the first type of derivatives instruments to be launched in the Indian markets, followed by index options in June 2001, options in individual stocks in July 2001, and futures in single stock derivatives in November 2001. Since then, equity derivatives have come a long way. New products, an expanding list of eligible investors, rising volumes, and the best risk management framework for exchange-trade derivatives have been the hallmark of the journey of equity derivatives in India so far. India's experience with the equity derivatives market has been extremely positive. The turnover of derivatives on the NSE increased from 24 billion in 2000- 2001 to 2, 92,482 billion in 2010-2011, and reached 3,13,497 billion in 2011-2012. In 2012-13, the figure reached 3, 15,330 billion. The average daily turnover in this segment of the markets on the NSE was 1,266 billion in 2012-13 compared to 1,259 billion in 2011-12. India is one of the most successful developing countries in terms of a vibrant market for exchange-traded derivatives. This reiterates the strengths of the modern development in India's securities markets, which are based on nationwide market access, anonymous electronic trading, and a predominantly retail market. There is an increasing sense that the equity derivatives market plays a major role in shaping price discovery and in many other areas in times to come.

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