Chapter – II
Research Design

Introduction

Financial Derivatives have seen a metamorphic change and are offering a bundle of utilities to the stakeholders in hedging their performance risk, realizing speculative gains and in capitalizing on the arbitraging opportunities due to temporary disequilibrium or inefficiency of the markets. Participants in the financial markets are exposed to diverse risks and they seek effective and efficient risk management tools that help them to mitigate their probable performance risk of their portfolio and realize optimal rewards for their investments. Market regulatory authorities are striving hard for providing innovative risk management tools to manage the risk in the hands of participants. Financial Derivative Instruments have been one of such innovations.

Financial Derivatives, though considered as Risk Hedging Instruments, are preferred less by larger sections of retail investors in India. This is due to the complex nature of the Derivative Instruments and volatile market conditions making the investors highly resistive towards adoption of innovative instruments such as Derivatives. These instruments are getting more confined to large scale investors, institutional investors, and HNIs who are found investing in Equity or Index Derivative platforms. It is also observed and opined by the market intermediaries and investor participants that the cash markets are greatly affected
by the derivative segments as they are driving away major segment of the cash markets i.e., speculators by offering them better rewards with lesser capital participation.

Index Derivatives especially the Index Futures are doing well globally, and Equity Derivatives (F&O) are also providing the investors better hedging opportunities and performance efficiency of their investment portfolio. Global market crisis influenced by mortgage crisis, failure of CDS (Credit Default Swaps) in US and European markets are making rest of the economies skeptical towards these instruments and leaving the future for growth under shadow. Anyhow, the high degree of market risk and uncertainty in the market are forcing the investors to look for better hedging opportunities. Derivative Instruments are providing for opportunities in this regard. However, lack of knowledge about the Derivative Products is leading to their underperformance.

Indian Capital Markets, against the global markets, are still in naive/nascent stage as their presence in the Indian markets is just over a decade now. The experience of Indian Capital Markets reveals that the Derivatives have greatly been successful in supplementing the cash market by creating better liquidity platform and leveraging opportunities for the instruments traded. The cash markets have observed a high degree of positive correlation with the performance of the Derivatives.

The Derivatives Market has seen the highest growth of all financial market segments in the recent years. It has become a major contributor to the stability of
the financial system and an important factor in the functioning of the economy. Despite the importance of the Derivatives Market, some are concerned about the size, structure, role and segments of Derivations and on how they work. The Derivatives Market has recently attracted more attention against the backdrop of the financial crisis, fraud cases and the near failure of some market participants. Although the financial crisis has primarily been caused by structured credit-linked securities that are not Derivatives, policy makers and regulators have started to think about strengthening regulations to increase transparency and safety for both Derivatives and other Financial Instruments.

Derivative since its inception in Indian Capital Markets has brought about a paradigm shift in the capital market operations in India. Indian Capital Markets in Derivative trading, among the top ten performers globally, stand third in the world for Single Stock Futures trading, second in the Stock Index Options trading and third in Stock Index Futures trading. But the country has failed to take any place among the top ten for trading on Single Stock Options (the rate of growth in trading on stock option has been in phased manner) as most of these contracts are OTC (Over-the-Counter) traded and being customized transactions, they do not ensure delivery of underlying assets and most of the times, they are cash settled. Further, they also have failed to attract a larger section of investors towards them as most of the participants in the market require the transactions to be standardized and ensure liquidity to the contract. BSE has failed to appear, in the list of top ten exchanges, in all the forms of Derivative trading globally.
In this background, the study entitled *A Study of Options and Futures Mix Strategies for Optimizing Portfolio Returns* is undertaken to evaluate the perception of market participants and the intermediaries towards Derivatives, the level of efficiency realized by the markets and by the investors by adopting Derivatives in their investment portfolio, and to understand various factors that are contributing and/or hindering the performance of Derivatives to their desired efficiency, etc.

**Earlier Works – A Brief Review**

With the twin objectives of obtaining a comprehensive idea about the theoretical framework of the topic and also to identify the research gap that exists at present, an attempt is made in the following paragraphs to review some of the important earlier works. For the purpose of review, the selected important earlier works are classified into four categories as follows.

1. Reports of Committees on different aspects of Financial Derivatives,
2. Selected Doctoral Works in the area of Financial Derivatives,
3. Published Research Papers in the area of Financial Derivatives, and

**I. Reports of Committees on different aspects of Financial Derivatives**

Few committees were constituted by SEBI and other regulatory bodies to study the feasibility of introducing Derivative Instruments in the Indian markets, and to develop the necessary regulatory system – i.e., the regulatory mechanism to facilitate the effective functioning of these instruments in delivering the required
utilities to the stakeholders such as retail investors, institutional investors, banks and other financial institutions, etc., in the market. Reports of few important and relevant committees are reviewed below.

L. C. Gupta Committee\(^1\) was constituted by the Securities and Exchange Board of India (SEBI) in 1996 to develop appropriate regulatory framework for Derivatives trading in India. The Committee’s concern was with Financial Derivatives in general and Equity Derivatives in particular. The Committee observed that Derivatives in the markets are not always clearly understood. A few well-publicized debacles involving Derivatives trading in other countries had created widespread apprehensions in Indian public mind also. While the economic literature recognizes the efficiency-enhancing effect of Derivatives on the economy in general and the financial markets in particular, the Committee felt that there was a need for educating the public to transform their opinion. The committee also felt the need for developing effective regulatory framework. In this regard, the committee made the following recommendations.

01. Withdrawal of legal restriction from use of future instruments by institutional participants in their own interest for hedging their investment or performance risk.

02. The regulatory responsibility for Derivatives trading to be shared between the exchange conducting Derivatives trading on the one hand, and SEBI on the other to maximize regulatory effectiveness and minimize the regulatory costs.

03. Having separate exchange for Derivative and Cash Market trading as in USA. Because, this, in the opinion of the committee, facilitates the cash
markets in having better liquidity platforms and also reduce the cost of carrying the transactions on two different exchanges.2

04. The committee was of the strong opinion that introduction of Financial Derivatives would act as a cost effective measure to hedge the market risk. The committee proposed introduction of Equity Derivatives, Interest Rate Derivatives and Currency Derivatives. The committee highlighted the role of Stock Future Derivatives and the Interest Rate Derivatives in stabilizing the market performance. It pointed out that the Equity Derivatives have to be introduced in the market in a paced manner. Recognizing the role of organized markets and the need for efficient regulatory framework in promoting these instruments, they recommended various measures to enhance the performance of these instruments.3

**Tarapore Committee on Capital Account Convertibility** constituted by the Reserve Bank of India4 proposed the need for risk management wherever there is a Fuller Capital Account Convertibility (FCAC). The committee observes that the utilization of risk management tools such as Interest Rate Futures and Options, Credit Derivatives, Commodity Derivatives and Equity Derivatives is not possible by the banks due to poor infrastructure. Therefore, the committee proposed to create effective infrastructure for the banks to conduct their operations in a stable and efficient manner, for which the committee called for the RBI to have robust accounting framework through proper accounting standards, independent risk management framework, appropriate management of assets, comprehensive guidelines for dealing in Derivative Products and have proper governance or disclosure mechanism. The Committee also opined that the markets for
Derivatives is still ripe and recommended for the development of Fixed Income Money Market and Derivatives Association (FIMMDA) that may be suitably empowered to act as a self regulatory organisation to develop market ethics, trading standards and also protect the interest of participants besides disseminating information regarding the market performance and the impact on the underlying asset performance.

**J. R. Varma Committee** constituted by SEBI in 1998 for studying the Risk Containment Measures in the Indian Stock Index Futures Market\(^5\) recommended various measures that had to be taken by the markets for effectively managing the risks exposed by the investors trading in these markets. The Committee, continuing from the recommendations of L. C. Gupta Committee, recommended to develop a measure for assessing the volatility in the market in terms of VaR (Value at Risk) and assessing the margin requirement that has to be maintained by the participants with the exchanges to make good the margin differential due to volatility experienced by the market. The Committee observed that it was easier to introduce stringent risk containment measures in the Derivatives Market which are being set up since their introduction in the market. However, it does not make sense to have risk containment measures which lack rigor, strictness and firmness in the cash market than in the Derivatives Market. The Committee recommended that, margins in the cash market should be based on 99% VaR (Value at Risk). As an interim measure, the margins could be twice that in the Index Futures Market since individual securities are roughly twice as volatile as the Index. Exposure limits could also be commensurately lower than in the Derivatives Market.
SEBI Advisory Committee on Derivatives Regulations⁶ was constituted in June 2002 for the development of regulatory framework for Derivative trading in India which submitted its report in September 2002. The committee recommended various norms pertaining to determination of margin and cross margining, cross hedging, surveillance mechanism to govern the markets and trading, risk containment measures, minimum contract size for participation, marking the indices to bucket of stock made available for writing the contracts, eligibility requirement (where the committee opined that the determination of stock to write Stock Options and Futures Contracts shall be left to the individual exchanges offering the contracts), determination and fixation of position limits, qualifying criteria for the institutional participants (i.e., insurance companies and mutual fund organizations) to adopt these instruments as a measure of hedging their financial and performance risks, and portfolio rebalancing measures. The committee also suggested to SEBI for appointment of ACD (Advisory Committee on Derivatives) to look into the markets and to assess the feasibility of incorporation of regulatory framework for enhancing the performance of the capital markets in India.

Advisory Committee of Derivatives (ACD)⁷ was constituted in April 2002 to provide broader framework for physical settlement procedure for Derivative Contracts. The SEBI Board required the committee to assess the risks and benefits of physical settlements along with possible risk containment measures. The ACD considered the following principal issues involved in the physical settlement.
01. In the absence of a vibrant mechanism for securities lending and borrowing, physical settlement of Stock-specific Derivative Contracts, especially Stock Options, may raise concerns.

02. Globally, cash settlement is cheaper than physical settlement. But it lacks clarity in India where the modernization of payment system has lagged that of the securities settlement system.

03. Under the existing procedure of cash settlement, hedgers and arbitragers incur overnight price risk for liquidating one leg (position) of their transaction in the cash markets.

04. The Committee also recognized the concerns regarding short squeezes in physical settlement.

To address the above issues and concerns, the committee recommends the following measures.

01. The exchanges to lay down limits on daily exercise and assignment of Stock Options and applying position limits that could avoid possible manipulation under cash settlement and position limits.

02. The Committee also believed that there is a need for effective surveillance mechanism especially when the contract approaches expiry large positions tend to be closed out or rolled over into the next contract month making the market more skeptical regarding the future anticipated gains for such positions held.

03. An alternative approach is to examine the changes in contract design and market micro-structure that would eliminate the basic risk for hedgers and arbitrageurs even under cash settlement.
DMRC (Derivatives Market Review Committee) headed by M. Ramohan Rao in its report submitted in December 2008 examined the implications on the stock exchanges when SEBI took up the initiative for introduction of physical settlement of Stock Futures and Options (F&O). This was a move with the objective of creating and edging for the bulls over the bears in markets and to boost the stock lending and borrowing mechanism. This was also to provide an opportunity to the Bombay Stock Exchange (BSE) to reclaim the lost ground from the National Stock Exchange (NSE).

II. Doctoral Works in the area of Financial Derivatives

Some of the important and relevant doctoral works in the area of Financial Derivatives are selected to have an insight into their contributions towards the development of these instruments. Further, these works are reviewed in terms of their relevance to the topic of the present study.

Sri. Ramanjaneyalu (2010) in his unpublished thesis entitled *A Study on Financial Derivatives and Risk Management* focuses on understanding the investors’ (retail investors) perception towards Derivatives in the light of the myths in the markets regarding these instruments. The researcher attempts to understand the feasibility of Derivative Instruments in delivering the desired utility to the investors to provide them with hedging opportunities and acting as the efficient tools in their hands to manage their risk. Further, the objective of research being to understand the level of awareness and acceptability of the products in the market, derived utilities of these instruments, and to understand the correlation that exist
between the spot/cash markets, and the future markets, the study concludes that creating awareness among the investors, better regulatory platforms, political stability and stable market policies, and better surveillance mechanisms in the market can bestow confidence in the minds of the retail investors and provide for better acceptability among the retail investors. Derivative contracts cannot be merely introduced as a risk management tool. Rather, they should be used for discovering the price risk as well as to speculate, thereby attracting hedgers and speculators towards Derivatives market.

Davis Bundi Ntwiga (2005) in his unpublished thesis entitled *Numerical Methods for the Valuation of Financial Derivatives*\(^{10}\) has developed measures for valuation of Single Stock Futures (SSF) Contract and evaluated the feasibility of their application using the data of Futures Contracts on the underlying security of equities listed on the Johannesburg Stock Exchange (JSE) and South African Futures Exchange (SAFEX). The value of a SSF contract is taken as equal to 100 times the particular share on which the futures price was determined and negotiated through an order matching platform called, the Automated Trading System (ATS). The study shows that the fungibility of using Black Scholes estimation to solve the Partial Differential Equation (PDE) by approximating the differential equation over the area of integration by a system of algebraic equations is an incomplete measure. The Researcher feels that there should be more powerful and flexible technique capable of generating accurate numerical solutions to PDEs arising in financial and other physical sciences. He suggests simulation as a numerical technique for conducting experiments by imitating a
situation using mathematical and logical models in order to estimate the likelihood of various possible outcomes over a period of time. He feels that simulation is feasible for application and helps in valuation of Exotic Options, Asian Options, etc., as a comprehensive measure.

Nir Naor (2003), in his unpublished work titled *Reporting on Financial Derivatives from a Law and Economics Perspective*, highlighted the importance of corporate governance practices and fair value accounting for removing the informational asymmetry between firms and their stakeholders. Public Choice Theory offered some insights regarding some risk-aversion and complexity biases. However, adoption of Accounting Standards such as FAS 133 (Financial Accounting Standards Board Statement No. 133) and IAS 39, (International Accounting Standard - 39) can bring in an increased transparency and provide for fair value accounting. The study concludes that hedging is a socially beneficial activity and constitutes the larger part of trading in Derivatives on behalf of firms.

**III. Published Research Papers**

Sri. Patil, R. H (2006), in his paper entitled *Current State of Indian Capital Markets*, has analyzed the role and relevance of sophisticated information technology tools in trading and settlements. The author explained the role of NSE in transforming Indian Capital Markets. While explaining the role of NSE, he examined how short settlements and dematerialization have enhanced the efficiency in capital market operations. Further, the author showed how the
introduction of Badla system (in stock markets) and Stock Futures would pose threat in future. He further emphasized on the potential risks the investor would face in future by the introduction of F&O and Index Futures, and questions how the Index Futures would be sustained by the market in the long run.

Jones, Mark Britten and Neuberger, Anthony (2000) in their study entitled *Option Prices, Implied Price Process and Stochastic Volatility* show how the robustness of market would influence the prices of the financial instruments traded in the market, and claim determination of volatility does not require any specific model. The investors would always look for a robust hedging strategy that would implicitly recognize the volatility and its impact on future performances. The study shows how risk neutral probability of stock price moves over a future period affecting the Option price which would in turn will be influenced by consistent and continuous price moves, implied volatility and stochastic performance of the underlying instruments on which the contracts are drawn.

Misra D and Misra S.D, (2005) in their study entitled *Growth in Derivatives in the Indian Stock Market: Hedging versus Speculation* examined various factors acting as drivers for trading on Derivatives. They showed how the Derivatives are providing solutions to the investors in the market. Raina Ajay and Mukhopandhyar, C (2004) in their study entitled *Optimizing a Portfolio of Equities, Equity Futures and Equity European Options by Minimizing Value-at Risk (VaR)* analyzed how Equity Derivatives help the investors in assessing the right quantum (proportion) of portfolio mix by allocating the unit capital to
minimize the VaR associated with the investment portfolio. The study shows that the variance alone cannot be a good measure to assess the associated risk of portfolio but the investors will have to look for optimal allocation of capital to different assets that help them to minimize the VaR. They observed that a combination of equity options (Call and Put) and sell Futures reduce the associated VaR of equities invested significantly.

Liu Jun and Pan Jun (2003) in their study entitled Dynamic Derivative Strategies\(^{16}\) exhibit how adoption of Derivatives and strategizing investment portfolio can provide for better tradeoff between risk and returns. The study shows that mere leveraging of portfolio by various combinations of Stocks and Bonds would not provide for optimal portfolio performance. This is more so when the markets are experiencing higher price volatilities. However, adoption of Derivatives by non-myopic investors would expand the opportunity set for capitalizing on returns in commensuration to risk exposed to by time-varying investment opportunities. Neuberger Anthony and Hodges Stewart (2002) in their research paper entitled How Large are the Benefits from using Options?\(^{17}\), analyzed how Option Contracts in the market extend the benefits to the investors in performance optimization of their portfolio. They developed an economic model to study how dynamic trading strategies assist the investors in enhancing their performance. However, the magnitude of benefits realized depends upon how best the investors optimize the opportunity sets available in the market. The research concludes with an open question, prediction of the market would always be complex as the expected benefits are always substantially higher than what is
determined for. Sankarshan Basu (2004), in his study entitled *Indian Derivative Market entering the Next Phase of Development,* has provided a conceptual framework for Derivative Instruments traded on the Indian Stock Exchanges. He has analyzed how the phased development of these instruments and the introduction of Swaps, Currency Options, Exotic Options and Interest Rate Options have provided for effective hedging of risk by Banks and Other Financial Institutions. The Researcher shows how the lack of transparency, non-inclusion of OTC (over the counter) Derivatives by Securities Contract Regulation Act (SCRA), market volatility and inconsistent monetary policies and lack of knowledge about Derivative Instruments have hindered the growth of these instruments in the market.

Raman Rao, S.V (2007), in his study observed that the introduction of Derivative Instruments such as Index Futures, Index Options, Stock Options and Stock Futures have brought about radical changes in the performance of Nifty spot market and has enhanced the volatility of spot market index significantly. Joshi Manisha and Mukhopadhyay Chiranjit (2004) in their paper entitled “The Impact of Option introduction on the Volatility of an Underlying Stock of a Company: The Indian Case”, have analyzed how Option introduction impacts the simple and compounded returns volatility measured by stock return variance taking 29 stocks that were the initial introduction on NSE (for writing the Derivative Contracts) during July 2001. Continuing from the basic presumption that introduction of Options should not have a bearing on the Spot Markets, the study shows that under the current market scenario where the markets are always in
temporary disequilibrium due to market imperfections, Derivative Markets are bound to have a bearing on the underlying cash markets. Mukherjee Kedarnath and Mishra R. K (2007)\(^{21}\) have examined how the future price of the Option Contract would be influenced by the informational efficiency of the market. Using the S&P CNX Nifty Index Options data during December 2001 to January 2004, the study observes the inter-relationship between the Net Open Interest and Trading Volumes on the underlying cash market using Granger's Causality Test. The study showed a significant relationship between open interest and trading volumes, and future price movements in underlying cash markets.

Sehgal Sanjay and N Vijaykumar (2007), in the research paper entitled The Relationship between Stock Market Variables and Option Market Liquidity: Evidences from India,\(^{22}\) analyzed the relationship that exists between the Financial Derivative Market and liquidity positions in the cash markets on instruments on which the Option Contracts are drawn. Based on this, the authors conclude that consistent and regular trades ensure institutional investors to realize better leverage advantages by trading on Options Contracts which also provide them with the advantage of lower transaction cost and short sale restrictions. Sarangi, Sibani Prasad and Patnaik, Uma Shankar (2007)\(^{23}\) evaluate as to how the introduction of F&O in Indian Capital Market has brought about a significant change in its operation. The volatile market conditions and inconsistent behaviour make the market performance highly uncertain. The adoption of sophisticated IT infrastructure ensures enhanced market efficiency as the investors are well informed enabling rational decisions. Further, this study shows that the spot
market had observed a significant difference in the prices of the traded securities due to the introduction of F&O, and the nature and degree of volatility in the market have also changed significantly. The study concludes that there is no significant impact on underlying market volatility due to the introduction of F&O trading, and F&O introduction has neither stabilized nor destabilized the cash market volatility. The researchers further conclude that the F&O introduction has attracted only the well informed investors.

Long D Michael, Schinsk D Michael and Officer T Dennis (1994) in their research paper entitled, The Impact of Option Listing on the Price Volatility and Trading Volume of underlying OTC Stocks, analyzed the impact of Option listing on the trading volume of the underlying stock and volatility experienced by them in the market when traded on OTC. The study uses the market information from NYSE and AMEX which initiated listing of OTC-traded Option Contracts drawn from CRSP (Center for Research in Security Prices) of daily OTC data tapes. The researchers observe that Options listing provided more benefits to smaller and medium firms than their larger counterparts. Using Relative Value and Average Relative Value of OTC-traded Options listed on exchanges, the study concludes that trading volume of OTC firms increased significantly with the introduction of Options increasing the trading activities significantly and markets have no evidences of destabilization due to introduction of Options. Easley, David, O’Hara Maureen and Srinivas P. S (1998) in their research paper entitled, Option Volume and Stock Prices: Evidences on where informed Traders Trade, discussed how investor awareness of the market and the instruments traded...
influence the volume traded, and the nature and type of contracts drawn in the market. The researchers have shown how Stock Option trading influences the equity markets. Further, this study shows how informed traders would be profiting in both markets and how they move across markets to primarily attain the point of equilibrium and equalize profits in each market taking different positions in the markets either to buy or to sell based on the information floated in the market. The study concludes that the volume traded, influenced by the informational asymmetry, would affect the trading potential of the assets in future as well as the cash market.

Conrad, Jennefer (1989) in his research article entitled *The Price Effect of Option Introduction*, analyzed how introduction of Options on individual stock would affect the price/value of the underlying assets. Using the data on the performance of the stock on which the options contracts were drawn during the study period (1974-80), the author observes that, before and after introduction of these contracts the underlying assets earned a positive gain (or most of the times attained equilibrium point) either due to market inefficiencies or due to anticipated gains as promoted by the traders (hedgers or non-hedgers). The study concludes that the introduction of Options on individual stocks would cause a permanent price increase and would remain consistent atleast for reasonable period of time. Anthony H Joseph (1988) observes that there is a time lag relationship between option listing and trading of underlying common stock at least for a day. The study is based on the analysis of market information structure and its impact on trading potential of the assets on which the Option Contracts are drawn. The study bases
its evaluation on 25 stocks listed on NYSE (Newyork Stock Exchange) and AMEX (American Stock Exchange) on which Option Contracts were drawn during the evaluation period. The study, using Causality Test and Multi-Variate Causality Test, concludes that Option volumes cause stock volumes in predominant cases and in the case of few stocks, there was a time lag of day or no impact as the market would correct immediately due to informational efficiency. And in cases of bad corporate governance, markets would remain isolated from the real potential of the traded assets. Kumar Raman, Sarin Atulya and Shastri Kuldeep (1998) analyzed how the Option listing can reduce the risk associated with the price of the underlying stock with the help of comprehensive evidences drawn on Options listed on AMEX, CBOE, NYSE, PSE (Pacific Stock Exchange) and PHLX (Philadelphia Stock Exchange) during 1983-89. The study observes that trading on Options provides for consistent trading volumes coupled with higher trading frequencies and larger average transactions size reducing the transaction costs. The study concludes that listing of Options on exchanges would increase the liquidity of underlying stocks, and increase the trading volumes in larger blocks and marginally affect the bid-ask spread and lead to greater price efficiency. A study by Bessembinder Hendrick and Seguin J Paul (1992) showed that unexpected spot market trading has a larger impact on volatility than expected spot market trading volumes. Though there is a positive relationship between future unexpected trading volume and spot market volatility, there is a negative association between spot market volatility and expected future trading volume. The study concludes that it is not that Derivatives are destabilizing the spot market.
but poorly informed speculators trading on equity futures who are destabilizing the market performance.

Poteshman M Allen and Serbin (2003)\textsuperscript{30} analyzed how rational and irrational behaviour of the investors affect the future prices of the Option contracts. Using the data of listed Options on CBOE during January 1996 through December 1999, the authors observed that early exercise of the Options either due to liquidity requirement or anticipation of discounted value of underlying securities or Option value on a future date, result in investors taking short position irrationally. This behaviour in the market affects the future price of the Option contracts and induces the market to perform below the potential or standard. Mayhew Steward (2002)\textsuperscript{31} examined the relationship that exists between the price differentials in the market (Spread) and the relative strength of the market where the underlying stock gets listed.

The research article entitled \textbf{Forecasting Emerging Market Exchange Rates from Foreign Equity Options} by Chu Ting-Heng and Swidler Steve (2002)\textsuperscript{32} examined how the currency crisis and exchange rate depreciation make foreign equity options as the only attractive and liquid exchange traded derivatives. Using the Probability Density Functions and Risk Neutral Density Functions, the study observes that the Government’s Foreign Exchange Policy had a log normal impact on the valuation of foreign equity options, and showed that the emerging markets facing the exchange rate risk has a embedded effect of exchange rate movements on the foreign equity options, especially when the assets used for hedging were
denominated in a foreign currency. Vellekoop and Nieuwenhuis (2006) highlighted the inconsistencies experienced by the Equity Options on the assets in the event of payment of interim dividend or cash dividend and suggest that the Derivatives on equity could be valued on the assumption that between two dividend payment dates, the asset would follow lognormal dynamics, and the same dynamics are to be used to value or price all the Derivative products. Figlewski, Stephen (1989) in his paper entitled Options Arbitrage in Imperfect Markets identified that the determination of Option values is sophisticated and would be closely influenced by the arbitrage strategies adopted by the investors in the market. This study highlighted that the investor focus would always be at hedging those Options on underlying (targeted financial instruments) to rebalance his portfolios to realize his expected returns under market imperfection and market volatility. The emphasis of this study was on understanding how the underlying values of the securities (on which Options are drawn) would affect the liquidity and performance of the Option Contracts drawn.

Oaikhenan H E and Osunde O (2006) evaluated various factors that influence the demand for the Derivatives Contracts in Nigerian Markets. The Researchers provide a brief insight into various Derivative Contracts available in the market, their associated risk, regulatory framework governing the contracts and why the markets look for Derivative Contracts. This study shows how the level of activities in the market, behaviour of market index and reduction in the exchange rate due to export restriction in Nigerian markets influenced the demand for the rights (Derivatives) in the market. Karpoff M Jonathan (1987) examined how the
trading volumes in the financial markets influence the price and thereby determine the potential capitalization of investments made in equity and equity futures traded on exchanges. The Researcher has critically analyzed all the previous studies with the help of empirical evidences drawn from Wall Street and concludes how informational asymmetry would destabilize the market and volumes traded would influence the Futures prices on equity and equity derivatives traded.

Ramaswamy, Krishna and Sundaresan, Suresh M (1985) in their paper entitled Valuation of Options on Future Contracts analyzed the factors such as policies, governance practices, and market behavior. They concluded that the interest rate regulation and market imperfection would affect the value of underlying securities and Option prices. Grinblalt, Mark and Keloharju, Matti (2001) identified the critical factors that influence the investors in selecting and prioritizing their investment portfolios and how they determine the life cycle of their trading. Starting the study with the presumption that the investors are always risk averse towards realization of losses, the Researchers have studied the eventual decisions taken at various points of developments in the market which they claim has regression relationship and the impact of disposition in the market (sell decisions). They conclude that the past returns, reference price effects, the size of holding period, capital gain or loss, the smoothing of consumption over the life cycle, etc., determine the nature of trading, volume of trading, and the types of assets with the help of fair and robust evidences. Ahmad, Khan Masood, Ashraf Shahid, and Ahmed Shahid (2006) in their research article entitled Testing Weak Form Efficiency for Indian Stock Markets analyzed the sensitivity of market
information on the performance of stock market, and determined how other financial instruments that are traded on the exchanges would also influence the price or the payoff from the investment portfolios.

IV. Working Papers funded by NSE

Chakravarthy, Sugato and Ray, Rina (2010) highlighted the relevance of private information on the Probability of Informed Trade (PIN) and how the heterogeneity among the traders and their irrational behaviour in the market would be minimized to provide for informational and functional efficiency. Further, they have exhibited as to how the heterogeneous expectations would have an impact from the informational efficiency in the market and concluded that the markets should focus on providing relevant opportunities to trade by educating the investment community and orienting them towards the market performance with the potential they carry within them to deliver value to their investments.

Joshipura, Mayank (2009) explains how the market's overreactions would greatly affect the market performance and exhibits evidences from the market as to how the inefficiencies experienced in the market symbolically destabilize the market performance. He concludes with the help of Factor Reversal Test that whenever the market overreacts, it creates contrarian profits in the long run.

Bagchi, Debasis (2009) in his paper entitled *Global Stock Futures: A Diagnostic Analysis of a selected Emerging and Developed Markets with special reference to India,* states how the current state of liberalization and globalization provides the opportunities for global integration in the capital
markets and opportunities in the hands of investors to design their portfolio. Using VAR (Vector Auto Regression) and VECM (Vector Error Correction Model), he has studied the impulse nature of markets to the vulnerability reported by the allied or dependant economies and the securities of such economies traded on Indian capital markets. This paper concludes that the linear relationship existing between the markets and integration creates a favourable dynamic equilibrium relation with each other. Gupta, Kapil and Singh, Balwinder (2009) highlight the contributions made by the Equity Futures in providing for better price discovery mechanism and state how the equity markets are supplementing each other's performance. This study also shows that the Equity Derivative Markets are experiencing greater informational efficiency and the impact on the changes in the markets is evidenced instantaneously in the cash market transactions. The lead lag strength exhibited in F&O markets is more efficient than in cash markets. This study concludes that the equilibrium existing between these two markets is acceptable but better price convergence mechanism has to be developed. Though there are more than 250 scripts available for trading on F&O, only less than 10% of them are liquid.

Malik, N. S (2008) provides an overview of the utilities delivered by few selected Derivative strategies on index and stock, and examines the relative sensitivity of the performance of the underlying in the cash markets as compared with their performance in the Derivative segments. This study concludes that the investors opt to make their investments in Index Futures when focusing on short term and contrarily when the investments are made in the long run, it is favourable
to the investors to understand the market risk and chose stock option strategies which could assure them with opportunities to hedge and earn marginal gain offered by the market due to price swings experienced in the market.

Mukherjee, Kedarnath and Mishra, R. K (2006) exhibit the impact of information disclosure on Equity and Index Futures. It is shown that the market reactions to information disclaimers are greater in the Index Futures than in equity as the durability of performance in Equity Derivatives is much stronger compared with the Index. They conclude that though the underlying asset’s real value is sound and appreciative most of the times, the market forces make it to underperform as there will be volatility spill over in both Equity as well Index Futures. They suggest that for the market to perform to its true potential, there should be an efficient communication infrastructure. Marisetty, B Vijaya and Vedupuriswar, A.V (2004) in their paper entitled Corporate Governance and Market Reactions, explain the importance of corporate governance practices in providing for market efficiency and how mispricing of the instruments could be avoided to make them to perform to their efficiency. This reveals that proper information disclosure would always assure efficient performance of trading instruments in the market.

Srivastava, Sandeep (2003) brings the importance of net efficiency of open interest on Derivative Contracts written on underlying instruments and how it would affect the spot price in future ensuring the investor with greater liquidity and opportunity to hedge his financial risk. Shenbagaraman, Premalata (2003)
provides an empirical evidence to check the impact of Futures and Options trading on underlying cash market performance and concludes that there has not been a significant change in the volatility of the underlying stock index. However, the nature of volatility the instruments are getting exposed seems to be changing post implementation of Futures.

It is obvious from the above that a number of works, both by the individuals and the groups, have been undertaken, both at the national and at the international levels, on the broader subject of the theme selected for the present study. Further, the earlier works concentrated on one or the other micro aspect of the topic selected for the present study. Further, no comprehensive work on establishing the meaningful relationship between the F&O Strategies on the one hand, and the investors’ returns on the other is undertaken. Besides, the studies on the perceptions of the investors are also most missing. Hence, the present study is an attempt towards filling this research gap.

**Statement of the Problems**

Capital Markets around the world are experiencing a major turmoil in terms of their performance and/or performance of their investment portfolios. The markets are always looking forward for opportunities for effective hedging of their investment risk and to capitalize on the potential opportunities extended by the markets. Due to market integration and liberal economic policies, the markets are becoming more and more vulnerable to the changes effected by unstable policies, poor market infrastructure, informational inefficiencies, irrational behaviour of
participants, lack of information regarding the markets and the financial assets in which they invest. Regulatory frameworks formulated for the governance and control of markets also works below their potential as none can have a bearing and control on the irrational behaviour in the markets which, most of the times, are the major causes for the markets to underperform. A number of strategies initiated by the markets, innovative products and the tools for management of risks designed by the markets and offered to the investors are also performing below their actual potential.

Introduction of Financial Derivative Instruments in the year 2000 in the Indian Capital Markets was one such initiative by SEBI for extending the opportunities to the investors (both the institutional and individual investors) for effectively hedging their financial and performance risk of their investment portfolios. However, even today, the market participants are not so familiar with Derivatives and have not adopted them in their investment portfolios. It may be either due to lack of information about the instruments or due to myth of the instruments being complex for adoption or both.

Derivative Markets in India, in their structured form, are in existence just over a decade from now. In the midst of a number of myths in the market, they have seen metamorphic changes in their operations. SEBI, as a part of continuous initiative for development of their markets, had set up a number of committees for studying the market, potential opportunities and risks associated with trading on Derivative instruments. All these committees, in their reports, highlighted the important
contributions that would be brought into the markets by introduction of these instruments. They also provided an insight into the need for formulation of effective regulatory framework for the growth of these instruments in Indian Capital Markets. But, a look at the current market scenario shows that the market participants are highly skeptical regarding the real potential of these instruments. Absence of efficient regulatory system and independent exchanges for trading on Derivatives (like, LIFEE in London, CBOT and CBOE in America) are also seen as the causes for under-performance of the markets and Derivative instruments.

The initiatives of the Regulators for promoting these instruments are not so comprehensive and most of the studies conducted focus on the application of mathematical models to infer the market behaviour and do not make any attempt to understand the perceptions of investors towards these instruments and what makes them to accept or resist/reject adoption of Derivative Instruments in their investment portfolio. When a number of strategies are available for adoption (for portfolio management), only few are accepted and adopted, and many are either not accepted or remain isolated from the market participants. In many cases, management of investors' portfolios is always marked to market performance or decisions taken in isolation. The present study viz., A Study of Options and Futures Mix Strategies for Optimizing Portfolio Returns examines and evaluates all these problems.
Objectives of the Study

The primary objective of this Study is to investigate into the relationship between Options and Futures Mix Strategies, and the Portfolio Returns. To put it alternatively, it is to study how Options and Futures Mix Strategies can be used to obtain optimal return from the portfolio. In the process of achieving this, the study also aims at examining the attitude of investors towards Financial Derivatives and risk management starting with the initial presumption that investors are risk-averse. It also aims at obtaining an overall understanding of awareness, knowledge and use of Derivatives as risk management tools among the retail investors. This primary objective is split into a number of specific and detailed objectives as presented below.

01. To study the factors which influence the investment decisions of the investors and the level of significance of these factors.

02. To study the development and the current trends in Derivatives Market, and the reform measures initiated to exploit the trading potential of these instruments.

03. To examine the efficiency of the markets as observed by the investors and the intermediaries in providing them opportunities to realize their expected yield in terms of risk and returns.

04. To evaluate the perception and level of acceptability of Derivative Instruments among the diverse market participants.

05. To study the role of Derivatives and their strategies in optimizing the portfolio performance and/or returns, and the level of efficiency realized by the investors.
06. To evaluate the future trading potential of Derivative Instruments in Indian capital markets and the factors which are hindering their current performance and growth in India – investors and intermediary perspectives.

07. To evaluate the perceptions of investment community about the steps initiated and the steps to be initiated for the development of trading potential of these instruments, and to offer suggestions as to how investors through appropriate mix of Derivative Strategies can optimize their portfolio performance.

Scope of the Study

Capital Markets are in the process of continuous innovation and development to provide the market participants with optimal solutions that can meet the objectives which in turn govern the investors’ participation in the market. Capital markets are no more confined to the geographical boundaries of any country but go beyond it and cover all those markets where they are integrated either for the purpose of mobilizing capital or for the purpose of extending markets as a part of their related or unrelated diversification strategies initiated for realizing the optimal benefits offered by the market or for hedging their performance risk when operating only in single market. Capital markets, today, are attracting international investment by offering them efficient portfolio mix, and helping them to optimize their returns and to minimize the cost of investment and the risk. International investments are normally seen in the form of FDI or FII investments in the markets which in turn enhance the liquidity in the market and make the capital market vulnerable as an impact of perceived market risk by the investors. Market offers its participants with a number of opportunities in the
form of risk management tools such as Mutual Funds, Insurance, Derivatives, and other covered hedging tools to hedge the risk associated with the investments in the market. This study is an attempt to find out the most preferred form of risk management tools in the market, the level of satisfaction realized by adopting them in their investment portfolio and the hindrances faced by them for adoption— in the perception of both investors and the market intermediaries. The study also evaluates the market trends, both in Indian and Global capital markets, with the help of secondary data collected from the official sources of NSE, BSE, SEBI, etc.

**Hypothesis of the Study**

This study tests the hypothesis, *strategies pertaining to the mix of Options and Futures influence the portfolio returns*. In other words, the study aims at testing the hypothesis that, *with appropriate Options and Futures Mix Strategies, Portfolio Returns can be optimized.*

**Sources and Collection of Data**

The required and relevant data are collected from both primary and secondary sources. In other words, both the primary and the secondary data are collected and used in this study. Primary data are collected from two groups of respondents viz., investors and investment intermediaries with two separate sets of questionnaires.

Primary data are collected from the retail investors using questionnaire-based survey method. Questionnaire is used to obtain the details about the awareness and perceptions of retail investors about various Derivative products available for
trading in Indian Capital Markets with special reference to Equity Derivatives and how they see these instruments as effective tools for hedging risk associated with their investment portfolio. The questionnaire contained 44 questions covering their demographics, investment preferences, decision making criteria, parameters to evaluate risk, tools adopted for hedging their investment risk, awareness and perception towards Derivative instruments, Derivative instruments and strategies adopted, realized efficiency of these strategies and instruments, and future for these instruments in the opinion of the target group which comprised of respondents from different professions, income groups and educational background.

Another set of questionnaire is administered for the investment intermediaries to obtain their responses regarding the objectivity and attitude of the investors (as observed by them) in the adoption of Derivative instruments in the markets and what is the nature of benefits realized by the investment community.

Besides the primary data, secondary data are gathered from different sources such as, e-sources, articles from e-sources such as EBSCO, UGC-Inflibnet, etc., journals, proceedings of conferences and seminars, data bases of NSE and BSE for studying the growth achieved by the markets and to study the correlation existing between cash market trading and Derivative trading. Reports of few committees such as L. C. Gupta Committee, Tarapore Committee, J. R. Varma Committee, SEBI Advisory Committee on Financial Derivatives, Advisory Committee on
Derivatives, and Derivative Market Review Committee are also used to collect the necessary details for the study.

**Sample Size**

Using Simple Random Sampling, investor-respondents were selected from different parts of South India and the majority of the respondents are from Bangalore (Karnataka) and Mumbai (Maharashtra) where major trading on Derivatives is said to be taking place. For selecting intermediaries, Snow Ball Sampling was used. Because, during the process of study, the Researcher experienced lot of resistance by this group (i.e., intermediaries) when randomly selected and approached, and when they were approached through reference, an appreciable response was received from the intermediaries.

Retail investors were approached personally with questionnaires at different parts of Karnataka and Mumbai, and through others, at other places like Chennai and Hyderabad. For others, questionnaire was sent through post and e-mail. Out of 450 filled questionnaires received from the respondents, only 370 were complete in all respects and the remaining 80 were incomplete and therefore, they were rejected. Resistance of the respondents (both the investors and the intermediaries) to respond to the questionnaire was the main factor which forced the Researcher to contend with only 370 individual investors and 52 stock broking firms/investment advisors.
Statistical Tools used for Data Analysis

The data was compiled using Excel, and SPSS was used for tabulating the data collected through questionnaires. To analyse the data from different sources and to interpret the analysis, Simple Percentage, Moving Average, Weighted Average and Rating Method are used. Besides, statistical tools such as Chi-Square Test for testing of independence of variables, Z test for testing of proportions, and “t” test for testing of correlation co-efficient are used. Pie charts and bar graphs are also used to exhibit the data in a systematic manner for interpreting the data and drawing inferences there from.

Chapter Scheme

The entire report is presented in seven chapters as presented below followed by a brief analysis of each of the chapters.

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The first chapter provides conceptual framework of capital markets in India and abroad, Financial Systems and major transformation experienced, various issues faced by the capital markets globally, factors behind evolution of Derivative Instruments, various types of Derivative Instruments available for trading, markets for Derivatives, mile stones achieved, accounting and taxation issues of Derivative Instruments, current state of Derivative Instruments in the market, and the regulatory framework governing the Derivative Trading.

Chapter – II: Research Design introduces the topic followed by a comprehensive review of earlier works. Thereafter, technical aspects of research report such as statement of the problems, scope of the study, objectives, collection of data, methodology adopted for the study, statistical tools used for analysis, chapterization, limitations of the study, etc., are presented.

The next chapter viz., Chapter – III: Performance of Derivative Markets in India – An Evaluation provides an overview of developments with respect to Derivative Instruments in India, factors behind evolution and growth, markets for Derivatives (NSE and BSE), trading procedure, regulatory framework, types of Derivative Instruments available for trading, participants in these markets, future of these instruments, correlation between trading on Derivatives and cash market performance, etc.

Chapter – IV: Investment Preferences, Risk Management and Derivatives – An Analysis of Investors’ Perception focuses on evaluating the investment preference of the investors, factors that influence their investment choice, their
perception towards different risk management tools available in the market, and their opinion regarding their effectiveness in managing the risk and how they see Derivative Instruments as tools for managing the investment-related risks.

Different Derivative Instruments and the strategies adopted by the investors to manage their risk and the efficiency of these strategies in enhancing the performance of their investment, etc., are analyzed in Chapter – V: Derivative as Strategic Tools for Managing Risk – An Evaluation. Further, it also analyzes the kind of position in the Derivative Markets which enables the investors to realize the potential performance of their investment portfolios.

Chapter – VI: Role of Market Intermediaries in Promoting Derivatives – An Evaluation evaluates the perception of investment advisors as to how they see Derivatives as an effective tools for risk management, and what factors they observe in the market as drivers of growth in Derivative trading, and what factors deter their acceptability and application in the market and what future they see for these instruments in Indian Capital Markets.

Chapter – VII: Summary of Major Findings and Suggestions is used to present the summary of major findings of the study and the suggestions offered to strengthen the Derivative Market.

Limitations of the Study

Though all precautions have been taken to make this study a comprehensive one and objective, there are certain limitations which are inherent
in this type of study. Hence, the conclusions drawn based on the interpretations of data analyzed are subjective to the following limitations.

01. Derivative instruments are relatively new and therefore, have lesser acceptability in the market. This is one of the reasons as to why many investors (when contacted with questionnaire for response to different questions) did not provide responses to the questionnaire. It may be due to lack of awareness or due to the complex nature of the instruments, among the investors. Hence, the study covered only a small section of investors. Of course, this group is representative of retail investors and reasonably a good number for this type of studies.

02. There is a small group of investment intermediaries and there was a lot of resistance from them when they were approached. Of course, they responded positively only when some references were quoted. The responses received from the target group were not complete and therefore, in some case, the Researcher had to make some adjustment with whatever data was collected.

03. The secondary data used for the study was based on trading data on NSE since introduction of Derivatives in 2000 to September 2011. BSE data was not used as there was a lot a inconsistencies in their performance. Further, BSE has failed to create a distinctive market for Derivative trading on its terminals. Evaluations made to draw the inferences are, therefore, based on only NSE data. Hence, the inferences represent the performance of Derivatives on NSE only.
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