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Study of the Application of Short Straddle Strategy in Options on Various Underlying Assets in the Indian Option Market

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ABSTRACT

Titled "Study of the Application of Short Straddle Strategy in Options on Various Underlying Assets in the Indian Options Market" this study aims at studying the implication of short straddle strategy on selected 6 option contracts of 2 underlying categories.

This research paper tries to explore the applicability of short straddle strategy in options. Derivatives market is one of the unexplored markets by the Indian investors, as the concentration is mostly on the stock market primarily. This paper takes into consideration an investor having limited funds but good knowledge of the markets of the underlying assets, who desires to earn a return more than the risk-free rate of return. The paper provides to such an investor with an investment pattern which caters his requirements. The study puts out the merits of short straddle strategy. It shows the applicability of the short straddle strategy on the chosen investment avenues. It has considered equity and index as the underlying and selected Tata Motors, Reliance industry, Kotak Mahindra Bank, Asian Paints in the equity segment and Nifty 50, Nifty Bank in the indices segment.

1. Introduction

Savings of the individuals needs to be invested for the better functioning of the economy. There are various channels of investment through which this can be done. The prime focus of this paper is on the investment in options of the derivatives market in India. Derivative instruments are such instruments which derives its value through its underlying assets. These underlying assets can be stocks, bonds, indices, commodity etc.

Options are one of the types of derivative instruments which give the buyer the right but not an obligation, to buy the underlying asset, at the strike price of the option contract upon its expiry. On the other hand, the option seller does not have the right to dishonour, and hence they have an obligation to sell the underlying asset at the contracted price, if the other party exercises the option. The premium paid is the price at which an option contract is bought. Premium is paid by the buyer to the seller. Trading in options can be risky but with help of the option strategies, one can achieve their investment objectives. These strategies are designed based on the opinion that the investor has knowledge about performance of the underlying asset. The option strategies provide the investor with the risk and return prospects based on the objectives and opinions of the investor. There are various categories of option strategies. This research paper focuses on the **short straddle strategy**and the application of the same on the underlying asset of stock and indices of the Indian derivative market. In a straddle strategy, the investor writes (sells) equal number of contracts of calls and puts for the same time period and at the same strike price. A short straddle strategy is a stable strategy which is used when the investor is expecting the price of the underlying to be stable.

In a short straddle strategy, the option seller agrees to sell and writes an option contract at a strike price which is nearest to at-the-money price. Here, the option writer receives premium from both the put and call option contracts. The investor expects the price of the underlying to be the same as the strike price at the time of expiration, although the chance of this is very low. The option seller will always make a profit until the difference between the price of the asset and the strike price is less than the premium collected. When the price of the asset moves drastically, the investor faces losses. The maximum profit is limited to the premium collected and the losses can be unlimited, due to which this strategy is generally advised for more advanced investors.

In this research paper, we attempt to evaluate the profitability of using short straddle strategy on stock options and index options of the Indian options market. The stock options considered in this research paper are the options of Kotak Mahindra Bank, Reliance Industries, Tata Motors and Asian Paints. The index options considered here are Nifty 50 and Bank Nifty.

2. Review of Literature

1) Development of financial Derivatives market in India-a case study

(Vashishtha, 2010)Risk is not completely avoidable in financial markets. Quick globalization and liberalization across the world have led to rapid variations in foreign exchange, interest rates and stock market prices resulted in growing financial risk among the corporate sector. Derivatives are the perfect tools for risk management involving hedging against uncertainty and volatility of underlying assets. Derivatives are explained by giving simple life example of butter and milk. Price of butter is the derivative of price of milk which can be understandable even by common public. The price of butter is derived from underlying asset,that is price of milk which depends upon supply and demand of milk. List of various Underlying assets available are,Share and share warrants of

listed companies, commodities, precious metals, OTC money market products, foreign exchange rates, bonds. Classification of underlying assets for derivatives as basic and complex instruments gives base for the users in selection of underlying depending upon their investment. The paper explains the evolution of Regulatory Framework of Derivatives in India, how derivatives products started trading in BSE and NSE along with their introduction date and year with number of leading company stocks/indices/currencies involved. Graphical representation of business growth in derivatives, product wise turnovers, comparison of year wise cash and derivative segment turnovers, segment wise turnover comparison with that of total turnover gives better understanding of entire derivatives trading.Finding the position of Indian derivative market in global derivative market and growth trends in global derivative market makes the paper outstanding among others.

2) Comparison of the results of long and short straddle option strategies on the WIG20 during 2005-15

(Floty, 2015)Options are one of the major parts in derivative market. Many strategies are developed to assess the performance of options in which straddle is also one. This article mainly aims at finding rate of return of long and short straddle strategy. The hypothesis is formulated in such a manner that the rate of return under straddle strategy from the year 2005-15 are higher than other strategy returns. The futures and forward contracts require small percentage of total contract value as deposits at the time of entry. This small amount of deposits attracts both new individuals of market and experienced traders. Because of more entry to markets the prices of underlying assets volatile, where the direction of volatility is difficult to predict. Thus, introduction of option market safeguards the investors. The manner how options are useful to exporters and importers are discussed keeping foreign exchange rates as underlying assets.

3) Performance Analysis of Volatile Strategy Under Indian Options Market

(Krishnan, Scholar, & Kerala, 2018)Options are most widely used to reduce volatility. Various strategies under options are developed to minimize the risk and to maximize profit. In the opinion of option market experts, straddle and strangle are the best strategy suited for volatility. The paper focuses on finding which strategy generates higher profit through conducting performance analysis using Sharpe, Jensen and Treynor's ratios taking one two- and three-month maturity period. Return of particular strategy application less the risk-free rate of return upon standard deviation of strategy gives Sharpe ratio. Treynor's ratio remains same except it uses beta of strategy instead of standard deviation. Jensen alpha ratio indicates excess return obtained from portfolio through strategy application than risk free rate of return and beta. Market risk would be obtained through present price upon previous day price. The deviation in straddle is taken as average of call and put whereas in strangle it is taken with two strike prices. Strangle strategy performs better in bullish market. In Sharpe and Treynor's ratio strangle gives higher return. However, in Jensen ratio Strangle generates negative ratio in the next month of maturity cycle. Since volatility in stock prices is a key factor, suitable strategy differs as per volatility. As results are arrived for selected period represents bullish in nature.

4) Equity Derivatives- Comparative and Critical Analysis from BSE to NSE

(Raju & Pradesh-india, 2014)The researcher seeks to find the relation exist between different components of derivative market, such as stock futures, stock options, index options, index futures etc., from BSE to NSE. The paper aims at determining the best segment of derivative market through increasing the volume of turnover. Option holder may or mayn't execute the contract as on the maturity date. The option premium would be based on intrinsic and time value. The difference between current market price of underlying assets and exercise price of options provides intrinsic value. There are two option pricing methods. They are quantitative models consisting binomial and B-S model and quantities modes.

The required data are obtained from hand book statistics of SEBI. Implementation of different statistical tests and usage of SPSS 16.0 version helps interpreting of obtained data.

3. Research Design

a) Title: "Study of the Application of Short Straddle Strategy in Options on Various Underlying Assets in the Indian Options Market"

b) Statement of Problem: Indian investors often avoid the chances of investing in the options market. They lack the basic understanding of the options market and often relate options trading to higher unavoidable risks alone, leaving the prospective gain unrecognised. Their unawareness about the various strategies in hand, leaves them behind in the rat race of the options market. A short straddle strategy is often not opted even by an avid investor as they find it to pose higher amount of risks. This statement can be substantiated by an understanding that the only profit that can be made from a short straddle strategy is the amount of premium received upon entering the contract. Thus, an investor lacking the thorough knowledge of investment and failing to figure out the prospective movement in the share prices would never opt this strategy. As a result, lack of knowledge about the intensity of the risk and the means to combat the same act as catalysts to avoid the possibility of a higher gain in the options market. So, this paper focuses on providing a keen understanding of the profit profile under the short straddle strategy of the options contract on the selected underlying assets.

c) Hypothesis:

H0: The short straddle strategy of options will not provide the minimum required rate of return* in the Indian Derivative market.

H1: The short straddle strategy of options will provide the minimum required rate of return* in the Indian Derivative market.

d) Research Objectives:

The study has the following objectives:

i. To guide investors to mobilise savings.
ii. To provide a systematic understanding of the short straddle strategic investment.

iii. To interpret the chances of striking a gain from the short straddle strategy with a limited amount of investment.

iv. To explore the performance of short straddle strategy on active option contracts in India.

v. To find the success ratio of the short straddle strategy on the diverse option contracts selected.

vi. To rank the various options on the basis of risk return analysis with the risk-free rate of return in the market kept as the minimum required rate an investor would like to assume.

e) Research Gap:

The Indian derivative market has always remained an unexplored challenge by the Indian investors, making them unfortunately lose an opportunity of striking a gain. The study tries to explore the applicability of the short straddle strategy. It being considering various underlying assets which are traded on the NSE, provides a higher edge over other papers. The paper provides for a ranking based evaluation of the various options selected which can even be understood by a layman. The study provides a range of choices rather than a single optimum investment solution, enabling an investor to choose an investment avenue after considering his risk-taking ability and the expected return.

f) Scope:

Short Straddle strategy has been applied on the following industries, companies and indices:

1. Conglomerate-
Reliance Industries
2. Automotive Manufacturer-
Tata Motors
3. Banking Industry-
Kotak Mahindra Bank
4. Paint and coating manufacturing company-
Asian Paints
5. NSE Indices-

- NIFTY 50
- NIFTY BANK

NOTE: *The companies have been chosen on the basis of the statistics of the top most active stock and index option contracts listed on NSE.*

g) Sources of Data: The data of the prices of the underlying and the prices of the options are historical. Hence, they will be collected from secondary sources:

- Money Control: www.moneycontrol.com
- NSE Website: www.nseindia.com
- EconomicTimes: www.economictimes.indiatimes.com

The data to be collected is quantitative in nature.

h) Data Analysis Tools**:** Microsoft Excel® has been used for the calculation and analysis of data as its easily applicable and understood by a layman as well.

i) Expected Outcome: The study focuses to obtain a deeper understanding of the applicability of the short straddle strategy. This paper will empower an investor to obtain a basic ideology about the short straddle strategy. It offers a pattern of investments, ordered through ranks, that will provide him a higher payoff in comparison to the risk-free rate of return. It will also provide an insight about the most profitable investment.

j) Limitations:

- ✓ The study has a defined minimum risk-free rate of return
- ✓ The study is about the short straddle, thus its expecting that the market would not make a large move, irrespective of the direction.
- ✓ This strategy is apt for the risk takers of the market who have deep understanding of the market. Hence, it is not advisable for the investors who are new to the options market.

k) Assumptions:

The study has certain assumptions which are necessary to be noted:

- ✓ *The study tries to identify investment avenues that render a return rate higher than the assumed risk-free rate of 8%
- ✓ The study has a minimum amount of investment i.e., INR 2,00,000 out of which INR 10,000 is kept as margin, and hence, the individual has INR1,90,000 to invest.
- ✓ The lot sizes of the historical option contracts are assumed to be the same as that of the current time.
- ✓ A volatility of 10% for equity stocks with the spot price of Rs.500 or less and 8% for equity stocks with the spot price more than Rs.500, and 100 points for Nifty 50 and 200 points for Bank Nifty has been assumed for the calculation of strike price.
- ✓ Its assumed that the option contracts are entered into on the first Thursday of the month.
- ✓ The study assumes that the open option contracts are squared off i.e., purchased on the maturity date (last Thursday of the month)
- ✓ The study doesn't consider commission for the calculations.

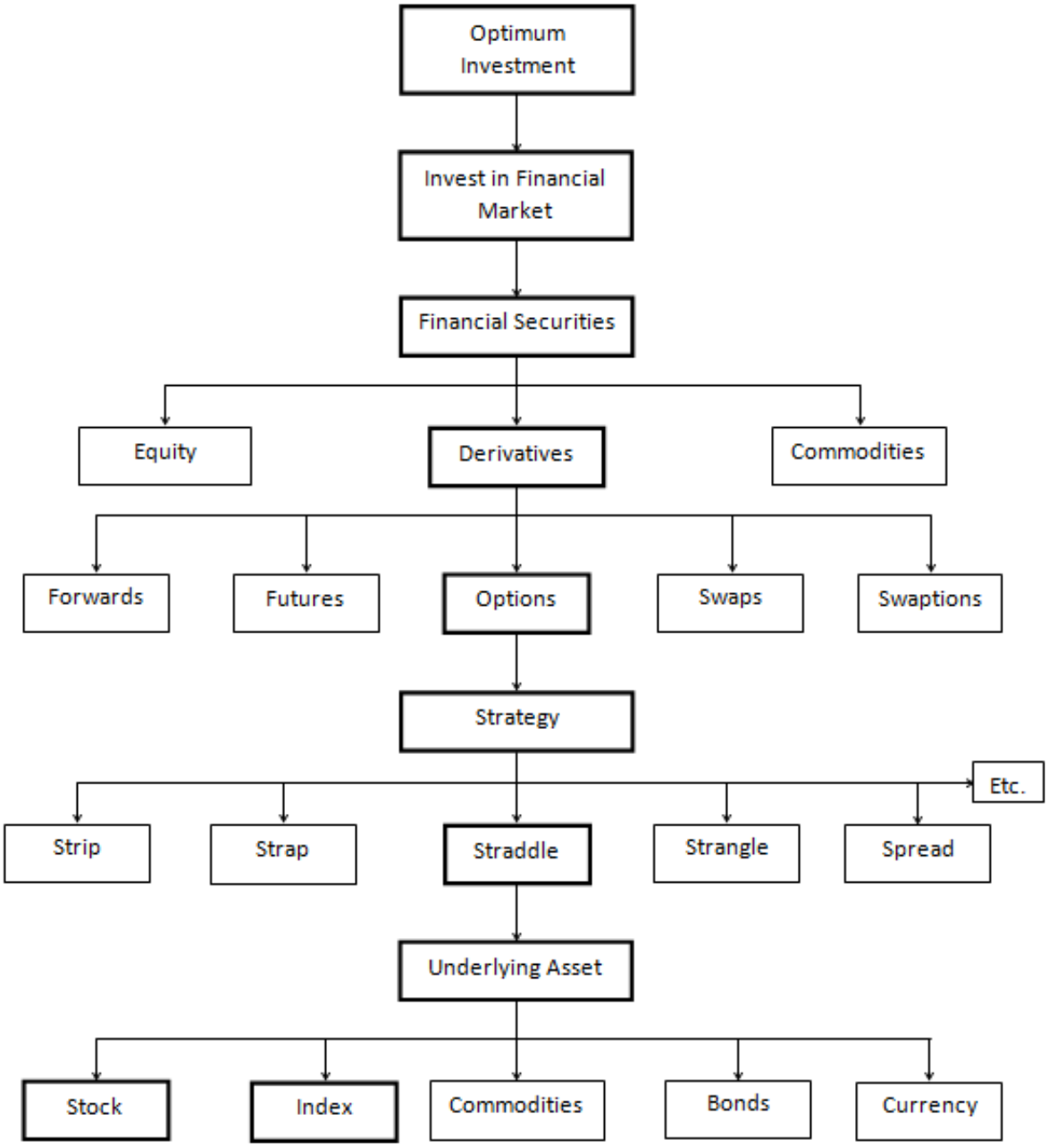
4. Methodology

The spot prices of each of the indices and stocks were taken from the NSE website, lying in the period range of September 2015 to August 2018. To the spot prices of the underlying equity and indices a volatility measure was added to arrive at the strike price for each of the contracts. The spot and the option prices considered in this paper are obtained from the NSE market. Historical one month period European options were considered. The success rate for each of the contract played the major role for considering an investment, which was calculated using a list of formulae. The return on investment was the deciding factor about the contract's success rate. All the calculations have been completed using **Microsoft Excel®.**

Linear graphs have been constructed plotting the return on investment over the 3 years for each company and index. The return on investment is then compared with risk free rate of return.

For the purpose of the study, the analysis has been categorized into four sections- Monthly, Quarterly, Semi-Annually, and Annually. Each section holds the number of times during that period the strategy has been successful.

The study at the conclusion offers a pattern of investment based on the period, amount available to invest and the choice of risk level that an investor chooses to take.



5. Data Analysis and Interpretation

The step taken after the data collection is the profit derived from each contract.

The study has taken six underlying- four companies and two indices, for a period of 3 years, considering one-month expiry option. Thus, there will be 36 contracts for each underlying. The following steps are taken:

STEP 1: Since option contracts are entered on the first Thursday of every month, the prices of the underlying as on Wednesday are collected.

STEP 2: To the spot prices of Wednesday, a volatility measure of 10% for equity stocks and 100 points for Nifty 50 and 200 points for Nifty Bank, to obtain the strike prices for the contracts.

STEP 3: Collect the details of the option price for a call and a put option on the first Thursday of the month at the specified strike price.

STEP 4: Total the call and the put premium and determine the quantity based on the lot size

STEP 5: Compute the total sale value using the formula:

(PRICE CE*QTY CE) + (PRICE PE*QTY PE)

STEP 6: Calculate average selling price

Avg selling price= Sale value/total qty

STEP 7: Total the premium of call and put option as on the date of purchase

STEP 8: Calculate the total purchase value

Total purchase value = (purchase price of CE* Qty purchased) + (purchase price of PE* Qty purchased)

STEP 9: Calculate the Average purchase price

Average purchase price= Total purchase Value/ Total Qty

STEP 10: Compare the average selling price with the average buy/purchase price to find the net profit/loss made.

Net profit/(Loss)= Average selling price-Average buy price

STEP 11: Calculate the Return on Investment

Return on Investment= Net Profit*100/Investment value

STEP 12: Calculate the average return per month, quarter, semi-annually and annually

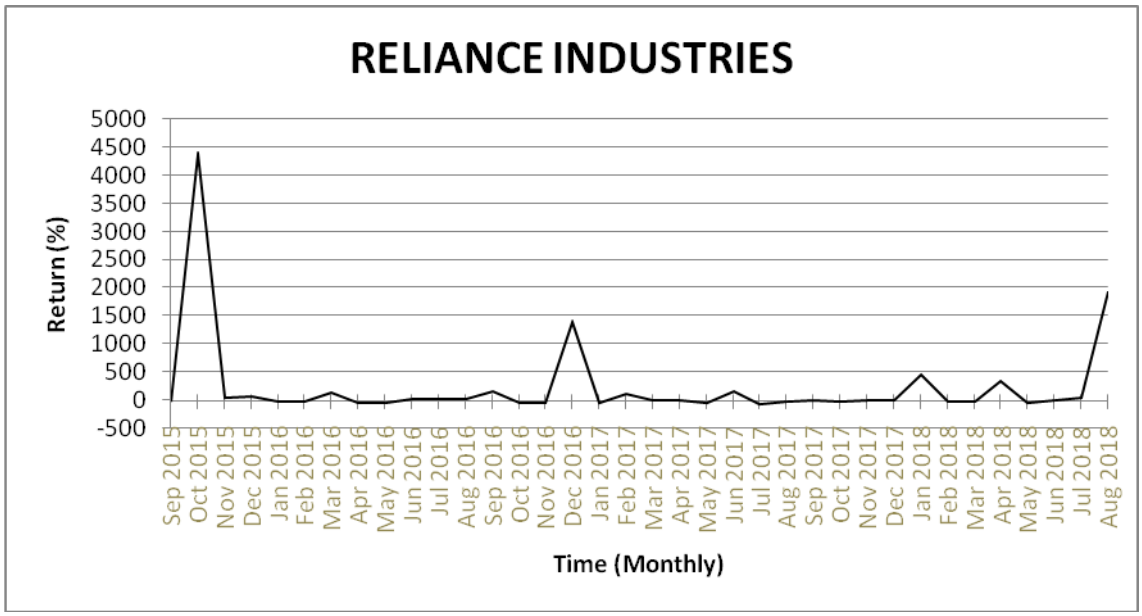
STEP 13:Count and tabulate the number of times the return has exceeded the risk-free rate

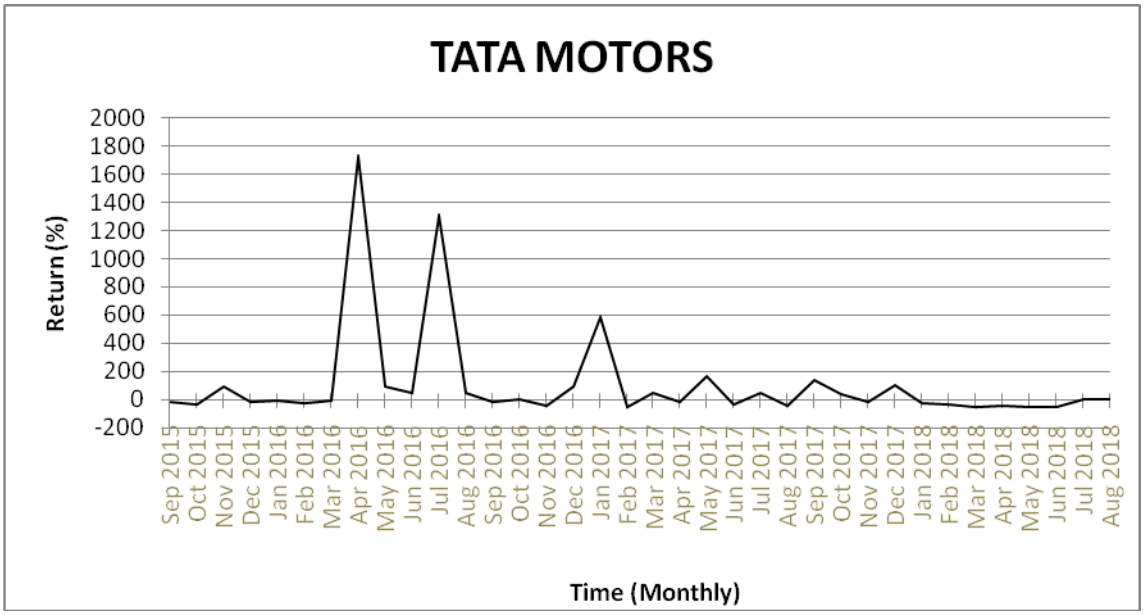
STEP 14: Calculate the success rate of each underlying for each period.

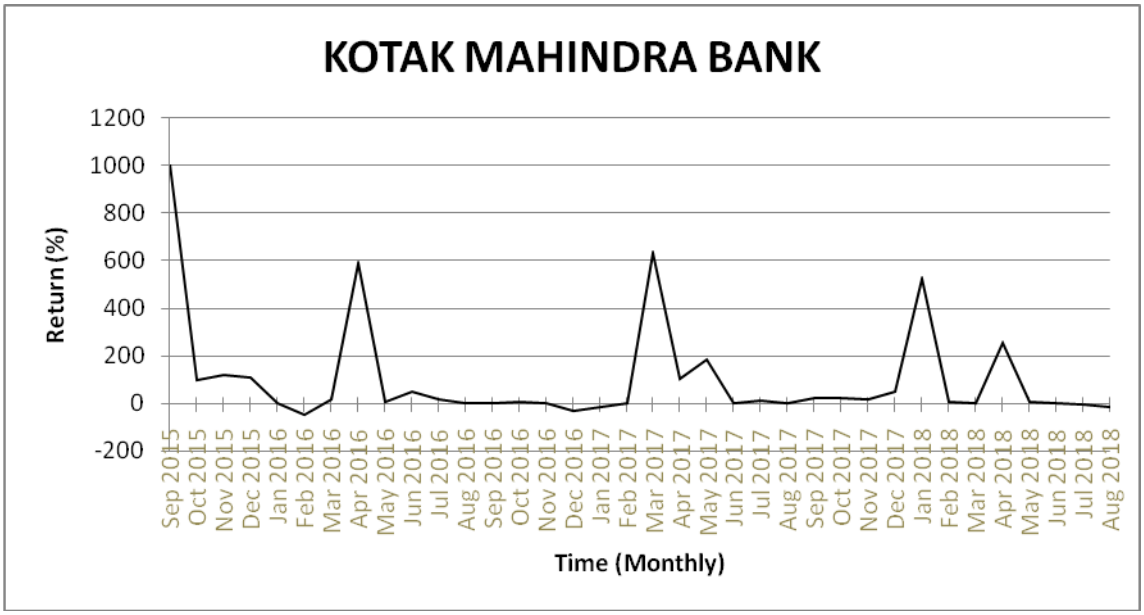
NOTE:*1) In options of Reliance Industries and Kotak Mahindra Bank, the base value required exceeded the limit of 190000. Hence, no contract was entered into in the month of March 2017, April 2017, and September 2017 for Reliance Industries and in the month of June 2018 in case of Kotak Mahindra Bank. Due to this, the returns for those months are nil.*

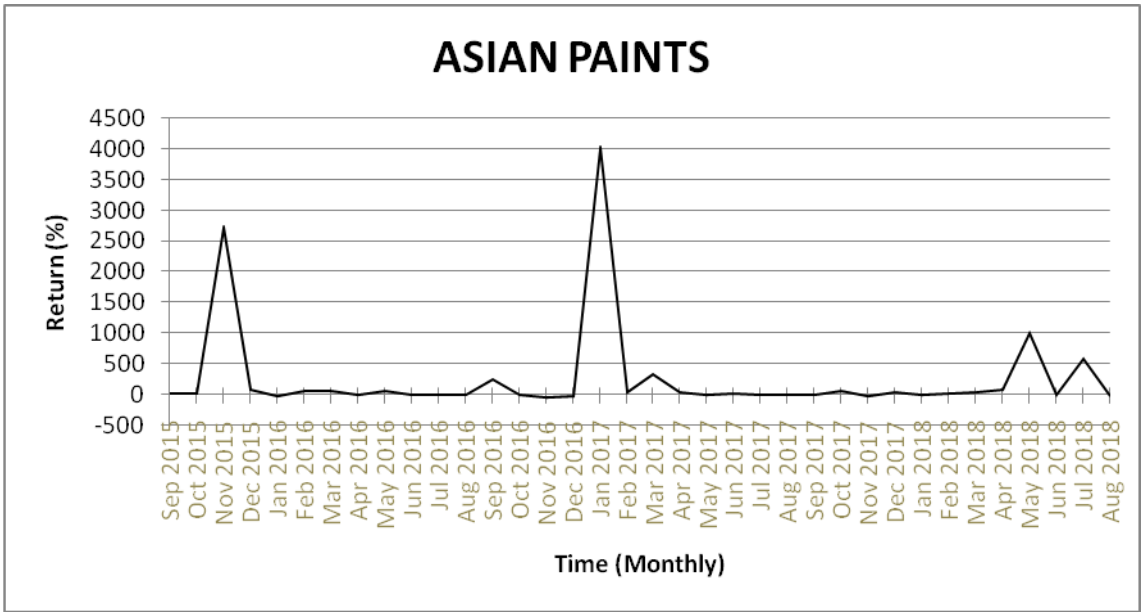
2) In options of Kotak Mahindra bank, for contracts in the months of September 2016 and August 2017, the average purchase price and the average selling price were same. This is due to lack of volatility in the market which drastically reduced the volume of option contracts traded for those months. Hence, the returns for those months are nil.

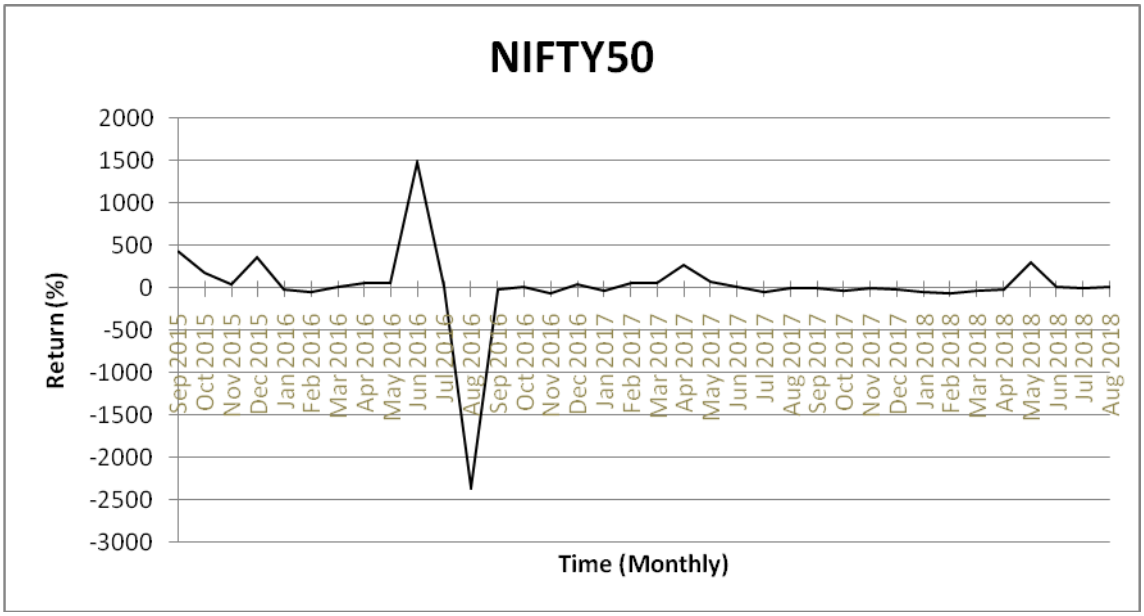
The following charts depict the return on option contracts over a period of three years for the six underlying assets

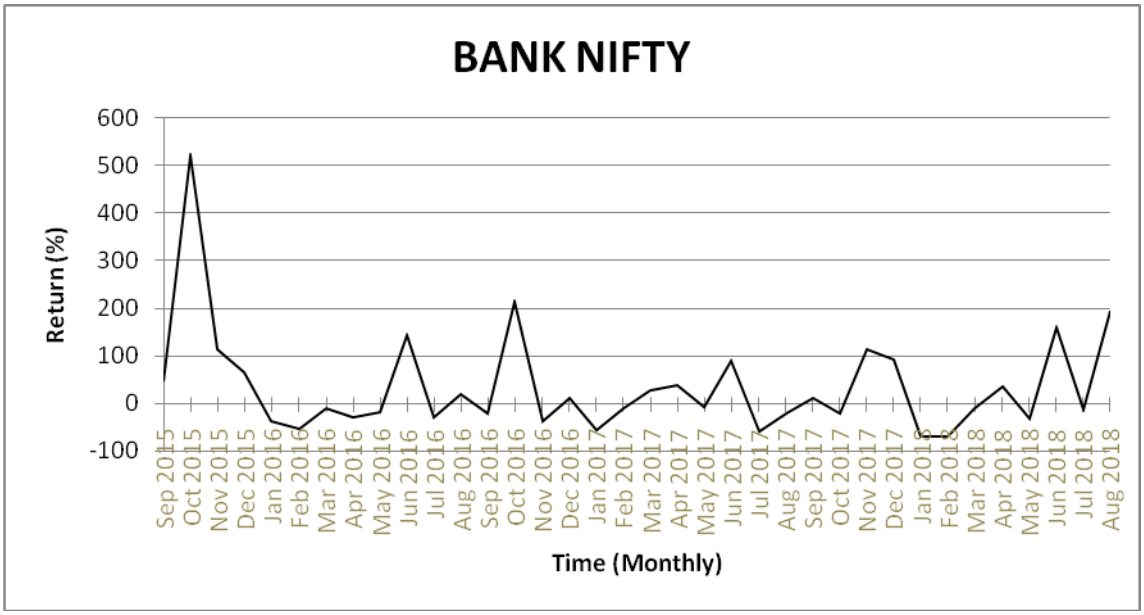












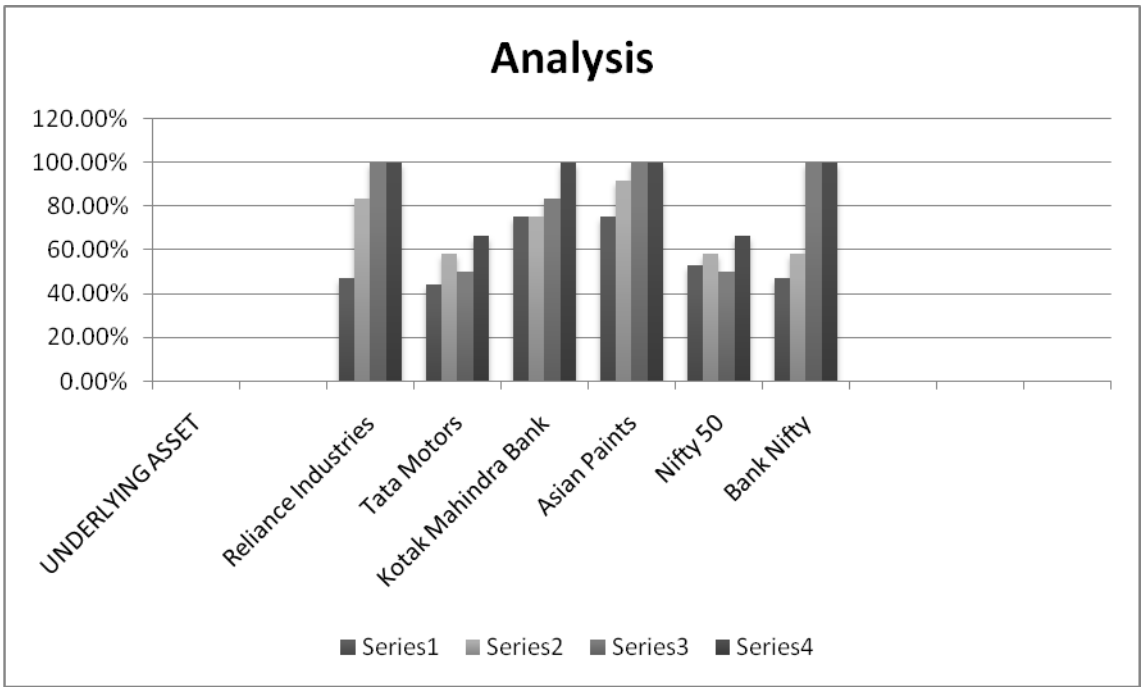
The above calculations and graphs are summarized into the following table, which outlines the success rates on investing in each of the underlying assets. The table helps us to analyse and include the acceptance or rejection of the hypothesis drawn.

TYPE OF UNDELYING ASSET	UNDERLYING ASSET	MONTHLY [total months= 36; Rf=(8/12)%]		QUARTERLY [total quarters= 12; Rf=(8/4)%]		SEMI-ANNUALLY [total 6-month periods=6; Rf=(8/2)%]		ANNUALLY [total years= 3; Rf=8%]	
		No. of times return >0.67%	Success Rate(%)	No. of times return > 2%	Success Rate(%)	No. of times return > 4%	Success Rate(%)	No. of times return > 8%	Success Rate(%)
Stock	Reliance Industries	17	47.22%	10	83.33%	6	100%	3	100%
	Tata Motors	16	44.44%	7	58.33%	3	50%	2	66.67%
	Kotak Mahindra Bank	27	75%	9	75%	5	83.33%	3	100%
	Asian Paints	27	75%	11	91.67%	6	100%	3	100%
Index	Nifty 50	19	52.78%	7	58.33%	3	50%	2	66.67%
	Bank Nifty	17	47.22%	7	58.33%	6	100%	3	100%

6. Conclusion

The focus of this research is on investments made by individuals who are well-versed with the knowledge of the market. It studies that whether, in India, an individual gets more return by investing in options invested with the help of short straddle strategy, as compared to investing in risk-free 10-year Indian Government Bonds.

Shown below is the graph which represents the success rate of investing in options of varied underlying assets, in four time scales. Here, Series 1 is Monthly success rates; Series 2 is Quarterly success rates; Series 3 is Semi-Annual success rates; Series 4 is Annual success rates. Success rate implies the percentage of times the return from options is more than the risk-free return.



The graph shows that each of the underlying assets has a minimum of 40% success rate in all the four time scales. Thus, null hypothesis(H0: the short straddle strategy of options will not provide the minimum required rate of return in the Indian derivative market) is rejected. The options of Kotak Mahindra Bank and Asian Paints have provided exceptionally good success rates each with 75% and above success rates in the four time scales. Options of Reliance Industries, Asian Paints and Bank Nifty show 100% success rate in the Semi-Annual and the Annual time scale. Options of Tata Motors and Nifty 50 depict moderate success rates as compared to other options. Overall, all the options chosen are seem safe to invest in, with the help of short straddle strategy as the success rates are 40% and above in all cases.

In the perspective of time scales, Stock options are successful in both, short term as well as long term, whereas Index options are volatile in short term and hence good for long term in case of short straddle strategy.

We can conclude that investing in options successfully gives good returns than investing in risk-free bonds, and an investor with prescribed capital and required rate of return can follow the following **PATTERN FOR INVESTMENT:**

Serial. No.	Underlying Asset	Monthly	Quarterly	Semi-Annually	Annually
1	Reliance Industries		#	#	#
2	Tata Motors		#	#	#
3	Kotak Mahindra Bank	#	#	#	#
4	Asian Paints	#	#	#	#
5	Nifty 50	#	#		#
6	Bank Nifty		#	#	#

The table marks the cases where an investment can be made with a hash (#); the blanks meaning investing in those contracts are not as profitable as in the other time scales. Further, the study has chosen selected underlying and it is required for an investor to know that an investment can be made on various other underlying assets. Thus, the study can also be extended to option contracts with commodities, bonds, and futures etc. as the underlying assets.

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