Term Project

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Put-Call Parity & Arbitrage Opportunities – A Case Study of NSE Stock Options

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DECLARATION

I Mahender Pal Vashist student of EMBA 2014-2016 batch of Delhi School of Management, Delhi Technological University, Bawana road, Delhi-42 declare that, this term project **Put-Call Parity & Arbitrage Opportunities – A Case Study of NSE Stock Options** submitted in partial fulfilment of Executive MBA program is the original work conducted by me.

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

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

Name of candidate with sign
Mahender Pal Vashist

Place: New Delhi
Date: 4th May 2016

GUIDE CERTIFICATION

This is to confirm that Mahender Pal Vashist student of DTU DSM EMBA 2014-16, has done research project on the topic **" Put-Call Parity & Arbitrage Opportunities – A Case Study of NSE Stock Options"** under my guidance and that the work done by the candidate is original and fulfils the requirements of the institute.

Dr Archana Singh

DTU, DSM - New Delhi

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"*It is not possible to prepare a project without the assistance & encouragement of other people. This one is certainly is no exception.*"

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EXECUTIVE SUMMARY

Put-call parity is one of the foundations for option pricing, explaining why the price of one option can't move very far without the price of the corresponding options changing also. So if the parity is violated, an opportunity for arbitrage exists.

Arbitrage strategies are not a useful source of profits for the average trader, but knowing how synthetic relationships work can help in understanding options better while providing investors with strategies to add to their options-trading toolbox.

This study is based on arbitrage or risk less profit on stock options trading on NSE (National Stock Exchange). The most flexible derivatives are options. An option is a legal agreement between two parties that gives one party, the option holder, the right but not the obligation to buy or sell an asset. It is this element of choice that differentiates options from forwards and futures.

If an option is not exercised before the maturity date as stated in the contract, it simply expires without value. However, the style of option determines exactly when the option can be exercised with respect to the maturity date.

In this report Put-Call Parity formula based on Black-Scholes theory have been used to analyse the Put-call Parity and Arbitrage opportunities in selected stock options. The analysis shows that there is disparity among the option pricing and arbitrage opportunities exists.

Precisely the primary objectives of the study were to examine the Put-Call Parity on selected options; to explore whether Put-Call disparity in stock options affect the arbitrage opportunities for the investors; to examine whether arbitrage opportunities changes the behaviour of investors.

This study has strengthened the argument that Indian derivatives market is not yet efficient and hence there is scope of making good profits or better to say there is scope of arbitrage.

Based on these findings, it is argued that the investors would buy out-of-the-money call options when they expect the market to rise and put options when they expect it to decline. The reasoning, as mentioned in the previous section, does support their contention.

As the market activity progresses further, more evidence would come in support of the above findings. It would not only benefit the investor community but also provides support for the hypothesis that derivative securities enhance the quality of underlying asset market. This study also complements the earlier evidence documented by many scholars in their study.

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1. DERIVATIVE BASICS

1.1 Origin and Definition

A derivative is a financial instrument, which derives its value from some other financial price. This “other financial price” is called the underlying. A wheat farmer may wish to contract to sell his harvest at a future date to eliminate the risk of a change in prices by that date. The price for such a contract would obviously depend upon the current spot price of wheat. Such a transaction could take place on a wheat forward market. Here, the wheat forward is the “derivative” and wheat on the spot market is “the underlying”. The terms “derivative contract”, “derivative product”, or “derivative” are used interchangeably. The most important derivatives are futures and options.

Derivatives in general refer to contracts that derive from another - whose value depends on another contract or asset. Derivatives are essentially devised as a hedging device to insulate a business from risks over which a business has no or little control, but in practice, they are also used as yield-kickers.

A derivative is, as the name suggests, a financial contract whose value is derived from the value of another asset. The basic concept of derivatives is a simple and ancient one, with evidence that the Romans used them thousands of years ago, and that they have roots in Japan and the Netherlands dating back to the early sixteenth century (Markets History). A common example is a farmer who uses a forward contract, a type of derivative, to sell wheat before the harvest at a predetermined fixed price. The derivative in this case is used to protect the farmer against an unexpected decrease of the price in wheat, thus reducing his exposure to market risk [link to market risk]. On the other hand, the buyer accepts the risk associated with the fixed price and faces the possibility of either financial gain or loss, depending on the difference between the fixed price and the actual price at the time of harvest. Consequently, one may think of derivatives as a tool to buy and sell risk.

Derivatives have been an integral aspect of the modern financial risk environment since the founding of the Chicago Board of Trade in 1848, a futures market where members trade a wide variety of items, from livestock to US Treasury bonds. However, it is the volatility in foreign exchange and capital markets in the 1970's and the invention of option pricing theory, the Black-Scholes Model, which moulded the derivatives market into its current state. With the abolition of the Bretton Woods system of fixed exchange rates in 1971 and the ensuing unexpected volatility, a need was created for financial instruments that could control risk. Robert Merton, Myron Scholes, and MIT researcher Fischer Black responded to the crisis with a method of determining the value of derivatives. Their model enabled the use of derivatives in efficient risk management as a way of hedging against fluctuations in currency valuations, interest rates, and bond prices.

Accounting Standard SFAS 133 defines a derivative thus:

A derivative instrument is a financial instrument or other contract with all three of the following characteristics:

- It has (1) one or more underlying, and (2) one or more notional amounts or payment provisions or both. Those terms determine the amount of the settlement or settlements... and in some cases, whether or not a settlement is required.

- It requires no initial net investment or an initial net investment that is smaller than would be required for other types of contracts that would be expected to have a similar response to changes in market factors.

- Its terms require or permit net settlement, it can readily be settled net by a means outside the contract, or it provides for delivery of an asset that puts the recipient in a position not substantially different from net settlement

Where there are risks, there are derivatives to strip the risk and transfer it. As derivatives are essentially devices of transferring risks, their types and

applications differ based on the type of risk facing a business. Take, for instance, the following sources of risk and the derivatives to protect a business against such risks:

Interest rate risk

Banks and financial institutions face the risk of changes in interest rates. If a bank has liabilities carrying floating costs and assets having fixed rates, it faces the risk of an adverse movement, that is, a decline in interest rates. This risk can be sheltered by writing an interest rate swap - that is, swapping the floating rate for fixed rates.

Associated with interest rate movements is the basis risk, that is risk of unpredicted changes in the basis on which interest rates float. Let us say, a business has loans which are floating with reference to the LIBOR or EURIBOR, whereas the assets of the business are floating with reference to US treasuries. To cushion against this risk, the business may like to swap the basis by entering into a basis swap.

Foreign exchange risk

A person has assets or liabilities denominated in foreign currency, there is a risk of adverse changes in exchange rates. This risk is sheltered by foreign exchange futures or forward covers.

Commodity risks

A business having any position on commodities faces risk of changes in commodity prices. Such risks are also sheltered by futures and forwards in commodities.

Risk on capital market instruments

Someone holds equity shares, there is a risk that prices of equity shares will move up or down. To manage this risk, there are various futures and options available.

Credit risk

Another risk in all financial transactions is credit risk. Credit derivatives are used to hedge against credit risk.

Weather risk

Even something like risk of changes in weather is hedged and transferred. There is a variety of weather derivatives, that is, instruments that pay off based on weather changes.

1.2 Types of Derivatives

All derivatives can be divided into two broad classes: linear and non-linear. The distinction lies in how the derivative's function relates to the underlying asset's value. Within these two classes are three general types of derivatives: forwards and futures (linear), swaps (linear), and options (non-linear). Furthermore, derivatives may be grouped as exchange-traded or over-the-counter (OTC). Exchange-derivatives, which include futures, are traditional, highly standardized contracts that readily provide liquidity and minimize credit risk. On the other hand, OTC derivatives are customized to meet the need of the user. Forwards and swaps are examples of OTC derivatives. Options can be either exchange-traded or OTC.

The following are the basic types of derivatives:

1.2.1 Forwards:

A forward is a contract to buy a thing or security at a prefixed future date. The typical usage of a forward would be something like this: a business having its assets in a local currency has taken a loan repayable in a foreign currency 6 months hence. There is an exchange rate risk here: if the local currency suffers against the foreign currency, the business has to write a loss. To cover against this risk, the business enters into a forward contract - that is, it agrees today to buy the foreign currency 6 months hence at prices prevailing today, against a pre-fixed premium. Obviously, if the perceptions of the seller and the buyer as to future prices of the foreign currency differ, both will strike what they perceive is a win-win deal.

Forwards are also quite common in commodities, and can be used either for speculation or for hedging. Say, XYZ has an order to ship 10000 tons of steel 6 months hence at a prefixed price of say USD 1000 per ton (by the way, I have no idea of steel prices, this is just an example!). And XYZ expects the price of steel to go up. So, to hedge against the price risk, XYZ enters into a forward purchase agreement, for 10000 tons 6 months hence. XYZ's position is now fully hedged: if the price of steel goes up as expected, XYZ will either claim a delivery from the forward seller, or a net settlement. If the price comes down, XYZ will be obliged to settle by making a payment for the price difference to the forward seller, but will be fully offset by the pre-fixed price it gets from its own forward sale contract.

1.2.2 Futures

Future contracts is an agreement made and traded on the exchange between two parties to buy or sell a commodity at a particular time in the future for a pre-defined price. Since both the parties are unaware of each other, the exchange provides a mechanism to give the party assurance of honoured contract. The exchange specifies standardized features of the contract. The risk to the holder is unlimited, and because the pay off pattern is symmetrical, the risk to the seller is unlimted as well.

Money lost and gained by each party on a futures contract are equal and opposite. In other words, futures trading is a zero-sum game. These are basically forward contracts, meaning they represent a pledge to make a certain transaction at a future date. The exchange of assets occurs on the date specified in the contract. These are regulated by overseeing agencies, and are guaranteed by clearinghouses. Hedgers often trade futures for the purpose of keeping price risk in check.

Future contracts are often used by commercial enterprises as ‘hedging tools’ to reduce the risk of expected future purchases or sales of the underlying asset. If used to speculate, risk increases. So risk depends on the underlying instrument and the use of the future.

Advantages

- If price moves are favourable, the producer realizes the greatest return with this marketing alternative.
- No premium charge is associated with futures market contracts.

Disadvantages

- Subject to margin calls
- Unable to take advantage of favourable price moves
- Net price is subject to Basis change

Distinction between forwards and futures:

The basic nature of a forward and future, in a strict legal sense, is the same, with the difference that futures are market-driven organised transactions. As they are exchange-traded, the counter party in a futures transaction is the exchange. On the other hand, a forward is mostly an over-the-counter transaction and the counter party is the contracting party. To maintain the

stability of organised markets, market-based futures transactions are subject to margin requirements, not applicable to OTC forwards. Futures market are normally marked to market on a settlement day, which could even be daily, whereas forward contracts are settled only at the end of the contract. So the element of credit risk is far higher in case of forward contracts.

The following are some of the key factors, which decide the suitability of the commodities for future trading: -

- The commodity should be competitive, i.e., there should be large demand for and supply of the commodity - no individual or group of persons acting in concert should be in a position to influence the demand or supply, and consequently the price substantially.
- There should be fluctuations in price.
- The market for the commodity should be free from substantial government control.
- The commodity should have long shelf life and be capable of standardisation and gradation.

1.2.3 Options

The most flexible derivatives are options. An option is a legal agreement between two parties that gives one party, the option holder, the right but not the obligation to buy or sell an asset. It is this element of choice that differentiates options from forwards and futures. If an option is not exercised before the maturity date as stated in the contract, it simply expires without value. However, the style of option determines exactly when the option can be exercised with respect to the maturity date.

- European style options can only be exercised on the maturity date.

- While American style options may be exercised at any time prior to maturity.
- Bermudan style options, a third variety, may be exercised prior to maturity but only on certain days.

The price of the option, which is called the strike price, and the maturity date are fixed and the option issuer, the counterparty, does not have the same flexibility that the option holder enjoys. For this reason, the option holder may expect to pay a premium to the option issuer.

The significant difference between a future and an option is that the option provides the contracting parties only an option, not an obligation, to buy or sell a financial instrument or security at a pre-fixed price, called the strike price. Obviously, the option buyer will exercise the option only when he is in the money, that is, he gains by exercising the option.

For *example*, Consider a typical transaction. On 1 July 2000, S sells a call option to L for a price of Rs.3.25. Now L has the right to come to S on 31 Dec 2000 and buy 1 share of Reliance at Rs.500. Here, Rs.3.25 is the “option price”, Rs.500 is the “exercise price” and 31 Dec 2000 is the “expiration date”.

L does not have to buy 1 share of Reliance on 31 Dec 2000 at Rs.500 from S (unlike a forward/futures contract which is binding on both sides). It is only if Reliance is above Rs.500, on 31 Dec 2000, that L will find it useful to exercise his right. If L chooses to exercise the option, S is obliged to live up to his end of the deal: i.e. S stands ready to sell a share of Reliance to L at Rs.500 on 31 Dec 2000.

Hence, at option expiration, there are two outcomes that are possible: an option could be profitably exercised, or it could be allowed to die unused. If the option lapses unused, then L has lost the original option price (Rs.3.25) and S has gained it.

When L and S enter into a futures contract, there is no payment (other than initial margin). In contrast, the option has a positive price which is paid in full on the date that the option is purchased.

The price of an option is determined on the secondary market. An option always has a non-negative value: i.e., the value of an option is never negative.

Two basic types of options are: call options and put options.

A **call option** is right to buy, a call option is an option to call, that is, acquire a particular quantity and/or at particular strike price.

A **put option** right to sell, a put option is just the reverse- the option to put or sell a particular quantity and/or at a particular strike price.

One contract gives the holder the right to buy or sell some fixed number of shares for a stock at the specified strike price. For example, market lot for different stocks has been shown below.

At a practical level, the option buyer faces an interesting situation. He pays for the option in full at the time it is purchased. After this, he only has an upside. There is no possibility of the options position generating any further losses to him (other than the funds already paid for the option). This is different from a future: which is free to enter into, but can generate very large losses. This characteristic makes options attractive to many occasional market participants, who cannot put in the time to closely monitor their futures positions.

Buying put options is buying insurance. To buy a put option on Nifty is to buy insurance that reimburses the full extent to which Nifty drops below the strike price of the put option. This is attractive to many people, and to mutual funds creating “guaranteed return products”. The Nifty index fund industry will find it very useful to make a bundle of a Nifty index fund and a Nifty put option to create a new kind of a Nifty index fund, which gives the investor protection against extreme drops in Nifty.

Selling put options is selling insurance, so anyone who feels like earning revenues by selling insurance can set himself up to do so on the index options market. More generally, options offer “nonlinear payoffs” whereas futures only have “linear payoffs”. By combining futures and options, a wide variety of innovative and useful payoff structures can be created.

Basic Terminology in Options

Strike Price

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

Expiry

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

Premium

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

Writer of an option:

The writer of a call/put option is the one who receives the option premium and is thereby obliged to sell/buy the asset if the buyer exercises on him.

Exercising an Option

The period during which an option is exercisable depends on the style of the option. On NSE, index options are European style, i.e. options are only subject to automatic exercise on the expiration day, if they are in-the-money. As compared to this, options on securities are American style. In such cases, the

exercise is automatic on the expiration day, and voluntary prior to the expiration day of the option contract, provided they are in-the-money. Automatic exercise means that all in-the-money options would be exercised by NSCCL on the expiration day of the contract. The buyer of such options need not give an exercise notice in such cases.

Assignment of an Option

The exercise notices are assigned in standardized market lots to short positions in the option contract with the same series (i.e. same underlying, expiry date and strike price) at the client level. Assignment to the short positions is done on a random basis. NSCCL determines short positions, which are eligible to be assigned and then allocates the exercised positions to any one or more short positions. Assignments are made at the end of the trading day on which exercise instruction is received by NSCCL and notified to the members on the same day. It is possible that an option seller may not receive notification from its TM that an exercise has been assigned to him until the next day following the date of the assignment to the CM by NSCCL

1.2.4 Swaps

In a swap, both the parties exchange recurring payments with the idea of exchanging one stream of payments for another. A typical usage is a swap of fixed interest rates with floating rates, or rates floating with reference to one basis to another basis. In credit derivatives market, there are swaps based on the total return from a particular credit asset against total return on a reference asset.

1.2.5 Swaption:

A swaption is an option on a swap. The option provides the holder with the right to enter into a swap at a specified future date at specified terms. This derivative has characteristics of an option and a swap.

1.3 Types of Traders in a Derivatives Market

1.3.1 Hedgers

Hedgers are those who protect themselves from the risk associated with the price of an asset by using derivatives. A person keeps a close watch upon the prices discovered in trading and when the comfortable price is reflected according to his wants, he sells futures contracts. In this way he gets an assured fixed price of his produce.

In general, hedgers use futures for protection against adverse future price movements in the underlying cash commodity. Hedgers are often businesses, or individuals, who at one point or another deal in the underlying cash commodity.

Take an example: A Hedger pay more to the farmer or dealer of a produce if its prices go up. For protection against higher prices of the produce, he hedge the risk exposure by buying enough future contracts of the produce to cover the amount of produce he expects to buy. Since cash and futures prices do tend to move in tandem, the futures position will profit if the price of the produce rise enough to offset cash loss on the produce.

1.3.2 Speculators

Speculators are some what like a middle man. They are never interested in actual owing the commodity. They will just buy from one end and sell it to the other in anticipation of future price movements. They actually bet on the future movement in the price of an asset.

They are the second major group of futures players. These participants include independent floor traders and investors. They handle trades for their personal clients or brokerage firms.

Buying a futures contract in anticipation of price increases is known as ‘going long’. Selling a futures contract in anticipation of a price decrease is known as ‘going short’. Speculative participation in futures trading has increased with the availability of alternative methods of participation.

Speculators have certain advantages over other investments they are as follows:

- If the trader’s judgement is good, he can make more money in the futures market faster because prices tend, on average, to change more quickly than real estate or stock prices.
- Futures are highly leveraged investments. The trader puts up a small fraction of the value of the underlying contract as margin, yet he can ride on the full value of the contract as it moves up and down. The money he puts up is not a down payment on the underlying contract, but a performance bond. The actual value of the contract is only exchanged on those rare occasions when delivery takes place.

1.3.3 Arbitrators

According to dictionary definition, a person who has been officially chosen to make a decision between two people or groups who do not agree is known as Arbitrator. In commodity market Arbitrators are the person who take the advantage of a discrepancy between prices in two different markets. If he finds future prices of a commodity edging out with the cash price, he will take offsetting positions in both the markets to lock in a profit. Moreover the commodity futures investor is not charged interest on the difference between margin and the full contract value.

1.3.3.1 Arbitrage

The simultaneous purchase and selling of a security in order to profit from a differential in the price. This usually takes place on different exchanges or marketplaces. They involve a sequence of trades on the spot and on the index futures market. Yet, they are completely riskless. The trader is simultaneously buying at the present and selling off in the future, or vice versa. Regardless of what happens to Nifty, the returns on arbitrage are the same. Since there is no risk involved, it is called arbitrage.

Also known as a riskless profit. An example of this is when an arbitrageur buys a stock on a foreign exchange that hasn't adjusted for the constantly changing exchange rate. The arbitrageur will purchase the undervalued stock and short sell the overvalued stock, thus profiting from the difference. This is recommended for experienced investors only.

2. OPTION PRICING AND PARITY CONDITIONS

The pricing of stock options mean calculation the option price for a given value of the price of underlying stock and maturity period of option. The option price is equal to its expected payoff in a risk-neutral world discounted at the risk-free interest rate. The two popular techniques that are used for the stock pricing of options are as follows:

- Binomial Model
- Black-Scholes Model

2.1 Binomial Model

A useful and very popular technique for pricing of a stock option involves constructing what is known as binomial tree. This is a tree that represents different possible paths that might be followed by the stock price over the life of the option. To understand the concept of binomial trees we will start with the very basic form of binomial tree.

We start by considering a very simple situation where a stock price is currently Rs 20 and it is known that at the end of three months the stock price will be either Rs 22 or Rs 18. we suppose that we are interested in valuing a European call option to buy the stock for Rs 21 in three months. This option will have one of the two values at the end of three months. If the stock price turns out to be Rs 22, the value of the option will be Rs 1; if the stock price turns out to be Rs 18, the value of the option will be zero.

The only assumption we need is that there are no arbitrage opportunities for an investor. Since there are two securities (stock and stock option) and only two possible outcomes, it is always possible to set up riskless portfolio.

Consider a portfolio consisting of a long position in Δ shares of stock and a short position in one call option. We will calculate the value of Δ that makes

the portfolio riskless. If the stock price moves up from 20 to 18, the value of the shares is 18Δ and the value of the option is zero so that the total value of the portfolio is 18Δ. The portfolio is riskless if the value of Δ is chosen so that the final value of the portfolio is the same for both of the alternative stock prices.

2.2 Black and Scholes Pricing Model

The four variables, which we discussed so far, futures price, exercise price, time to expiry and volatility, are used in conjunction with a mathematical pricing model to generate a theoretical price for the option. The most common pricing model is the Black-Scholes model developed in 1973 by Fisher Black and Myron Scholes. The rational of this model lies in the creation of hypothetical risk-free portfolio or hedge.

2.2.1 Assumptions underlying Black-Scholes

The assumption underlying the Black-Scholes model is that stock price follows what is termed a random walk. This means that the proportional changes in stock price in a short period of time are normally distributed. The assumption made by Black and Scholes when they derived their option pricing formula were as follows:

1. Stock price behaviour corresponds to the lognormal model developed earlier with μ (expected return) and σ (volatility) constant.

2. There are no transaction costs or taxes. All securities are perfectly divisible.

3. There are no dividends on the stock during the life of the option.

4. There are no riskless arbitrage opportunities.

5. Securities trading are continuous.

6. Investors can borrow or lend at the same risk-free rate of interest.

7. The short-term risk-free rate of interest, r is constant.

Other researchers have relaxed some of these assumptions. For example, variations in the Black-Scholes formula can be used when r and σ are functions of time and the formula can be adjusted to take dividend into account.

2.2.2 Black-Scholes Pricing Formulas

The Black-Scholes formulas for the prices at time zero of European call option on a non dividend-paying stock and a European put option on a non-dividend paying stock are

$$c = [S_0][N(d_1)] - [K][e^{-rT}][N(d_2)] \qquad (1.9)$$

and

$$p = [K][e^{-rT}][1 - N(d_2)] - [S_0][1 - N(d_1)] \qquad (1.10)$$

where

$$d_1 = \frac{\ln(S_0 / K) + (r + 0.5\sigma^2)T}{\sigma\sqrt{T}}$$

$$d_2 = \frac{\ln(S_0 / K) + (r - 0.5\sigma^2)T}{\sigma\sqrt{T}} = d_1 - \sigma\sqrt{T}$$

$N(x)$	Cumulative probability distribution function for a standardized normal distribution.
c	European call price
p	European put price
S_0	Stock price
K	Exercise (strike) price
T	Time (in fractions of 1 year) to option's maturity
σ	Volatility of the stock
r	Risk free interest rate
e	2.7183

Since the American call price, C equals the European call price, c for a non-dividend paying stock, equation (1.9) also gives the price of an American call option.

As stated earlier, the price generated by a pricing model is a theoretical price. That is the price we would expect to pay to break even in the long run.

American call options should never be exercised early when the underlying stock pays no dividends. When dividends are paid, it is sometimes optimal to exercise at a time immediately before the stock goes ex-dividends. The reason for this easy to understand, the dividend will make both the stock and the call option less valuable. If the dividend is sufficiently large and the call option is sufficiently in the money, it may be worth forgoing the remaining time value of the option in order to avoid the adverse effects of the dividend on the stock price.

Call options are most likely to be exercised early immediately before the final ex-dividend date.

Like an insurance cover, an options contract has to be purchased up-front, the price being known as the premium. The price/premium of a call option can be computed using the Black-Scholes options pricing formula and its variations. The formula is mathematically abstruse, and aims at estimating the call value as the present value of the option's payoffs, after adjusting for the probability of the outcome that the option will expire in-the-money. While Black-Scholes Model generally suggests that the price of a call option

- Decreases with the strike price because the higher the strike price the lower is the probability that the option will be exercised; increases with the time left for its expiration because the further away the strike date the higher is the probability that the option will be exercised;

- Increases with the degree of volatility of the price of the underlying asset because the greater the historical variation in the price of the primitive

asset the higher is the probability that the change in its price will be large, such that the option is exercised; and

- Decreases with the interest rate because any payoff from the exercise of an option is realised in the future and, therefore, has to be discounted using the interest rate which can be used as a proxy for the rate of time preference. Once the price of a call option has been estimated using the Black- Scholes formula, the price of a put option can be computed using the Put-Call Parity relationship. The relationship is the embodiment of the argument that an investor is accorded the same protection when (s)he buys a call option as compared with the situation when (s)he buys the underlying asset and simultaneously buys a put option. The cost of the former strategy, therefore, equals the price of the call option and the value of the safe asset that the investor must hold to purchase the underlying asset should (s)he exercise the call option. The cost of the latter strategy, on the other hand, equals the price of the put option and the price of the underlying asset for which the put option is purchased. The costs these alternative strategies can, of course, differ, given the strike prices for the two options, the spot price of the asset, the risk-free interest rate (required for discounting future payoffs), and the prices of the options themselves. However, if the cost of any one strategy is lesser than that of the other then all investors will opt for that strategy and the price for the corresponding options contract will rise till the “gains” disappear. Hence, in equilibrium, the costs of the two strategies should be the same. This put-call parity condition can, therefore, be expressed as an algebraic equation which relates the price of a call option of an asset with a put option of the same maturity. Hence, once the price of a call option has been estimated, given the values of the strike and spot prices, and the risk-free interest rate, the price of the put option can be easily calculated.

2.2.3 Hedge Ratio

With the Black-Scholes model, $N(D_1)$ is the hedge ratio or, as it is also called, the option's delta for the call option. The hedge ratio indicates the number of units of the asset held long (or purchased) for each call sold. The relationship is positive because as S_0 increases (decreases), c increases (decreases). For example, if $N(D_1)$ or delta equals, then the investor should hold long one share of stock for every four calls sold. If the investor buys shares and sells calls according to the hedge ratio, then changes in the price of the stock or underlying asset will not change the value of the investor's portfolio for very small changes.

2.3 Put Call Parity

An important principle in options pricing is called put-call parity. It says that the value of a call option at one strike price implies a certain fair value for the corresponding put, and vice versa. The argument for this pricing relationship relies on the arbitrage opportunity that results if there is divergence between the value of calls and puts with the same strike price and expiration date. Arbitrageurs would step in to make profitable, risk-free trades until the departure from put-call parity is eliminated. Knowing how these trades work can give you a better feel for how put options, call options and the underlying stock are all interrelated.

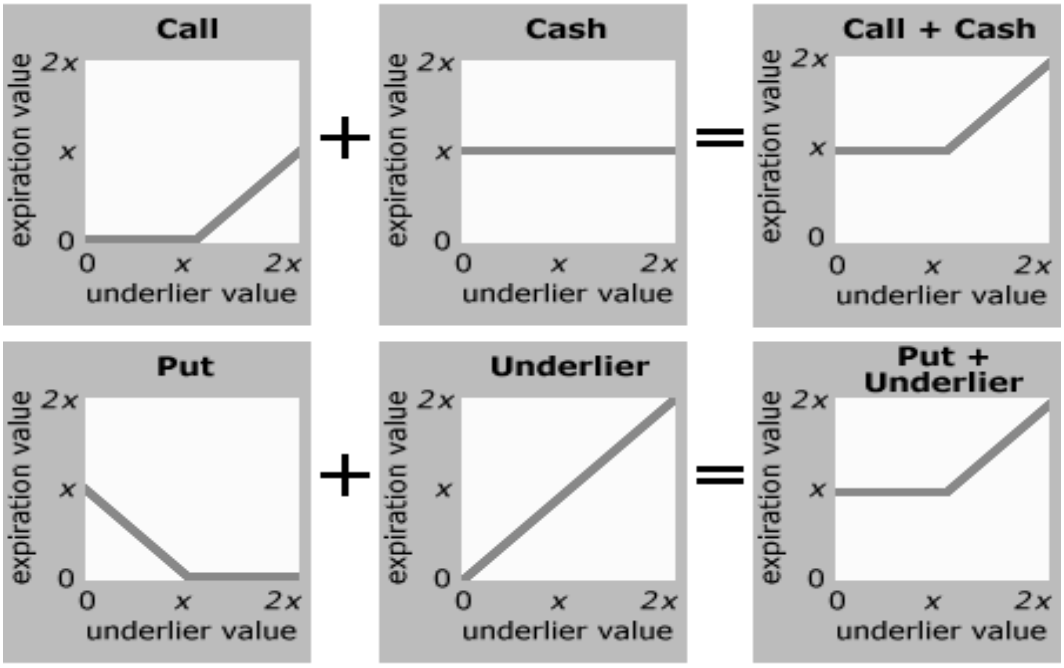
For condition of Put Call Parity The following condition needs to be hold and RHS should equal to LHS.

$$P_p + S = P_c + Xe^{(-rt)}$$

P_p : Price of put option
S : Spot Rate
Pc : Price of Put option
X : Exercise Price
R : Risk Free Rate of Interest

T : Time

Exhibit 1



2.3.1 Adjustments for American Options

This relationship is strictly for European-style options, but the concept also applies to American-style options, adjusting for dividends and interest rates. If the dividend increases, the puts expiring after the ex-dividend date will rise in value, while the calls will decrease by a similar amount. Changes in interest rates have the opposite effects. Rising interest rates increase call values and decrease put values.

2.3.2 The Synthetic Position

Option-arbitrage strategies involve what are called synthetic positions. All of the basic positions in an underlying stock and/or its options have a synthetic equivalent. What this means is that the risk profile (the possible profit or loss) of any position can be exactly duplicated with other but more complex strategies.

The rule for creating synthetics is that the strike price and expiration date of the calls and puts must be identical. For creating synthetics with both the underlying stock and its options, the number of shares of stock must equal the number of shares represented by the options.

To illustrate a synthetic strategy, let's look at a fairly simple option position, the long call. When a call is bought, loss is limited to the premium paid while the possible gain is unlimited. Now consider the simultaneous purchase of a long put and 100 shares of the underlying stock. Once again, loss is limited to the premium paid for the put and your profit potential is unlimited if the stock price goes up.

The trade that includes the stock position requires considerably more capital, the possible profit and loss of a long-put/long-stock position is nearly identical to owning a call option with the same strike and expiration. That's why a long-put/long-stock position is often called a "synthetic long call". In fact, the only difference between the two lines above is the dividend that is paid during the holding period of the trade. The owner of the stock would receive that additional amount, but the owner of a long call option would not.

2.3.3 Arbitrage Using Conversion and Reversals

We can use this idea of the synthetic position to explain two of the most common arbitrage strategies: the conversion and the reverse conversion (often called a reversal). The reasoning behind using synthetic strategies for arbitrage is that, since the risks and rewards are the same, a position and its equivalent synthetic should be priced the same.

A conversion involves buying the underlying stock while simultaneously buying a put and selling a call. (The long-put/short-call position is also known as a synthetic short stock position.) For a reverse conversion you short the underlying stock while simultaneously selling a put and buying a call (a synthetic long stock position). As long as the call and put have the same strike price and expiration date, a synthetic short/long stock position will have the

same profit/loss potential as shorting/owning 100 shares of stock (ignoring dividends and transaction costs).

Remember, these trades guarantee a profit with no risk only if prices have moved out of alignment and the put-call parity is being violated. If you placed these trades when prices are not out of alignment, all you would be doing is locking in a guaranteed loss. The figure below shows the possible profit/loss of a conversion trade when the put-call parity is slightly out of line.

This trade illustrates the basis of arbitrage - buy low and sell high for a small but fixed profit. As the gain comes from the price difference between a call and an identical put, once the trade is placed, it doesn't matter what happens to the price of the stock.

Because they basically offer the opportunity for free money, these types of trades are rarely available. When they do appear, the window of opportunity lasts for only a short time (i.e. seconds or minutes). That's why they tend to be executed primarily by market makers or floor traders, who can spot these rare opportunities quickly and do the transaction in seconds (with very low transaction costs).

Illustration

A call option gives the holder (buyer/one who is long call), the right to buy specified quantity of the underlying asset at the strike price on or before expiration date. The seller (one who is short call) however, has the obligation to sell the underlying asset if the buyer of the call option decides to exercise his option to buy. Consider an investor who buys one European call option at the strike price of Rs. 3500 at a premium of Rs. 100. If the market price on the day of expiry is more than Rs. 3500, the option will be exercised. The investor will earn profits once the share price crosses Rs. 3600 (Strike Price + Premium i.e. 3500+100). Suppose stock price is Rs. 3800, the option will be exercised and the investor will buy 1 share from the seller of the option at Rs 3500 and sell it in the market at Rs 3800 making a profit of Rs. 200 f(Spot price - Strike price) Premium. In another scenario, if at the time of expiry stock

price falls below Rs. 3500 say suppose it touches Rs. 3000, the buyer of the call option will choose not to exercise his option. In this case the investor loses the premium (Rs 100), paid which should be the profit earned by the seller of the call option.

Put Option A Put option gives the holder (buyer/one who is long Put), the right to sell specified quantity of the underlying asset at the strike price on or before an expiry date. The seller of the put option (one who is short Put) however, has the obligation to buy the underlying asset at the strike price if the buyer decides to exercise his option to sell.

Consider an investor who buys one European Put option at the strike price of Rs. 300, at a premium of Rs. 25. If the market price, on the day of expiry is less than Rs. 300, the option can be exercised as it is 'in the money'. The investor's Break-even point is Rs. 275 (Strike Price - premium paid) i.e., investor will earn profits if the market falls below 275. Suppose stock price is Rs. 260, the buyer of the Put option immediately buys a share in the market @ Rs. 260/- and exercises his option selling a share at Rs 300 to the option writer thus making a net profit of Rs. 15 f(Strike price - Spot Price) - Premium paid. In another scenario, if at the time of expiry, market price of Reliance is Rs 320, the buyer of the Put option will choose not to exercise his option to sell as he can sell in the market at a higher rate. In this case the investor loses the premium paid (i.e. Rs 25), which shall be the profit earned by the seller of the Put option.

3. RESEARCH METHODOLOGY

3.1 Methodology

Research methodology is a way to systematically solve the research problem. A thorough examination of the various steps that are generally adopted by a researcher in studying his research problem along with the logic behind them were studied. It is necessary for the researcher to design his methodology for his problem as the same may differ from problem to problem.

Securities and Exchange Board of India (SEBI) introduced stock options on 31 shares in July 2001. The trading interest in these contracts has been consistently increasing. The data for this study was taken from the daily *bhavcopy* posted on the NSE website. It provides all the market information on call and put options traded on different stocks during the day that include option premium (open, high, low and close), trading volume and open interest at each strike price. This study covers stock option contracts for three months, namely January, February & March, comprising a total of 62 trading days (including the expiration day). Currently, we have stock option contracts available in Indian market for one, two- and three- month maturity. As the present study attempts to decipher the price-volume relationship, the Put-Call Parity of stock options becomes an important issue. Keeping this in view, only those contracts included which were most traded. Basis of estimation of price of put and call options, stock price, time and rate of interest have been calculated on the following basis.

- Stock prices as well as option prices are calculated by taking the average of High and low price of that day [(High + Low)/2].

- ❖ Strike price are choose on the basis of trade value in Lacks, exercise price which was having the highest trade value is considered as that will give a better picture that whether the Put-Call Parity holds or not.

- ❖ Risk free rate of interest is considered to be at 6% constant for the entire period.

- ❖ Time is calculated by days remaining to maturity by number of days in a month.

- ❖ Two days have been analysed as a sample (a) last Thursday of the month when options are matured and (b) one in the middle of the month.

Analysis of all the data was done with help of computer and for most of the data analysis MS-Excel programme was used.

3.2 Objectives

From a market microstructure perspective, derivatives markets may reduce the extent to which informed speculators are found on the spot market, thus reducing the adverse selection on the spot market. Derivatives also help reduce the risks faced by liquidity providers on the spot market, by giving them avenues for hedging. These effects help improve liquidity on the spot market. Although many research have been conducted on Put-Call Parity, and many authors and research scholars have concluded, that it is best way of finding market efficiency by calculating Put-Call Parity. To put it precisely the primary objectives of the study were:

- To test the Put-Call Parity relationship on selected stock options.

- To explore whether Put-Call disparity in stock options affect the arbitrage opportunities for the investors?

- To examine whether arbitrage opportunities changes the behaviour of investors?

3.3 Sampling Design

All 53 stock options listed on NSE have been analysed for calculating the Put-Call Parity on stock options for the period for 1st Jan 2005 to March 2005. These options generally refer the direction of the market. This study was made for finding out that these options are trading at true prices. Sample of two trading days every month have been taken as follows:

- One the last Thursday of the month when the option comes to maturity/settlement.
- Two middle of the month (any other trading day in case options are not exercised on 14th of the month)

3.4 Sources of Data

Secondary data was primarily used for the purpose of study. All the data which have been used in the analysis has been secondary data and mostly collected from NSE (National Stock Exchange) website www.nse-india.com. For option prices and exercise price daily *bhavcopy* was being used and for spot price historical data of NSE stock was used. The data employed in the study consist of daily closing prices of the Stock options traded on NSE & Stock prices of the same securities at NSE for the period of 1st Jan to-31st March collected from the National Stock Exchange (NSE) website (www.nse-india.com).

In order to estimate the Put-Call Parity daily option *bhavcopy* and stock prices bhavcopy. The series comprises of observations related to the observations of 53 securities traded on NSE. Beside this, requisite information was also derived from journals, newspapers and magazines.

3.5 Research Assumptions

- All stock options were considered as European options.
- The short-term risk free rate of interest, r is constant at 6% for the study period, i.e. from January to March.
- There are no dividends on the stock during the study period.
- Securities are trading on continuous basis.
- There is no transaction cost and taxes.

However, few cases were also analysed assuming American Style of options.

3.6 Limitations of the study

- Assumptions of European style options were the biggest limitation of the study as all the stock options traded on NSE are American options.
- The time to maturity was calculated on approximation and may have its effect on the findings.
- The time period covered in the study was just 3 months which might not have shown the true picture of Indian Stock options market.
- Sample of two days per month might not have given true picture as options can more volatile on any particular day.
- Research assumptions of the study were also one limitation of the study.

4. ANALYSIS & FINDINGS

4.1 Analysis of Put-Call Parity

44 stock options were chosen out of total of 53 traded stock options because the rest of the stocks are not very actively traded on NSE. For all the stock options, daily *bhavcopy* has been gathered from NSE website for the period. Daily stock prices of all individual stocks have also been taken form the NSE website for the same period.

For the purpose of analysis the prices of options (call price and put price) have been calculated by taking the average of high and low value of the price of that exercise price which is having the largest trade value on that particular day. The prices of the sock prices have also taken as the average of the high and low price of that particular day. As far as time is concerned that is taken as days remaining in the month divided by 30 (number of days in a month) ignoring that option might be maturing before end of the month. Risk free rate of interest is considered as 6% constant for the period of the study. The effect of volatility was not considered in the study as the prices of the put and call options already adjusted by the volatility. Initially the idea of research was to find out a sample of five stock options and done a more deep study of Put-Call Parity on those stock options but as that would not have been able to give a clear picture of the current Indian Stock Option market, this have been decided to take sample of two days per month instead of taking sample of stocks. The sample of two days is been taken as one day of the middle of the month and one day of maturity of option. The reason behind that was that the day of maturity witness maximum number of trades while middle of the month is taken as a better representative of all the days.

The Put-Call Parity formula $\mathbf{P_p + S = P_c + Xe^{(-rt)}}$ was based on the **Black-Scholes Pricing Formula** used in the study which derived the price of put and call option. According to this formula price of a put and strike price should be equal to price of call option and stock price and exponential of time and risk free rate of interest. This formula gives a basis for arbitrage as if the equation does not hold there is scope of arbitrage.

After taking the average disparity among the stock options the stocks have been divided into three broad categories.

- Low disparity
- Moderate disparity
- High disparity

The stock comes in low disparity have less than 0.50% disparity, Moderate disparity constitute stocks having disparity between 0.50% to 1% and in high disparity those stock options comes which has disparity of more than 1% (Exhibit 1).

Exhibit 2 shows cases of options where Put-Call Parity was truly established. Maruti, State Bank of India and SCI are the three Stock Options where Put-Call Parity Holds Truly. This illustrates that there are no arbitrage opportunities available in these stock options.

Exhibit 3 shows the cases of slight departure from Parity, This Exhibit illustrates those stock options where Put-Call Parity does not hold truly but disparity is very less which means that the arbitrage opportunities are negligible in these stock options .

Exhibit 4 shows the cases of high disparity. Analysis shows that there are options available where opportunities of earning high arbitrage exist. The stock options, which were having high arbitrage opportunities, are ACC, Bank of

India, BPCL, HCL, ICICI Bank, IOC and Tata Tea. Most of the above options are highly traded on NSE. Stock options of ACC and HCL give opportunity of arbitrage of around Rs.100 on every option which is really a very huge arbitrage. Options like BPCL, IOC and Tata Tea are also giving opportunity of high arbitrage.

Exhibit 1 (Parity tested cases)

Low Disparity	Moderate Disparity	High Disparity
TISCO	UNIONBANK	HEROHONDA
NTPC	NATIONALUM	PNB
RELIANCE	INFOSYSTCH	HINDPETRO
SCI	IPCL	ORIENTBANK
GAIL	CIPLA	RANBAXY
HINDLEVER	M&M	ICICIBANK
MTNL	POLARIS	ARVINDMILL
ANDHRABANK	BANKBARODA	BHEL
TATAMOTORS	SYNDIBANK	HDFCBANK
GUJAMBCEM		TATATEA
MARUTI		DRREDDY
ITC		BANKINDIA
SATYAMCOMP		BPCL
ONGC		CANBK
WIPRO		TCS
TATAPOWER		ACC
SBIN		MASTEK
		IOC
		HCLTECH

Cases of high disparity shown in Exhibit 8 were analysed and it was found that there are high arbitrage opportunities.

Exhibit 2 (Perfect Parity Cases)

Valuation Date	Stock Option	Strike Price (X)	Spot Rate (S)	Risk free rate r_f	Time to expiration (t)	Call Option (Pc)	Put Option (Pp)	PUT - CALL PARITY		Difference	Parity
								Pp + S	Pc + Xe(-rt)		
24-Feb	MARUTI	470	472	6.00%	0.03	3.500	1.425	473.43	473.43	0.00	Yes
24-Feb	SBIN	680	685.875	6.00%	0.03	8.500	2.525	688.40	688.40	0.00	Yes
14-Feb	SCI	170	171.275	6.00%	0.50	6.000	4.300	175.58	175.58	0.00	Yes

Exhibit 3 (Low Disparity Cases)

Valuation Date	Stock Option	Strike Price (X)	Spot Rate (S)	Risk free rate r_f	Time to expiration (t)	Call Option (Pc)	Put Option (Pp)	PUT - CALL PARITY		Difference	Parity Established
								Pp + S	Pc + Xe(-rt)		
24-Feb	ACC	360	362.35	6.00%	0.03	3.05	0.48	362.83	363.00	0.17	Least Disparity
27-Jan	DRREDDY	740	733.75	6.00%	0.03	4.00	10.00	743.75	743.89	0.14	Least Disparity
24-Feb	GAIL	240	236.75	6.00%	0.03	0.85	4.00	240.75	240.81	0.06	Least Disparity
14-Mar	HEROHONDA	540	571.08	6.00%	0.50	34.90	2.60	573.68	573.55	0.12	Least Disparity
14-Feb	HINDLEVER	160	154.20	6.00%	0.50	2.38	7.80	162.00	161.98	0.02	Least Disparity
31-Mar	HINDLEVER	130	132.28	6.00%	0.03	2.53	0.28	132.55	132.51	0.04	Least Disparity
27-Jan	MARUTI	430	431.53	6.00%	0.03	5.00	3.53	435.05	434.94	0.11	Least Disparity
14-Jan	MTNL	140	140.28	6.00%	0.50	5.63	5.08	145.35	145.28	0.07	Least Disparity
24-Feb	NATIONALUM	175	175.30	6.00%	0.03	1.63	1.25	176.55	176.60	0.05	Least Disparity
24-Feb	ONGC	820	818.08	6.00%	0.03	2.45	4.05	822.13	822.33	0.20	Least Disparity
14-Mar	ONGC	920	918.75	6.00%	0.50	21.23	20.25	939.00	938.93	0.07	Least Disparity
27-Jan	POLARIS	130	131.05	6.00%	0.03	1.83	0.78	131.83	131.81	0.02	Least Disparity
14-Mar	SCI	170	170.33	6.00%	0.50	5.85	5.03	175.35	175.43	0.08	Least Disparity
27-Jan	TATATEA	480	479.80	6.00%	0.03	3.20	3.48	483.28	483.13	0.15	Least Disparity
24-Feb	WIPRO	680	680.00	6.00%	0.03	1.65	1.50	681.50	681.55	0.05	Least Disparity

Exhibit 4 (High Disparity Cases)

Valuation Date	Stock Option	Strike Price (X)	Spot Rate (S)	Risk free rate r_f	Time to expiration (t)	Call Option Pc	Put Option Pp	PUT - CALL PARITY		Difference	Parity Established
								Pp + S	Pc + Xe(-rt)		
14-Jan	ACC	350	457.55	6.00%	0.50	13.03	12.00	469.55	362.15	107.40	No
24-Feb	BANKINDIA	85	85.45	6.00%	0.03	1.03	5.35	90.80	86.01	4.79	No
27-Jan	BPCL	450	391.60	6.00%	0.03	0.15	25.90	417.50	450.08	32.58	No
14-Feb	HCLTECH	450	356.13	6.00%	0.50	9.88	9.00	365.13	458.75	93.63	No
14-Mar	ICICIBANK	400	371.48	6.00%	0.50	5.50	14.25	385.73	404.50	18.78	No
31-Mar	IOC	480	433.50	6.00%	0.03	5.03	7.00	440.50	484.95	44.45	No
29-Mar	MASTEK	320	346.80	6.00%	0.07	12.85	5.00	351.80	332.74	19.06	No
31-Mar	TATATEA	560	523.70	6.00%	0.03	1.10	2.50	526.20	561.02	34.82	No

4.2 Proof of Arbitrage

Taking an example of ACC on 14 Jan the spot rate of stock was Rs. 457.55 and for option having strike price of Rs. 450 that was expiring on 27 Jan. The Call option price the option was Rs. 13 and price of put option was Rs. 12. By using Put-Call Parity formula $Pp + S = Pc + Xe^{(-rt)}$ it is found that there is a difference of Rs.107.40 on one Option which is really a very high arbitrage.

4.3 Findings

The analysis shows that the Indian stock options market is not efficient and arbitrage opportunities do exist. The result of the study argues that when investors expect the price of underlying stock to increase they would be willing to buy call options at higher strike price and in case of anticipated decline in stock prices they would prefer to buy put options.

Derivatives are not very old for Indian market and so as market is not so efficient. However there are certain options come in the notice during the study where Put-Call Parity holds exactly Exhibit 2 shows that Maruti, SBI and SCI are three stock options where Put-Call Parity exactly holds. Meanwhile other then these Stock Options there are some other stock options where disparity exists but it is very less in percentage. Exhibit 3 shows that there are 15 stock options where disparity exists but it is less than 0.05%, which is very marginal.

This analysis does not show at all, that Indian option market is very efficient because there are some options where disparity is more than 5%, and in two cases (ACC & HCL it is around 25%) which shows that there is still very much scope of Arbitrage. Exhibit 4 shows 8 stock options are there where disparity between put and call option is more than 5%, and except Mastek all other stocks are highly traded socks. In the Exhibit 4, ACC & HCL, which are very actively traded stock options, have disparity of 23.47% & 26.29% which is very high for any stock. Although in case of ACC on other days disparity is quite less and for HCL one more trading day witness high disparity (4.46%). Other

than these stocks some other stocks are also having very high disparity Bank of India, BPCL, ICICI Bank, IOC, Mastek and Tata Tea all are having disparity more than 5%.

This analysis clearly shows that there are stocks options that hold Put-Call Parity, as shown in exhibit 1 all three options which holds Put-call Parity have average of least parity and there are least opportunities of arbitrage, but at the same time there are stocks where disparity is very high. Disparity means there are opportunities available for arbitrage. Investors would prefer to buy put options at higher strike price when they have specific information about the decline in stock prices, which would lead to higher arbitrage. Another possibility may be that the investors may like to write put options when they expect the stock prices to increase and call options when they expect stock prices to decline. It may be argued that the model used in this study is based on the basic premise that investors are expected to go long only either on call options or put options. However, it is to be noted that study not ruled out the option writing by the investors but it is believed that such transactions are going to be less. The reason is that while writing options one would take exposure to the unlimited risk potential. When investors are acting on the basis of information that would materialize in future, they are already undertaking the calculated risk. They would avoid multiplying their risk exposure by going short in the option market. Further, given the high degree of volatility in Indian stock market, the probability of investors buying options rather than writing options would be more.

5. CONCLUSIONS

This study has strengthened the argument that Indian derivatives market is not yet efficient and hence there is scope of making good profits or better to say there is scope of arbitrage.

Based on the findings it can be argued that the investors would buy out-of-the-money call options when they expect the market to rise and put options when they expect it to decline. The reasoning, as mentioned in the previous section, does support their contention.

Analysis of the Put-call Parity conditions for selected stock options imply the existence of the arbitrage, which means that the investor would buy out-of-the-money call options when they expect the market to rise and put options when they expect it to decline.

In this report Put-Call Parity formula based on Black-Scholes theory have been used to analyse the Put-call Parity and Arbitrage opportunities in selected stock options. The analysis shows that there is disparity among the option pricing and arbitrage opportunities exists.

It would definitely help the regulatory bodies in policy-making and further strengthening the efforts to promote the derivative market in India. There are many areas that are still unexplored and can be addressed by the future studies.

As the number of shares in stock option segment has been increased to 53, the future study may be conducted with larger sample size and longer duration statistics.

The empirical evidence broadly suggests that market efficiency and liquidity on the spot market improve once derivatives' trading comes about. Speculators

generally prefer implementing their positions using derivatives rather than using a sequence of trades on the underlying spot market.

Hence, access to derivatives increases the rate of return on information gathering, research and forecasting activities, and thus serves to spur investments into information gathering and forecasting. This helps improve market efficiency.

From a market microstructure perspective, derivatives markets may reduce the extent to which informed speculators are found on the spot market, thus reducing the adverse selection on the spot market.

Derivatives also help reduce the risks faced by liquidity providers on the spot market, by giving them avenues for hedging. These effects help improve liquidity on the spot market. However the lot size of the options is very large, which is a barrier for small and retail investors, reduction in the lot size can increase the option trade and also improve the efficiency of the market.

As the market activity progresses further, more evidence would come in support of the above findings. It would not only benefit the investor community but also provides support for the hypothesis that derivative securities enhance the quality of underlying asset market. The study also complements the earlier evidence documented by many scholars in their study.

APPENDIX

Valuation Date	Stock Option	Strike Price (X)	Spot Rate (S)	Risk free rate Rf	Time to expiration (t)	Call Option (Pc)	Put Option (Pp)	PUT - CALL PARITY		Difference	% Disparity
								Pp + S	Pc + Xe(-rt)		
27-Jan	ACC	350	347.250	6.00%	0.03	1.025	7.350	354.600	350.973	3.63	1.04
24-Feb	ACC	360	362.350	6.00%	0.03	3.050	0.475	362.825	362.996	0.17	0.05
31-Mar	ACC	360	360.950	6.00%	0.03	1.450	1.275	362.225	361.396	0.83	0.23
14-Jan	ACC	350	457.550	6.00%	0.50	13.025	12.000	469.550	362.151	107.40	23.47
11-Feb	ACC	480	489.950	6.00%	0.53	15.525	6.450	496.400	494.247	2.15	0.44
10-Mar	ACC	490	480.000	6.00%	0.67	12.950	23.050	503.050	501.319	1.73	0.36
								Average Change in %			4.27
27-Jan	ANDRABANK	80	81.575	6.00%	0.03	2.525	1.025	82.600	82.513	0.09	0.11
14-Jan	ANDRABANK	80	80.075	6.00%	0.50	4.700	3.800	83.875	84.500	0.63	0.78
24-Feb	ANDRABANK	90	89.275	6.00%	0.03	0.775	1.350	90.625	90.762	0.14	0.15
11-Feb	ANDRABANK	80	85.675	6.00%	0.57	6.775	1.625	87.300	86.549	0.75	0.88
31-Mar	ANDRABANK	110	108.450	6.00%	0.03	0.725	2.075	110.525	110.709	0.18	0.17
15-Mar	ANDRABANK	115	115.150	6.00%	0.50	5.000	4.700	119.850	119.713	0.14	0.12
								Average Change in %			0.37
14-Jan	ARVINDMILLS	115	113.350	6.00%	0.50	4.650	6.850	120.200	119.363	0.84	0.74

27-Jan	ARVINDMILLS	110	111.175	6.00%	0.03	3.050	1.775	112.950	113.034	0.08	0.08
14-Feb	ARVINDMILLS	130	123.300	6.00%	0.50	3.625	7.100	130.400	133.300	2.90	2.35
24-Feb	ARVINDMILLS	125	123.250	6.00%	0.03	1.025	2.300	125.550	126.006	0.46	0.37
15-Mar	ARVINDMILLS	130	122.750	6.00%	0.50	1.600	5.625	128.375	131.275	2.90	2.36
31-Mar	ARVINDMILLS	115	113.800	6.00%	0.03	1.475	0.475	114.275	116.458	2.18	1.92
								Average Change in %			1.42
14-Jan	BANKBARODA	210	212.950	6.00%	0.5	13.500	8.850	221.800	222.976	1.18	0.55
27-Jan	BANKBARODA	200	192.875	6.00%	0.03	3.000	6.750	199.625	202.970	3.35	1.73
15-Feb	BANKBARODA	200	211.325	6.00%	0.5	12.825	3.975	215.300	212.326	2.97	1.41
24-Feb	BANKBARODA	200	205.425	6.00%	0.03	5.775	0.150	205.575	205.745	0.17	0.08
15-Mar	BANKBARODA	240	236.15	6.00%	0.5	7.875	9.125	245.275	247.276	2.00	0.85
31-Mar	BANKBARODA	220	217.775	6.00%	0.03	1.475	4.125	221.900	221.442	0.46	0.21
								Average Change in %			0.81
14-Jan	BANKINDIA	90	85.275	6.00%	0.5	3.425	8.700	93.975	93.200	0.77	0.91
27-Jan	BANKINDIA	80	80.100	6.00%	0.03	1.300	0.800	80.900	81.288	0.39	0.48
15-Feb	BANKINDIA	85	84.325	6.00%	0.5	1.925	5.000	89.325	86.713	2.61	3.10
24-Feb	BANKINDIA	85	85.450	6.00%	0.03	1.025	5.350	90.800	86.012	4.79	5.60
15-Mar	BANKINDIA	115	113.700	6.00%	0.5	4.700	4.975	118.675	119.413	0.74	0.65
31-Mar	BANKINDIA	105	104.475	6.00%	0.03	0.650	1.675	106.150	105.634	0.52	0.49
								Average Change in %			1.87

17-Jan	BHEL	700	711.500	6.00%	0.5	20.000	15.050	726.550	718.252	8.30	1.17
27-Jan	BHEL	720	674.525	6.00%	0.03	2.000	28.525	703.050	721.892	18.84	2.79
15-Feb	BHEL	820	850.050	6.00%	0.5	35.025	9.950	860.000	852.978	7.02	0.83
24-Feb	BHEL	860	849.625	6.00%	0.03	4.300	24.900	874.525	864.171	10.35	1.22
15-Mar	BHEL	820	813.800	6.00%		18.500	15.750	829.550	838.500	8.95	1.10
31-Mar	BHEL	800	765.000	6.00%	0.03	5.100	25.500	790.500	804.980	14.48	1.89
								Average Change in %			1.50
14-Jan	BPCL	420	410.150	6.00%	0.5	9.900	21.500	431.650	428.851	2.80	0.68
27-Jan	BPCL	450	391.600	6.00%	0.03	0.150	25.900	417.500	450.083	32.58	8.32
14-Feb	BPCL	450	453.100	6.00%	0.5	10.150	9.5	462.600	459.026	3.57	0.79
24-Feb	BPCL	430	418.475	6.00%	0.03	0.550	12.250	430.725	430.486	0.24	0.06
15-Mar	BPCL	400	401.050	6.00%	0.5	8.750	13.000	414.050	407.751	6.30	1.57
31-Mar	BPCL	400	353.500	6.00%	0.03	0.125	46.125	399.625	400.065	0.44	0.12
								Average Change in %			1.92
14-Jan	CANBK	200	191.325	6.00%	0.5	8.275	8.000	199.325	207.776	8.45	4.42
27-Jan	CANBK	200	199.950	6.00%	0.03	2.775	1.100	201.050	202.745	1.70	0.85
14-Feb	CANBK	200	208.575	6.00%	0.5	12.975	2.325	210.900	212.476	1.58	0.76
24-Feb	CANBK	210	204.500	6.00%	0.03	0.825	2.125	206.625	210.794	4.17	2.04
15-Mar	CANBK	230	224.700	6.00%	0.5	8.100	8.200	232.900	237.526	4.63	2.06
31-Mar	CANBK	200	198.000	6.00%	0.03	2.100	0.975	198.975	202.070	3.10	1.56
								Average Change in %			1.95

14-Jan	CIPLA	270	266.825	6.00%	0.5	10.250	11.500	278.325	279.576	1.25	0.47
27-Jan	CIPLA	270	270.900	6.00%	0.03	4.725	1.250	272.150	274.685	2.53	0.94
14-Feb	CIPLA	280	277.550	6.00%	0.5	6.675	7.950	285.500	285.976	0.48	0.17
24-Feb	CIPLA	280	262.925	6.00%	0.03	5.025	17.500	280.425	284.983	4.56	1.73
15-Mar	CIPLA	280	280.325	6.00%	0.5	9.000	7.500	287.825	288.301	0.48	0.17
31-Mar	CIPLA	260	256.500	6.00%	1	9.625	11.050	267.550	268.328	0.78	0.30
								Average Change in %			0.63
14-Jan	DRREDDY	740	745.050	6.00%	0.5	28.400	20.000	765.050	766.552	1.50	0.20
27-Jan	DRREDDY	740	733.750	6.00%	0.03	4.000	10.000	743.750	743.889	0.14	0.02
18-Feb	DRREDDY	740	730.500	6.00%	1.4	27.500	39.900	770.400	762.338	8.06	1.10
24-Feb	DRREDDY	700	725.000	6.00%	0.03	9.500	0.300	725.300	709.395	15.90	2.19
15-Mar	DRREDDY	780	748.000	6.00%	0.5	9.000	12.800	760.800	787.052	26.25	3.51
31-Mar	DRREDDY	780	744.900	6.00%	0.03	1.025	17.000	761.900	780.908	19.01	2.55
								Average Change in %			1.66
14-Jan	GAIL	230	222.275	6.00%	0.5	5.125	11.450	233.725	234.551	0.83	0.37
27-Jan	GAIL	220	217.450	6.00%	0.03	0.850	3.600	221.050	220.817	0.23	0.11
14-Feb	GAIL	250	248.100	6.00%	0.5	7.175	6.350	254.450	256.551	2.10	0.85
24-Feb	GAIL	240	236.75	6.00%	0.03	0.850	4.000	240.750	240.814	0.06	0.03
15-Mar	GAIL	250	242.125	6.00%	0.5	4.600	11.125	253.250	253.976	0.73	0.30
31-Mar	GAIL	210	214.425	6.00%	1	14.100	8.525	222.950	223.053	0.10	0.05
								Average Change in %			0.28

14-Jan	GUJAMBCEM	430	429.650	6.00%	0.5	12.875	14.500	444.150	441.801	2.35	0.55
27-Jan	GUJAMBCEM	420	416.200	6.00%	0.03	1.050	5.375	421.575	420.987	0.59	0.14
14-Feb	GUJAMBCEM	450	451.600	6.00%	0.5	9.875	9.000	460.600	458.751	1.85	0.41
24-Feb	GUJAMBCEM	430	432.900	6.00%	0.03	3.100	1.075	433.975	433.036	0.94	0.22
15-Mar	GUJAMBCEM	440	428.175	6.00%	0.5	5.375	15.000	443.175	444.276	1.10	0.26
31-Mar	GUJAMBCEM	410	401.550	6.00%	0.03	0.700	12.475	414.025	410.639	3.39	0.84
								Average Change in %			0.40
17-Jan	HCLTECH	330	301.250	6.00%	0.5	3.000	17.500	318.750	332.176	13.43	4.46
27-Jan	HCLTECH	320	325.000	6.00%	0.03	5.000	1.975	326.975	324.952	2.02	0.62
14-Feb	HCLTECH	450	356.125	6.00%	0.5	9.875	9.000	365.125	458.751	93.63	26.29
14-Mar	HCLTECH	370	369.750	6.00%	0.5	8.425	13.750	383.500	377.501	6.00	1.62
31-Mar	HCLTECH	370	368.225	6.00%	0.03	2.500	2.025	370.250	372.445	2.19	0.60
								Average Change in %			6.72
23-Feb	HDFCBANK	780	780.650	6.00%	0.0667	24.500	10.150	790.800	804.240	13.44	1.72
24-Mar	HDFCBANK	740	702.500	6.00%	0.2	5.000	25.800	728.300	744.260	15.96	2.27
31-Mar	HDFCBANK	540	542.550	6.00%	0.03	6.475	0.750	543.300	546.394	3.09	0.57
								Average Change in %			1.52
14-Jan	HEROHONDA	520	535.500	6.00%	0.5	20.000	16.500	552.000	538.702	13.30	2.48
27-Jan	HEROHONDA	560	538.000	6.00%	1	12.000	44.000	582.000	569.207	12.79	2.38
14-Feb	HEROHONDA	540	560.300	6.00%	0.5	24.650	4.600	564.900	563.302	1.60	0.29
18-Feb	HEROHONDA	540	538.425	6.00%	0.4	10.300	9.975	548.400	549.221	0.82	0.15
14-Mar	HEROHONDA	540	571.075	6.00%	0.5	34.900	2.600	573.675	573.552	0.12	0.02
31-Mar	HEROHONDA	540	548.500	6.00%	0.03	4.525	1.000	549.500	544.444	5.06	0.92
								Average Change in %			1.04

14-Jan	HINDLEVER	140	139.950	6.00%	0.5	3.350	3.275	143.225	143.000	0.22	0.16
27-Jan	HINDLEVER	150	151.225	6.00%	0.03	1.100	0.700	151.925	151.078	0.85	0.56
14-Feb	HINDLEVER	160	154.200	6.00%	0.5	2.375	7.800	162.000	161.975	0.02	0.02
24-Feb	HINDLEVER	145	143.675	6.00%	0.03	0.750	1.650	145.325	145.728	0.40	0.28
14-Mar	HINDLEVER	140	139.475	6.00%	0.5	4.650	3.850	143.325	144.300	0.98	0.70
31-Mar	HINDLEVER	130	132.275	6.00%	0.03	2.525	0.275	132.550	132.506	0.04	0.03
								Average Change in %			0.29
14-Jan	HINDPETRO	360	354.000	6.00%	0.5	8.750	13.500	367.500	367.851	0.35	0.10
27-Jan	HINDPETRO	340	337.775	6.00%	0.03	2.350	5.700	343.475	342.299	1.18	0.35
14-Feb	HINDPETRO	390	374.000	6.00%	0.5	2.800	11.000	385.000	391.826	6.83	1.83
24-Feb	HINDPETRO	350	347.500	6.00%	1	16.350	13.625	361.125	364.604	3.48	1.00
14-Mar	HINDPETRO	330	335.450	6.00%	0.5	13.350	7.500	342.950	342.526	0.42	0.13
31-Mar	HINDPETRO	320	306.025	6.00%	1	10.550	17.500	323.525	328.954	5.43	1.77
								Average Change in %			1.14
14-Jan	ICICIBANK	350	353.275	6.00%	0.5	12.850	10.850	364.125	361.976	2.15	0.61
27-Jan	ICICIBANK	340	341.275	6.00%	0.03	2.500	3.000	344.275	342.449	1.83	0.54
14-Feb	ICICIBANK	380	381.250	6.00%	0.5	10.325	5.000	386.250	389.376	3.13	0.82
24-Feb	ICICIBANK	380	371.875	6.00%	0.03	0.800	7.500	379.375	380.743	1.37	0.37
14-Mar	ICICIBANK	400	371.475	6.00%	0.5	5.500	14.250	385.725	404.501	18.78	5.05
31-Mar	ICICIBANK	400	398.125	6.00%	0.03	4.500	4.050	402.175	404.440	2.27	0.57
								Average Change in %			1.33
14-Jan	INFOSYSTCH	2010	1979.150	6.00%	0.5	49.475	72.800	2051.950	2054.456	2.51	0.13
27-Jan	INFOSYSTCH	1950	1945.025	6.00%	0.03	9.050	9.475	1954.500	1958.758	4.26	0.22
14-Feb	INFOSYSTCH	2100	2149.850	6.00%	0.5	77.475	15.450	2165.300	2172.232	6.93	0.32

24-Feb	INFOSYSTCH	2160	2157.500	6.00%	0.03	9.000	6.200	2163.700	2168.676	4.98	0.23
14-Mar	INFOSYSTCH	2200	2215.500	6.00%	0.5	42.500	44.250	2259.750	2237.007	22.74	1.03
31-Mar	INFOSYSTCH	2220	2251.550	6.00%	0.03	11.550	17.000	2268.550	2231.217	37.33	1.66
								Average Change in %			0.60
24-Feb	IOC	450	470.500	6.00%	1	20.000	15.000	485.500	467.756	17.74	3.77
8-Mar	IOC	470	485.250	6.00%	0.7333	25.250	4.000	489.250	493.530	4.28	0.88
31-Mar	IOC	480	433.500	6.00%	0.03	5.025	7.000	440.500	484.953	44.45	10.25
								Average Change in %			4.97
14-Jan	IPCL	170	169.450	6.00%	0.5	5.875	5.900	175.350	175.451	0.10	0.06
27-Jan	IPCL	170	169.500	6.00%	1	7.375	6.025	175.525	176.527	1.00	0.59
17-Feb	IPCL	180	180.375	6.00%	0.5	3.075	3.725	184.100	182.626	1.47	0.82
24-Feb	IPCL	180	176.625	6.00%	0.03	0.800	3.475	180.100	180.773	0.67	0.38
14-Mar	IPCL	180	180.950	6.00%	0.5	6.300	4.250	185.200	185.851	0.65	0.36
31-Mar	IPCL	170	164.775	6.00%	1	6.625	8.500	173.275	175.777	2.50	1.52
								Average Change in %			0.62
14-Jan	ITC	1260	1241.575	6.00%	0.5	19.075	40.000	1281.575	1275.929	5.65	0.45
27-Jan	ITC	1350	1370.500	6.00%	0.03	19.725	6.500	1377.000	1369.523	7.48	0.55
14-Feb	ITC	1320	1331.000	6.00%	0.5	34.900	31.950	1362.950	1351.604	11.35	0.85
24-Feb	ITC	1350	1322.500	6.00%	0.03	0.250	20.600	1343.100	1350.048	6.95	0.53
14-Mar	ITC	1380	1348.475	6.00%	0.5	16.575	23.900	1372.375	1393.129	20.75	1.54
								Average Change in %			0.41
14-Jan	M&M	500	507.025	6.00%	0.5	17.750	14.000	521.025	516.502	4.52	0.89
27-Jan	M&M	500	504.625	6.00%	0.03	9.750	1.500	506.125	509.675	3.55	0.70
14-Feb	M&M	560	566.750	6.00%	0.5	15.000	6.250	573.000	573.602	0.60	0.11

24-Feb	M&M	540	540.225	6.00%	0.03	6.375	3.875	544.100	546.294	2.19	0.41
14-Mar	M&M	540	534.250	6.00%	0.5	9.475	5.875	540.125	548.127	8.00	1.50
31-Mar	M&M	520	503.500	6.00%	0.03	0.075	14.850	518.350	519.997	1.65	0.33
								Average Change in %			0.66
14-Jan	MARUTI	430	428.450	6.00%	0.5	12.500	14.125	442.575	441.426	1.15	0.27
27-Jan	MARUTI	430	431.525	6.00%	0.03	5.000	3.525	435.050	434.936	0.11	0.03
14-Feb	MARUTI	500	497.025	6.00%	0.5	11.425	14.975	512.000	510.177	1.82	0.37
24-Feb	MARUTI	470	472.000	6.00%	0.03	3.500	1.425	473.425	473.430	0.00	0.00
14-Mar	MARUTI	470	457.150	6.00%	0.5	8.400	14.800	471.950	477.226	5.28	1.15
31-Mar	MARUTI	420	424.100	6.00%	0.03	3.800	2.225	426.325	423.737	2.59	0.61
								Average Change in %			0.40
29-Mar	MASTEK	320	346.800	6.00%	0.0667	12.850	5.000	351.800	332.743	19.06	5.49
31-Mar	MASTEK	350	362.500	6.00%	0.03	6.500	5.000	367.500	356.448	11.05	3.05
								Average Change in %			4.27
14-Jan	MTNL	140	140.275	6.00%	0.5	5.625	5.075	145.350	145.275	0.07	0.05
27-Jan	MTNL	140	145.225	6.00%	0.03	5.200	0.175	145.400	145.179	0.22	0.15
14-Feb	MTNL	140	141.450	6.00%	0.5	3.800	3.150	144.600	143.450	1.15	0.81
24-Feb	MTNL	140	134.950	6.00%	0.03	0.375	5.150	140.100	140.354	0.25	0.19
14-Mar	MTNL	140	137.950	6.00%	0.03	4.100	5.225	143.175	144.079	0.90	0.66
31-Mar	MTNL	115	114.750	6.00%	0.03	0.925	1.075	115.825	115.908	0.08	0.07
								Average Change in %			0.32
14-Jan	NATIONALUM	170	170.675	6.00%	0.5	6.875	6.450	177.125	176.451	0.67	0.40
27-Jan	NATIONALUM	170	174.525	6.00%	0.03	4.975	0.175	174.700	174.950	0.25	0.14
14-Feb	NATIONALUM	180	181.550	6.00%	0.5	6.800	3.875	185.425	186.351	0.93	0.51

24-Feb	NATIONALUM	175	175.300	6.00%	0.03	1.625	1.250	176.550	176.599	0.05	0.03
14-Mar	NATIONALUM	180	184.350	6.00%	0.5	9.700	2.550	186.900	189.251	2.35	1.28
31-Mar	NATIONALUM	170	173.700	6.00%	1	9.450	6.250	179.950	178.602	1.35	0.78
								Average Change in %			0.52
14-Jan	NTPC	80	81.600	6.00%	0.5	3.775	1.875	83.475	83.575	0.10	0.12
27-Jan	NTPC	80	80.600	6.00%	0.03	0.975	0.225	80.825	80.963	0.14	0.17
14-Feb	NTPC	90	92.375	6.00%	0.5	3.750	1.225	93.600	93.525	0.07	0.08
24-Feb	NTPC	95	94.425	6.00%	0.03	0.525	0.975	95.400	95.511	0.11	0.12
14-Mar	NTPC	95	93.125	6.00%	0.5	1.650	3.550	96.675	96.413	0.26	0.28
31-Mar	NTPC	85	85.675	6.00%	0.03	0.900	0.325	86.000	85.887	0.11	0.13
								Average Change in %			0.15
14-Jan	ONGC	800	789.950	6.00%	0.5	13.350	32.300	822.250	811.352	10.90	1.38
27-Jan	ONGC	780	791.925	6.00%	0.03	12.625	1.325	793.250	792.508	0.74	0.09
14-Feb	ONGC	820	826.125	6.00%	0.5	19.375	7.800	833.925	837.328	3.40	0.41
24-Feb	ONGC	820	818.075	6.00%	0.03	2.450	4.050	822.125	822.327	0.20	0.02
14-Mar	ONGC	920	918.750	6.00%	0.5	21.225	20.250	939.000	938.928	0.07	0.01
31-Mar	ONGC	860	881.100	6.00%	0.03	15.450	1.650	882.750	875.321	7.43	0.84
								Average Change in %			0.44
14-Jan	ORIENTBANK	300	308.275	6.00%	0.5	13.025	6.700	314.975	312.276	2.70	0.88
26-Jan	ORIENTBANK	310	311.675	6.00%	0.06	4.650	4.000	315.675	314.557	1.12	0.36
15-Feb	ORIENTBANK	310	309.525	6.00%	0.5	7.625	5.950	315.475	316.851	1.38	0.44
24-Feb	ORIENTBANK	310	308.250	6.00%	0.03	0.500	14.500	322.750	310.454	12.30	3.99
14-Mar	ORIENTBANK	360	369.125	6.00%	0.5	18.250	7.775	376.900	377.351	0.45	0.12
31-Mar	ORIENTBANK	320	311.700	6.00%	1	15.500	17.350	329.050	333.904	4.85	1.56

								Average Change in %			1.22
14-Jan	PNB	370	374.075	6.00%	0.5	12.250	15.000	389.075	381.326	7.75	2.07
25-Jan	PNB	360	358.675	6.00%	0.09	5.250	3.000	361.675	365.088	3.41	0.95
14-Feb	PNB	400	422.775	6.00%	0.5	20.500	3.100	425.875	419.501	6.37	1.51
24-Feb	PNB	420	433.450	6.00%	0.03	13.500	0.400	433.850	433.437	0.41	0.10
14-Mar	PNB	450	473.950	6.00%	0.5	31.975	14.000	487.950	480.851	7.10	1.50
31-Mar	PNB	400	397.075	6.00%	0.03	2.500	4.350	401.425	402.440	1.02	0.26
								Average Change in %			1.06
14-Jan	POLARIS	140	141.550	6.00%	0.5	7.400	5.750	147.300	147.050	0.25	0.18
27-Jan	POLARIS	130	131.050	6.00%	0.03	1.825	0.775	131.825	131.806	0.02	0.01
14-Feb	POLARIS	130	137.200	6.00%	0.5	8.600	1.550	138.750	138.275	0.47	0.35
24-Feb	POLARIS	130	130.875	6.00%	0.03	1.825	0.625	131.500	131.806	0.31	0.23
14-Mar	POLARIS	130	129.200	6.00%	0.5	4.325	4.150	133.350	134.000	0.65	0.50
31-Mar	POLARIS	110	108.200	6.00%	1	8.000	6.275	114.475	117.451	2.98	2.75
								Average Change in %			0.67
17-Jan	RANBAXY	1050	1031.050	6.00%	0.5	21.450	49.000	1080.050	1068.828	11.22	1.09
27-Jan	RANBAXY	1050	1012.225	6.00%	0.03	9.750	6.475	1018.700	1059.593	40.89	4.04
15-Feb	RANBAXY	1080	1058.025	6.00%	0.5	13.500	20.000	1078.025	1090.803	12.78	1.21
24-Feb	RANBAXY	1050	1008.425	6.00%	0.03	1.150	49.475	1057.900	1050.993	6.91	0.68
14-Mar	RANBAXY	1040	1061.250	6.00%	0.5	37.125	14.200	1075.450	1074.528	0.92	0.09
31-Mar	RANBAXY	1020	1020.250	6.00%	0.03	4.800	10.500	1030.750	1024.647	6.10	0.60
								Average Change in %			1.25
14-Jan	RELIANCE	520	517.375	6.00%	0.5	13.025	13.925	531.300	531.727	0.43	0.08
27-Jan	RELIANCE	510	508.350	6.00%	0.03	3.625	3.525	511.875	513.549	1.67	0.33

14-Feb	RELIANCE	540	546.050	6.00%	0.5	17.500	7.750	553.800	556.152	2.35	0.43
24-Feb	RELIANCE	540	549.550	6.00%	0.03	9.500	0.175	549.725	549.419	0.31	0.06
14-Mar	RELIANCE	600	583.975	6.00%		8.500	23.100	607.075	608.500	1.42	0.24
31-Mar	RELIANCE	560	548.475	6.00%	0.03	0.925	11.600	560.075	560.841	0.77	0.14
								Average Change in %			0.22
14-Jan	SATYAMCOMP	370	369.000	6.00%	0.5	11.000	15.150	384.150	380.076	4.07	1.10
27-Jan	SATYAMCOMP	380	388.025	6.00%	0.03	7.600	1.475	389.500	387.543	1.96	0.50
14-Feb	SATYAMCOMP	420	419.875	6.00%	0.5	9.500	7.450	427.325	428.451	1.13	0.27
24-Feb	SATYAMCOMP	400	396.900	6.00%	0.03	1.000	3.800	400.700	400.940	0.24	0.06
14-Mar	SATYAMCOMP	410	413.575	6.00%	0.5	13.900	7.625	421.200	422.876	1.68	0.41
31-Mar	SATYAMCOMP	410	408.500	6.00%	0.03	2.300	2.775	411.275	412.239	0.96	0.24
								Average Change in %			0.43
14-Jan	SBIN	600	587.150	6.00%	0.5	12.775	24.500	611.650	611.277	0.37	0.06
27-Jan	SBIN	580	583.550	6.00%	0.03	4.775	2.025	585.575	584.688	0.89	0.15
14-Feb	SBIN	680	666.350	6.00%	0.5	9.325	17.000	683.350	687.627	4.28	0.64
24-Feb	SBIN	680	685.875	6.00%	0.03	8.500	2.525	688.400	688.398	0.00	0.00
14-Mar	SBIN	740	737.325	6.00%	0.5	18.500	15.825	753.150	756.652	3.50	0.48
31-Mar	SBIN	660	659.825	6.00%	0.03	5.275	3.200	663.025	665.176	2.15	0.33
								Average Change in %			0.28
17-Jan	SCI	150	149.900	6.00%	0.5	4.750	7.000	156.900	154.375	2.52	1.68
27-Jan	SCI	155	154.825	6.00%	0.03	1.775	4.200	159.025	156.752	2.27	1.47
14-Feb	SCI	170	171.275	6.00%	0.5	6.000	4.300	175.575	175.576	0.00	0.00
24-Feb	SCI	160	162.025	6.00%	0.03	2.175	0.450	162.475	162.151	0.32	0.20
14-Mar	SCI	170	170.325	6.00%	0.5	5.850	5.025	175.350	175.426	0.08	0.04

31-Mar	SCI	150	150.800	6.00%	1	9.500	5.775	156.575	158.752	2.18	1.44
								Average Change in %			0.81
14-Jan	SYNDIBANK	60	56.450	6.00%	0.5	2.625	7.125	63.575	62.475	1.10	1.95
27-Jan	SYNDIBANK	50	49.575	6.00%	0.03	0.875	0.925	50.500	50.868	0.37	0.74
14-Feb	SYNDIBANK	55	57.525	6.00%	0.5	3.925	1.675	59.200	58.788	0.41	0.72
24-Feb	SYNDIBANK	55	56.550	6.00%	0.03	1.400	0.150	56.700	56.392	0.31	0.55
14-Mar	SYNDIBANK	60	62.725	6.00%	0.5	4.950	1.500	64.225	64.800	0.58	0.92
31-Mar	SYNDIBANK	55	54.250	6.00%	0.03	0.425	0.950	55.200	55.417	0.22	0.40
								Average Change in %			0.88
14-Jan	TATAMOTORS	480	484.000	6.00%	0.5	16.000	13.700	497.700	494.801	2.90	0.60
27-Jan	TATAMOTORS	480	481.225	6.00%	0.03	3.150	2.800	484.025	483.078	0.95	0.20
14-Feb	TATAMOTORS	500	508.150	6.00%	0.5	17.250	6.250	514.400	516.002	1.60	0.32
24-Feb	TATAMOTORS	480	475.925	6.00%	0.03	1.775	5.325	481.250	481.703	0.45	0.10
14-Mar	TATAMOTORS	480	464.900	6.00%	0.5	7.275	18.000	482.900	486.076	3.18	0.68
31-Mar	TATAMOTORS	410	415.150	6.00%	0.03	5.150	1.575	416.725	415.089	1.64	0.39
								Average Change in %			0.38
14-Jan	TATAPOWER	350	349.850	6.00%	0.5	10.575	13.950	363.800	359.701	4.10	1.17
27-Jan	TATAPOWER	350	351.500	6.00%	0.03	3.900	1.025	352.525	353.848	1.32	0.38
14-Feb	TATAPOWER	400	410.100	6.00%	0.5	14.425	4.725	414.825	413.426	1.40	0.34
24-Feb	TATAPOWER	410	405.800	6.00%	0.03	1.425	5.025	410.825	411.364	0.54	0.13
14-Mar	TATAPOWER	400	391.075	6.00%	0.5	6.750	13.975	405.050	405.751	0.70	0.18
31-Mar	TATAPOWER	360	360.475	6.00%	0.03	3.950	1.500	361.975	363.896	1.92	0.53
								Average Change in %			0.46
14-Jan	TATATEA	480	472.900	6.00%	0.5	11.700	14.000	486.900	490.501	3.60	0.76

27-Jan	TATATEA	480	479.800	6.00%	0.03	3.200	3.475	483.275	483.128	0.15	0.03
14-Feb	TATATEA	560	554.500	6.00%	0.5	10.300	13.000	567.500	568.902	1.40	0.25
24-Feb	TATATEA	500	538.975	6.00%	0.03	31.000	0.100	539.075	530.925	8.15	1.51
14-Mar	TATATEA	560	540.075	6.00%		5.050	23.000	563.075	565.050	1.97	0.37
31-Mar	TATATEA	560	523.700	6.00%	0.03	1.100	2.500	526.200	561.016	34.82	6.65
								Average Change in %			1.60
14-Jan	TCS	1320	1297.450	6.00%	0.5	26.950	44.850	1342.300	1343.654	1.35	0.10
27-Jan	TCS	1260	1244.550	6.00%	1	36.025	39.275	1283.825	1289.741	5.92	0.48
14-Feb	TCS	1410	1404.525	6.00%	0.5	21.275	27.025	1431.550	1427.754	3.80	0.27
24-Feb	TCS	1380	1378.550	6.00%	0.03	7.500	6.925	1385.475	1387.293	1.82	0.13
14-Mar	TCS	1440	1440.000	6.00%	0.5	26.750	21.900	1461.900	1463.154	1.25	0.09
31-Mar	TCS	1410	1421.175	6.00%	0.03	11.000	6.500	1427.675	1420.789	6.89	0.48
								Average Change in %			2.60
14-Jan	TISCO	350	352.725	6.00%	0.5	13.200	8.950	361.675	362.326	0.65	0.18
27-Jan	TISCO	370	373.475	6.00%	0.03	4.075	1.025	374.500	374.020	0.48	0.13
14-Feb	TISCO	400	404.375	6.00%	0.5	13.175	5.775	410.150	412.176	2.03	0.50
24-Feb	TISCO	410	414.225	6.00%	0.03	4.375	0.350	414.575	414.314	0.26	0.06
14-Mar	TISCO	440	441.400	6.00%	0.5	11.950	8.275	449.675	450.851	1.18	0.27
31-Mar	TISCO	400	401.250	6.00%	0.03	2.950	2.075	403.325	402.890	0.43	0.11
								Average Change in %			0.10
14-Jan	UNIONBANK	100	103.750	6.00%	0.5	7.600	3.750	107.500	107.350	0.15	0.14
27-Jan	UNIONBANK	105	107.650	6.00%	0.03	3.075	0.700	108.350	108.059	0.29	0.27
14-Feb	UNIONBANK	115	117.000	6.00%	0.5	4.150	4.075	121.075	118.863	2.21	1.89
24-Feb	UNIONBANK	115	113.475	6.00%	0.03	0.550	1.750	115.225	115.533	0.31	0.27

14-Mar	UNIONBANK	130	129.375	6.00%	0.5	5.075	5.600	134.975	134.750	0.22	0.17
31-Mar	UNIONBANK	110	113.200	6.00%	0.03	3.550	0.775	113.975	113.534	0.44	0.39
								Average Change in %			0.52
17-Jan	WIPRO	680	666.900	6.00%	0.5	13.025	21.625	688.525	691.327	2.80	0.42
27-Jan	WIPRO	680	669.500	6.00%	0.03	4.250	8.500	678.000	684.148	6.15	0.92
14-Feb	WIPRO	700	711.500	6.00%	0.5	22.050	6.500	718.000	720.302	2.30	0.32
24-Feb	WIPRO	680	680.000	6.00%	0.03	1.650	1.500	681.500	681.548	0.05	0.01
14-Mar	WIPRO	700	696.700	6.00%	0.5	15.525	18.750	715.450	713.777	1.67	0.24
31-Mar	WIPRO	640	663.000	6.00%	1	34.300	13.275	676.275	671.108	5.17	0.78
								Average Change in %			0.45

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