

## **A Study on back testing of Bull Call Debit spread strategy on Nifty Index Options.**

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**Abstract:** - *Poverty eradication cannot be done by distribution of existing wealth, but by creation of new wealth- Narayan Murthy.*

Stock markets have always been looked upon as speculators paradise and never as a source of wealth creation. To add to the agony, Derivatives have only increased the pain of the retail investors and kept them away from markets. This study is an attempt to prove that wealth creation can be done with the help of Derivatives.

Nifty Index options are the most widely traded instrument in the Indian Capital markets. However these instruments have been perceived as a leveraged speculative tool rather than a hedging instrument. Speculators are very important players in the capital markets. However naked speculation on asset prices, have proved to be devastating. Options are derivative instruments which provide much more flexibility for speculation. Different options can be combined to give a structured payoff which is also called a strategy. Every strategy begins with a view on the market. However option trading allows a speculator to take multiple views on the market, and hence there are numerous option strategies available for trading.

The next question that arises is, whether there is any strategy that will yield profits without having a view on the markets. The answer to this can be obtained by back testing.

The objective of this study is to back test the Bull Call debit spread strategy for a time period long enough to cover the various practical scenarios of the capital market. Hence, a period of 6years is taken into consideration and a algorithmic method of back testing is used. The study does not look at any other factors such as market sentiments, the global scenarios, macro or micro economics, etc. The study focuses only on the price of the Nifty index. The open price of Nifty index futures for a particular expiry month is the start point and the close price at the expiry ie. The settlement price is considered to be the end point. The maximum cumulative loss over the period is considered the maximum investment and the cumulative profit at the end of 100 months is considered as the return.

The significance of the study is that it gives importance to simplicity and practicality for the retail investor. A retail investor can simply execute the strategy without any complex calculations and reap results after a considerable period.

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### **I. INTRODUCTION:**

The concept of Derivatives as a trade able instrument is still in its nascent stages in India. Moreover, before people actually understand the meaning of derivatives, they have been termed as "Derivatives are weapons of mass destruction"- Warren Buffet. Derivatives are still regarded as complex instruments which are understood only by few people in the industry. However, the truth is that derivatives are simple contracts and easy to understand. The complexity comes in deriving a fair price for these derivative instruments. For retail participants, pricing should never be an issue and therefore they do not need to get into the complexities of fair price. They should always have a view on the underlying asset price and trade derivatives at the current market price. With the advent of algorithmic trading, which will trade for risk free arbitrages, the retail participants can safely assume that the current price is the fair price at this point in time.

Various studies have been done on Derivatives, specifically Options to understand the pricing of these instruments. However much more needs to be done in this field. Most of the research has been on the theoretical aspect of modeling and mispricing, and very little research work is done on practically employing strategies and its implementation for profit from a retail investor's point of view.

Derivatives such as options basically were designed as hedging tools, which eventually have evolved to become the best speculation tools as the losses are limited in this instrument, whereas the profits can be potentially unlimited.

An option is a tradable instrument which is a contract in which the buyer of the option has the control and the right to exercise the contract if it is in his favor, or deny obliging the contract if the prices are not in his favor.

To get this right, the option buyer pays a cost which is also called the premium. A trader need not hold his position till the expiry; he can sell the contract at the prevailing premium.

Options traders can take multiple views on the market by trading a combination of options. These combinations are called strategies. These strategies have a structured payoff at the end of the expiry and hence it is easy to understand the risks involved before initiating a trade. With some underlying assumptions or views on the market, one can make profits in the long run.

Any combination of buy or sell of call or put can result in a structured payoff at the end of the expiry. Based on this, a trader can take multiple views on the price of the asset. For instance, if a trader is bullish, he can buy call option or sell put option. The choice of which to choose depends on further specifying the view. If the trader is bullish in the sense he thinks the price of the asset will increase above the breakeven point which is arrived at by strike + premium, he will buy a call option of that strike price. If the trader has a view that the price of the asset will stay anywhere above a particular strike price, then he can sell the put option of that particular strike price. Thus, in case a trader sells a put of a lower strike price than the current market price, and the price of the asset goes down but still manages to remain above the strike price on the expiry day, the put option seller will make profit. The decision to buy call or sell put is also dependent on the risk the trader wishes to take, in case his view goes wrong. In selling a put, there can be potentially unlimited loss, whereas, in buying a call option, the loss is limited to the premium paid.

In a similar way, a trader can be bearish by buying a put or selling a call, depending on his specific view.

An options trader can take few more views. He can take a view such that, he doesn't know in which direction the price of the asset will go, but he knows that the price will move fast in any one direction, due to an upcoming event after which the price of the asset will see a big move. For such a view, the trader can buy a call and buy a put. If the market sees a big move upside, the call can make potentially unlimited profit, whereas the put will make limited loss to the extent of the premium paid. If the asset price crashes down, the put will make huge profit and the call will make limited loss to the extent of the premium paid. Thus, even when a trader cannot take a directional view he can create a strategy by combining the payoffs of buy call and buy put. This strategy is called a Straddle (if the strike price of call and put is the same) and Strangle (if strike prices of both options are different).

#### **Straddle:**

A Straddle is a volatility strategy and is used when the stock price / index is expected to show large movements. With Straddles, the investor is direction neutral. All that he is looking out for is the asset price to break out exponentially in either direction.

#### **Strangle:**

A Strangle is a slight modification to the Straddle to make it cheaper to execute. This strategy involves the simultaneous buying of a slightly out-of-the-money (OTM) put and a slightly out-of-the-money (OTM) call of the same underlying stock / index and expiration date. Here again the investor is directional neutral but is looking for an increased volatility in the stock / index and the prices moving significantly in either direction. Since OTM options are purchased for both Calls and Puts it makes the cost of executing a Strangle cheaper as compared to a Straddle. Since the initial cost of a Strangle is cheaper than a Straddle, the returns could potentially be higher. However, for a Strangle to make money it would require greater movement on the upside or downside for the stock / index than it would for a Straddle. As with a Straddle, the strategy has a limited downside (i.e. the Call and the Put premium) and unlimited upside potential.

#### **Short Strangle:**

If a trader does not know which direction the price of the asset will move, but is sure that it will fluctuate in between a band of prices, he can sell a strangle i.e. call of the strike price above the upper band and sell a put of the strike price below the lower band. If the asset price remains between the bands, the trader can profit from the premium received from selling options.

Buying a simple call or put option can be a costly affair. Even though, the price of the premium is just a small percentage of the whole asset value, it is still high enough compared to the price move that asset can make in the given time period. This does not mean that the price of the option is so high that one

cannot make any profits out of buying options. However, it is difficult to justify the high price of the option at the time of taking a view. In that case, another strategy can be applied.

**Bull Call Spread:**

For a bullish view, a trader can make a bull call spread, in which he buys a call at a strike price near to the current value of the asset, also called the At the Money call, and sells a call of a higher strike price, also known as Out of Money call. By buying an ATM call, the trader will start making profit as the price of the asset goes up. However, he will start losing after the price of the asset goes above the strike price of the sold option. Thus one cannot achieve unlimited profits but is sure to get some profit if the price of the asset goes up. The trader has given premium to buy the ATM call and received premium in selling of the OTM call. Hence his total outflow of cash becomes less. Now, if the price of the asset goes down, both the call options will become zero. Hence the trader will lose the initial cash outflow only. Thus this is a strategy in which there is limited loss and limited profit. This strategy usually gives a very good reward to risk ratio. This is the best strategy known for retail investors.

**Bear Put Spread:**

Similarly for bearish view, a trader can make a bear put spread in which he buys an ATM put and sells a put of the lower strike price which is OTM put. The trader will make limited profit if the price of the asset goes down and makes a limited loss if the price of the asset goes up.

**Calendar Spreads:**

Another combination that an options trader can create is Calendar Spreads. In this strategy, one buys an option of a particular expiry period and sells the same option of another expiry period. This strategy is useful, when the trader does not have a view on the direction of the market, but has a view on the intensity of the movement of the market in a short term. This strategy is based entirely on the time value decay of an option.

**Back testing of strategies:**

Strategies or combination of option trades, which are done once and squared off on expiry are called static strategies. Strategies begin with a view on the market. Options trading allow a trader to take multiple views and hence there are various static strategies. Based on a view on all three factors, a strategy involving combination of options can be formed. The research aims to test at least 4 basic static strategies starting on a particular fixed day of the expiry and squaring off on the closing price of the last day of the expiry. The objective of the back testing will be to know if there is any static strategy which can yield profits in every month. Since the strategies are static, they can be back tested from the secondary data available from the Bhav copies of past trading days, available from NSE.

## **II. LITERATURE REVIEW**

Capital markets have been the fastest in adopting the technological advancements. This has allowed the presence of a huge database of secondary data. Since the focus of the research is on Nifty Index options, emphasis has been given to research studies in the Indian context. A lot of research has been carried out in the field of derivatives and the epicenter has always been on development of a model based on mathematical finance in the pricing of these derivative instruments, with the pioneers being the famous Fischer Black and Myron Scholes who published their paper “The pricing of options and corporate liabilities” in the Journal of political economy in 1973. Robert Merton was the first to publish a paper expanding the mathematical understanding of the options pricing model and named the model as Black and Scholes option pricing model. A lot of research has been carried out in the field of pricing the derivative securities especially options, however, despite this, very less efforts have been put in implementing the research to create a successful trading strategy for the common man. This could be attributed to the fact that options mathematics have been based mostly on the Black and Scholes model, and all development and research have been revolving around this starting point. The mathematics in the Black and Scholes model gave means to actually price options for the first time and thus allowed the development of the options market. However, the theory has its own assumptions in describing how options prices are determined in the market place. Many of the shortcomings were recognized from the

beginning; however Black and Scholes model is still dominant because of lack of any other theory and the fact that this is the only model markets still use.

A lot of research work has been carried out on the pricing of options and many shortfalls in the Black and Scholes model has been addressed. Mathematical finance has worked and succeeded to some extent on relaxing the assumptions of Black and Scholes model (Cook, 2006). However, the focus remains on the theoretical pricing of options and not looking at the overall dynamics of the options markets. The biggest shortfall of this theory is that it assumes the market to be a one dimensional entity and not multidimensional as it consists many buyers and sellers. The theory is built around buyers and sellers interacting with the market which is modeled as non-thinking, one dimensional entity governed solely by chance. Based on this model a price is calculated and a participant can choose to react by buying or selling the option. In reality, however, the prices of options are not based on some theoretical known price, but rather prices are determined by the risk aversion/needs of the participants, (Cook, 2006).

According to the Black and Scholes (1973) option pricing model, the option price is determined only by five input factors. Bollen and Whaley (2004) find evidence suggesting that net buying pressure affects options' implied volatility, which suggests that option prices are affected by demand. According to their research, there are more index puts traded than index calls. However, the opposite is observed for individual stock options. Their findings suggest that the index put buying pressure drives the change in volatility of index options, while the stock call buying pressure drives the change in volatility of stock options. Intuitively, the demand for calls and puts would be different in rising and falling markets. When the market becomes more volatile, the increasing volatility results in higher prices for both calls and puts.

Debashish and Mitra(2008) examined the lead and lag relationship between the cash markets and derivatives markets and concluded that derivatives markets led the cash markets. However other studies like Pradhan and Bhatt (2009), Johansen (1988), Basdas (2009) have observed that in many countries spot markets lead the derivatives markets. This ambiguity of which market leads the other, has made it very difficult for retail traders to take view and trade on prices.

Trennepohl and Dukes (1981) is among the earliest empirical research to test option writing and buying return. Merton, Scholes and Gladstein (1978) concluded that certain option strategies like fully covered writing strategy have been successful in changing the patterns of returns and are not reproducible by any simple strategy of combining stocks with fixed income securities. Covered strategy is a combination of the stock with its respective option. The strategy can give good returns in the long run compared to the traditional approach of long term investing in stocks.

Green and Figlewski (1999) examine the forecast of stock volatility and return of option writing. They find that at-the-money stock index calls have a high probability of producing large losses, with larger losses for longer time to maturity. Writing options with a delta hedge reduces the writer's risk exposure compared to naked writing, but risk is still considerable. The practice of option writing has increased steadily in recent years, and some practitioners apply relatively complicated hedging techniques to manage writing risks (Collins; 2007).

Research done by Bondarenko (2003), Jones (2006), and Coval and Shumway (2001), examine the returns of strategies that involve puts and calls. They report that strategies involving put options offer good returns and that put options are more expensive than calls of comparable distance from the money. Yet, little research has been done to explore the returns from combinations, straddles, and collars.

Maheshwari (2013) concludes that market participants majorly retail participants may not be experiencing efficient markets, due to lack of education, liquidity and transaction charges. This is true in the current scenario as retail traders and investors view options as a highly leveraged instrument apt for speculating. However speculation does not always work and these investors shy away from derivatives markets once they burn their hands with leveraged losses.

Derivatives are highly technical and based on financial/mathematical fundamentals. They are lacking on the part of understanding the issues of common investors as investors still are not familiar with derivatives and consider them as complex instruments. For example, Fischer and Jordan (1995) highlighted the deep study of Futures and Options, their types, models, pricing and valuation. Prof. J.R. Varma (1998) recommended risk containment measures for derivatives trading in India. There have been few research papers based on retail investor awareness and how they perceive derivative products, like N.Ramanjaneyalu and Dr. A.P. Hosmani (2010) highlighted the need for awareness among retail investors. Asani Sarkar (2006) has done the analysis of various derivatives products available for retail

investors. Rohini Singh (2009) discussed the advantages/disadvantages of using derivatives. Anjali Chokshi (2010) studied the investor's perception regarding Derivative market in India. Ashutosh Vashistha and Satish Kumar (2010) proposed that innovation of derivatives have redefined and revolutionized the landscape

### **III. RESEARCH METHODOLOGY**

The study will use secondary data on Nifty index stock options and check the results of Bull Call Spread strategy. The basic assumption in the stock markets is that the markets will move. Usually in the long run all participants are bullish on the prices. Hence assuming that the index has a tendency to go up in the long run, we test only bull call spread strategy. The strategy has a neutral probability of success. However it is accompanied with leverage and a favorable risk to reward ratio. The study thus aims to see the results of initiating bull call spreads every month and closing it at the expiry for the past 6 years. Secondary data of futures and options prices are available on the website of [www.nseindia.com](http://www.nseindia.com)

At the start of every current expiry month, a bull call spread strategy will be initiated and it will be squared off at the expiry price. The futures price on the opening of the current month will be considered as the spot price to determine the At the money (ATM) strike price. The combination in the bull call spread would be to buy an ATM call and sell 100 points above strike price call. Usually it is seen, that the debit amount and the strike price difference has a relation. It is seen that the debit amount is usually 40 % of the strike price difference. . In this case the strike price difference is 100 points; hence the net debit is approximately Rs. 40. The net debit, is not always the same and tend to play in a very narrow band from Rs.38 to 45 depending on the Implied Volatility skew. If we assume the spread to be of Rs. 40, then the strategy makes a profit of Rs 60 if the market remains above 100 points from the start point strike price, at expiry. The maximum loss in this strategy is the initial net debit. With the help of back testing method, the study will check how many risk months have occurred in the last 6 years.

To determine the ATM, the opening future price is taken as the reference point. If the future price is in the money from a strike price by Rs. 30, then that strike price is considered as Atm. If the future is more than 31 points in the money, the nearest upper, out of the money strike is considered as the Atm strike. The investment in the strategy is taken as the maximum amount of the cumulative net debit in the entire 6 years. The margins that are needed to execute the trade are not considered as the investment, since margin requirements are just deposits and can be paid in collateral or fixed deposits. The net debit has to be paid in cash and hence considered as investment.

### **IV. OBJECTIVE OF THE STUDY**

The main objective of this research study is to prove that wealth creation can be done by a disciplined approach to option strategies and with a long term time frame. The study will give retail investors a chance to profit from options trading. The study uses basic tools which retail investors can understand, rather than using complex models, which may derive similar information. The study will do a research on actual market prices and devise a strategy which will be implementable by retail participants. Options' trading is perceived as complex and is considered as a tool for only professionals. This study will focus on simplicity of trading option strategies.

### **V. SIGNIFICANCE OF THE STUDY:**

The study is very significant for retail investors who cannot devote their full time to markets, but would like to invest in passive strategies to create wealth. Market participants who have tried trading in options find it very difficult to understand the factors affecting the option prices. They find the behavior of option prices very complex and therefore avoid trading these instruments. This study will try to destroy the myth that Derivatives are weapons of mass destruction..

### **VI. ASSUMPTIONS AND LIMITATIONS OF THE RESEARCH**

- The research is a secondary data research based on the data from January 2008 to December 2014 available on [www.nseindia.com](http://www.nseindia.com)
- The spread debit is considered as the price difference between the buy and the sell call prices at the open price at the start of the expiry.
- 6 years data is enough to cover most of the practical scenarios that happen in capital markets.

- The transaction costs according to present scenario including brokerage are not considered. However, since the strategy will have only 4 transactions each month, these costs can safely be ignored.
- Since the bhav copies available on nseindia.com register the first traded price of the contract as the open price, and all contracts may not have traded simultaneously, there remains a chance of price discrepancy. However, since the options under consideration are quite liquid enough, these discrepancies can be safely ignored.

## **VII. BACK TESTING DATA AND ANALYSIS**

Nifty options are considered in the study as they are most widely traded and the most liquid. Every expiry month is tabulated based on its start date. The open is the open price on the last Friday of the previous calendar month which also is the starting of the new expiry. Since the strategy has to initiate at the ATM, and it is difficult to find the market trading exactly ATM, some rounding off is required. If the future price is Rs.30 ITM then the lower strike is considered. If the future is more than 30 points ITM, then the immediate next OTM is considered as the initiating point. The close is the settlement price on the date of expiry. Since this strategy caps the movement at 100 points, any upside movement above 100 points will yield a profit of 100 - spread amount. The breakeven point is the spread amount on the upside of the buy strike price. The maximum loss if the market moves down is the amount of the debit spread. The Analysis is shown in table 1.

## **VIII. ANALYSIS AND FINDINGS**

This strategy attracts margins since there are short options. However, the margin investments are not considered as investments as margins are allowed to be in the form of any collateral. Hence only the cash outflow is considered as the new investment.

Out of the 6 years data (Table 1.), in the back testing experiment, it is observed that

No. of profit months:	38
No. of loss months:	34
Maximum absolute loss in a month:	Rs. 51.75
Maximum cumulative loss at any point:	Rs. 89
Maximum Investment:	Rs. 89
Cumulative Profit at the end of period:	Rs. 554
Net CAGR:	35.60%

Looking at the data, one can observe that the market has behaved in quite random manner. In some months there had been extreme movements and in some there was no movement at all. The direction of the market has been up in 38 months and down in 34 months from its starting point of the expiry period. However, due to the payoff return or risk vs return of the strategy, and the leverage obtained by trading options, the returns are considered excellent.

## **IX. CONCLUSION:**

- ✓ The Bull call debit spread strategy is a very basic and easy to understand and implement options strategy.
- ✓ This strategy has proved to yield profits in the long run.
- ✓ The reason for the profits is the extent of loss when one goes wrong compared to the profit when one goes right.
- ✓ Since options trading provide a huge leverage in trading, the ROI becomes very attractive.
- ✓ Since the maximum profits and maximum losses are capped, the retail investor can take informed decisions.
- ✓ The study is done with a mechanical approach and still the yield is quite high. If human aspects such as intellectual analysis, news flows, exits at the right time before expiry, etc. are used, the net profit can be considerably increased.

## **X. SCOPE AND POLICY IMPLICATIONS:**

- This study can be used by brokers, exchanges and regulators to instill confidence among retail participants who are shy of exploring derivatives markets.
- Increased retail participation will result in much more mature markets and price discovery across all asset classes will improve.
- The study will also discourage unnecessary speculation and abuse of the excessive leverage inbuilt in derivative instruments like options.

**XI. APPENDIX**

Table 1:

Date	Open	Buy Call Buy Strike price	Price	Sell Call Sell Strike price	Price	Spread	Expiry Date Price	Diff of Ex Close and open strk	net P/l	Cumm. Profit	
26-Dec-08	2 879.00	2900	140	3000	93.2	46.8	2 823.70	-76.30	(46.80)	-46.8	
30-Jan-09	2 861.00	2900	111.8	3000	70	41.8	2 785.65	-114.35	(41.80)	-88.6	
27-Feb-09	2 727.00	2700	128	2800	76.4	51.6	3 082.70	382.70	48.40	-40.2	
27-Mar-09	3 127.00	3100	145	3200	93.6	51.4	3 473.90	373.90	48.60	8.4	
04-May-09	3 652.35	3700	156	3800	111	45	4 336.95	636.95	55.00	63.4	
29-May-09	4 444.20	4500	150	4600	110.9	39.1	4 241.80	-258.20	(39.10)	24.3	
26-Jun-09	4 384.00	4400	188.3	4500	143.2	45.1	4 571.15	171.15	54.90	79.2	
31-Jul-09	4 654.00	4700	151.2	4800	109.85	41.35	4 688.00	-12.00	(41.35)	37.85	
28-Aug-09	4 731.00	4800	126.85	4900	87	39.85	4 986.50	186.50	60.15	98	
25-Sep-09	4 960.00	5000	130	5100	86.8	43.2	4 750.20	-249.80	(43.20)	54.8	
30-Oct-09	4 695.90	4700	133.75	4800	85.55	48.2	5 005.30	305.30	51.80	106.6	
27-Nov-09	4 953.00	5000	134	5100	92	42	5 202.30	202.30	58.00	164.6	
04-Jan-10	5 243.00	5300	89.2	5400	50	39.2	4 867.20	-432.80	(39.20)	125.4	164.6
29-Jan-10	4 886.75	4900	121.55	5000	77.5	44.05	4 860.10	-39.90	(44.05)	81.35	
26-Feb-10	4 935.95	5000	88	5100	49.6	38.4	5 260.65	260.65	61.60	142.95	
26-Mar-10	5 292.00	5300	99	5400	54.35	44.65	5 254.10	-45.90	(44.65)	98.3	
30-Apr-10	5 260.50	5300	79.75	5400	39.4	40.35	5 004.00	-296.00	(40.35)	57.95	
28-May-10	5 037.00	5100	90.85	5200	50.55	40.3	5 320.55	220.55	59.70	117.65	
25-Jun-10	5 286.30	5300	109.35	5400	61.35	48	5 408.75	108.75	52.00	169.65	
30-Jul-10	5 371.00	5400	81	5500	39	42	5 477.70	77.70	35.70	205.35	
27-Aug-10	5 404.00	5400	114.8	5500	63.6	51.2	6 030.00	630.00	48.80	254.15	
01-Oct-10	6 176.00	6200	118.55	6300	75.15	43.4	5 987.70	-212.30	(43.40)	210.75	
29-Oct-10	6 040.00	6100	99	6200	61	38	5 800.00	-300.00	(38.00)	172.75	
26-Nov-10	5 772.35	5800	127	5900	83.9	43.1	6 102.95	302.95	56.90	229.65	
31-Dec-10	6 164.20	6200	79	6300	41.55	37.45	5 604.20	-595.80	(37.45)	192.2	229.65
28-Jan-11	5 544.50	5600	98.75	5700	61.05	37.7	5 262.90	-337.10	(37.70)	154.5	
25-Feb-11	5 328.00	5400	128.95	5500	86.05	42.9	5 833.75	433.75	57.10	211.6	
01-Apr-11	5 865.00	5900	93.7	6000	53.8	39.9	5 785.20	-114.80	(39.90)	171.7	
29-Apr-11	5 752.35	5800	86.6	5900	49.55	37.05	5 412.55	-387.45	(37.05)	134.65	
27-May-11	5 472.00	5500	92	5600	51.95	40.05	5 647.80	147.80	59.95	194.6	
01-Jul-11	5 632.85	5700	71	5800	38.9	32.1	5 488.25	-211.75	(32.10)	162.5	
29-Jul-11	5 490.55	5500	105	5600	63	42	4 839.90	-660.10	(42.00)	120.5	
26-Aug-11	4 747.60	4800	137	4900	91.25	45.75	5 016.40	216.40	54.25	174.75	
30-Sep-11	4 931.00	5000	115	5100	72.1	42.9	5 192.00	192.00	57.10	231.85	
26-Oct-11	5 233.00	5300	85	5400	46.2	38.8	4 757.00	-543.00	(38.80)	193.05	
25-Nov-11	4 707.30	4700	158	4800	106.25	51.75	4 646.30	-53.70	(51.75)	141.3	
30-Dec-11	4 626.00	4600	137	4700	88.7	48.3	5 158.20	558.20	51.70	193	141.3
27-Jan-12	5 212.80	5200	117.2	5300	70.1	47.1	5 483.95	283.95	52.90	245.9	
24-Feb-12	5 486.00	5500	145	5600	99.05	45.95	5 180.00	-320.00	(45.95)	199.95	

30-Mar-12	5 322.00	5300	133	5400	82.75	50.25	5 189.20	-110.80	(50.25)	149.7	
27-Apr-12	5 209.30	5200	114.26	5300	68	46.26	4 924.10	-275.90	(46.26)	103.44	
01-Jun-12	4 817.85	4800	138.7	4900	87.35	51.35	5 149.00	349.00	48.65	152.09	
29-Jun-12	5 312.40	5300	93.5	5400	52	41.5	5 042.95	-257.05	(41.50)	110.59	
27-Jul-12	5 132.00	5200	65.25	5300	31	34.25	5 315.00	115.00	65.75	176.34	
31-Aug-12	5 286.65	5300	84	5400	43.55	40.45	5 650.00	350.00	59.55	235.89	
28-Sep-12	5 723.00	5700	102.8	5800	58.4	44.4	5 706.20	6.20	(38.20)	197.69	
26-Oct-12	5 704.00	5700	94.5	5800	51.15	43.35	5 826.25	126.25	56.65	254.34	
30-Nov-12	5 906.15	5900	87	6000	44.55	42.45	5 870.50	-29.50	(42.45)	211.89	
28-Dec-12	5 955.15	6000	70.7	6100	36	34.70	6 035.50	35.50	0.80	212.69	211.89
31-Jan-13	6 038.05	6 100	53.1	6200	23	30.10	5 692.80	-407.20	(30.10)	182.59	
01-Mar-13	5 728.00	5700	94.75	5800	48.75	46.00	5 682.55	-17.45	(46.00)	136.59	
01-Apr-13	5 721.65	5700	89.95	5800	43.4	46.55	5 917.30	217.30	53.45	190.04	
26-Apr-13	5 889.00	5900	86.3	6000	46.8	39.50	6 124.50	224.50	60.50	250.54	
31-May-13	5 991.00	6100	99.15	6200	56.95	42.20	5 682.50	-417.50	(42.20)	208.34	
28-Jun-13	5 832.60	5900	70.95	6000	37.5	33.45	5 907.25	7.25	(26.20)	182.14	
26-Jul-13	5 926.85	5900	127.85	6000	79	48.85	5 410.20	-489.80	(48.85)	133.29	
30-Aug-13	5 462.00	5500	125.4	5600	81	44.40	5 882.00	382.00	55.60	188.89	
27-Sep-13	5 888.00	5900	156.6	6000	110	46.60	6 299.05	399.05	53.40	242.29	
01-Nov-13	6 358.00	6400	88.2	6500	48.85	39.35	6 091.50	-308.50	(39.35)	202.94	
29-Nov-13	6 228.00	6200	151.55	6300	103.1	48.45	6 279.00	79.00	30.55	233.49	
27-Dec-13	6 370.20	6400	92.00	6500	52.15	39.85	6 074.20	-325.80	(39.85)	193.64	233.49
31-Jan-14	6 107.50	6100	103.00	6200	57.50	45.50	6 239.90	139.90	54.50	248.14	
28-Feb-14	6 282.00	6300	73.85	6400	34.00	39.85	6 689.00	389.00	60.15	308.29	
28-Mar-14	6 735.40	6800	79.00	6900	43.00	36.00	6 841.90	41.90	5.90	314.19	
25-Apr-14	6 825.15	6800	257.55	6900	206.40	51.15	7 235.00	435.00	48.85	363.04	
30-May-14	7 230.00	7300	86.00	7400	51.05	34.95	7 492.65	192.65	65.05	428.09	
27-Jun-14	7 545.25	7600	130.00	7700	87.00	43.00	7 722.45	122.45	57.00	485.09	
01-Aug-14	7 624.00	7600	129.00	7700	81.20	47.80	7 955.05	355.05	52.20	537.29	
01-Sep-14	8 072.00	8100	90.30	8200	49.85	40.45	7 911.00	-189.00	(40.45)	496.84	
26-Sep-14	8 033.25	8100	86.20	8200	50.15	36.05	8 168.35	68.35	32.30	529.14	
31-Oct-14	8 355.20	8400	81.80	8500	44.05	37.75	8 495.70	95.70	57.95	587.09	
28-Nov-14	8 632.75	8700	72.50	8800	39.50	33.00	8 173.55	-526.45	(33.00)	554.09	

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