

## **Do the anticipated profit patterns of bull spreads with calls act as a lead indicator of market? - an exploratory study**

*N. R. Parasuraman*  
Director & Professor – Finance  
SDMIMD, Mysuru  
nrparasuraman@sdmimd.ac.in

### **Abstract**

*The options markets in India have grown considerably both in terms of volume and transparency. One can discern increasing interest in vertical spreads involving limited profits and limited losses. These spreads are entered into when the market player does not feel that the market has taken a definite upward or downward trend, but feels that it is slightly bullish or bearish. The fact that the player is not sure of his analysis is evident from the fact that there is a long and short position concurrently entered into, to ensure that losses are minimized. In the process, the profits are minimised too.*

*In this paper, we seek to ascertain as to whether the profits patterns for these spreads are borne out by the market eventually. Thus, if the bull spread indicates a greater profit potential than loss potential, does this mean that the market is really bullish. So the comparison has to be between the market when the vertical spread has been entered into and the eventual underlying price at the expiry of the option. From our sample there is no evidence to prove this.*

**Keywords:** *Option, call, bull spread, premium, in-the-money, out-of-the-money, at-the-money*

## **Introduction**

One of the greatest challenges in the securities market the world over is to identify lead indicators of stock prices and consistently work with these. Economic production, foreign exchange rates, interest rates and other macro parameters have been used from time to time for this purpose. A different approach would be to take an internal parameter – one that uses the stock prices directly or indirectly. The advent of the options and futures markets has given rise to this new possibility. For a while, some analysis used to be made as to whether Futures prices act as a lead indicator. But evidence has been contradictory. Further, the cost of carry rule in Futures affords a ready arbitrage if prices are not what it ought to be theoretically. Option prices are a lot more elastic and except for known arbitrage limits and inherent bounds, can assume more flexible figures. However, over time, option prices also tend to conform to market behaviour.

Gander (2011) has an interesting observation about bull and bear positions. His paper uses a switching regression approach for analysing the market equity value of firms in some South East Asia countries as a comparison to Japan. Two patterns get used to optimally classify the firms in a given country based on a switching function, which uses profit rate (net income to book equity) as a variable. The patterns are identified as a Bear security market or a Bull security market depending on the value of the profit rate.

“Two financial ratios are used in the regime regressions. It was found that the optimum scaled switch point separating the Bulls from the Bears for the countries was a positive profit rate ranging between 6 and 24%. The notion that a zero or negative profit rate identifies a Bear market is not supported. In general, the results across countries and for the long-term debt ratio were quite consistent. The post-Asian financial crisis of 1997 had a depressing effect on firm market equity values, regardless of the market type and the country. The Bulls and the Bears are not cousins when it comes to their different reactions to the long-term debt ratio and their different, relative, adverse responses to the financial crisis.”

Bouzoubaa & Osseiran, (2010) examine the role of exotic options in structuring, pricing and trading. They say “. Exotic Options and Hybrids is a practical guide to structuring, pricing and hedging complex exotic options and hybrid derivatives that will serve readers through the recent crisis, the road to recovery, the next bull market and beyond. Written by experienced practitioners, it focuses on the three main parts of a derivative’s life: the structuring of a product, its pricing and its hedging. Divided into four parts, the book covers a multitude of structures, encompassing many of the most up-to-date and promising products from exotic equity derivatives and structured notes to hybrid derivatives and dynamic strategies. Based on a realistic setting from the heart of the business, inside a derivatives operation, the practical and intuitive discussions of these aspects make these exotic concepts truly accessible. Adoptions of real trades are examined in detail,

and all of the numerous examples are carefully selected so as to highlight interesting and significant aspects of the business. The introduction of payoff structures is accompanied by scenario analysis, diagrams and life like sample term sheets. Readers learn how to spot where the risks lie to pave the way for sound valuation and hedging of such products. There are also questions and accompanying discussions dispersed in the text, each exploited to illustrate one or more concepts from the context in which they are set. The applications, the strengths and the limitations of various models are highlighted, in relevance to the products and their risks, rather than the model implementations. Models are de-mystified in separately dedicated sections, but their implications are alluded to throughout the book in an intuitive and non-mathematical manner. By discussing exotic options and hybrids in a practical, non-mathematical and highly intuitive setting, this book will blast through the misunderstanding of exotic derivatives, enabling practitioners to fully understand and correctly structure, price and hedge these products effectively, and stand strong as the only book in its class to make these “exotic” concepts truly accessible”.

Chaput & Ederington (2005) look at the structure of vertical spreads. They observe as follows. “In the Eurodollar futures options market, they represent about 9.4% of all option trades of 100 contracts or more and account for about 11.6% of the trading volume. The article examines trade of vertical spreads for Eurodollar futures options to see how vertical spreads are designed and what those designs tell

us about the objectives of vertical spread traders. Comparing vertical spreads with simple call and put positions, we first ask whether most vertical spread traders choose vertical spreads in order to reduce their risk and margin requirements on short positions or to reduce the net cost and raise the likelihood of gain on long positions. It is found that many of the advantages of vertical spreads claimed in the practitioner literature appear unimportant to the majority of vertical spread traders. It is observed that for opening positions, the proportion of bull spreads in the sample is somewhat greater than 53.2%.”

Mayhew (2002) examines the structure and profitability of spreads using options. The effect on bid-ask spreads is also examined. The observations are “Options listed on multiple exchanges have narrower spreads than those listed on a single exchange, but the difference diminishes as option volume increases. Option spreads become wider when a competing exchange delists the option. Options traded under a “Designated Primary Market maker” (DPM) have narrower quoted spreads than those traded in a traditional open outcry crowd. Effective spreads are found to be slightly narrower under the DPM than in the crowd, but only since 1992, and only on low-volume options”

### **Mapping of literature review with the paper’s objective and model**

The following table shows the mapping of the table to the objectives and model of the paper. What we seek to find

out is whether the existence of profits in bull spreads using calls and puts really act as a sort of lead indicator on the markets as a whole.

Paper	Connection
Gander (2011)	The switch value model suggested in the paper may be used for indicating the market performance. However, we find that indications are not strong on actual regression
Bouzoubaa & Osseiran, (2010)	The paper's findings are really useful, but they relate to exotics and the options used in the model are market-based. Exotics are also governed by price parameters which are stringent, but these would not reckon sentiment aspects
Chaput & Ederington (2005)	The findings validate the assumption on which this paper was written. Although their paper looks more at currency options, the principles remain the same. These are speculative spreads which ought to logically indicate the direction of the market in future
Mayhew (2002)	The structure and profitability of spreads examined in this paper do indicate the relationship with the underlying market. That way, it is surprising that we do not have positive correlations between spread profits and actual market movements

### **What we seek to look into**

One common spread used by traders is the bull spread. This is recommended when the markets are expected to be steady but slightly bullish. Here, the confidence of the trader is not so great as to take a total bet on the bullish movement. So the trader goes long on a call and for a higher exercise price sells another call. The call bought will cost more as it is more in the money, but the call sold will subsidize the cost of buying. In the process, the premium comes down. Side by side the profitability comes down as well, since the trader would not be able to participate in the profits beyond the exercise price at which the short call is made.

The question often asked is as to how much of the trader's conviction at the start of the position is borne out by reality. This needs to be closely examined. The option has an expiry date which may be a month, two months or three months away. Even at the outset, the bull spread indicates to all concerned the maximum profit that can be made and the maximum loss that will be incurred by the position. Thus, a bull spread with calls will have a maximum loss of the premium paid for entering into the two positions together, and a maximum profit possibility of the difference in strike prices less the premium paid.

For instance, on a particular day in July, 2016, NIFTY index was going at 8636.55. A bull vertical spread entered into with strike prices of 8600 and 8700 entailed paying a premium of Rs.175 against receiving premium of Rs.118. The

8600 call was bought and the 8700 call was sold. The net premium, then, was 57.

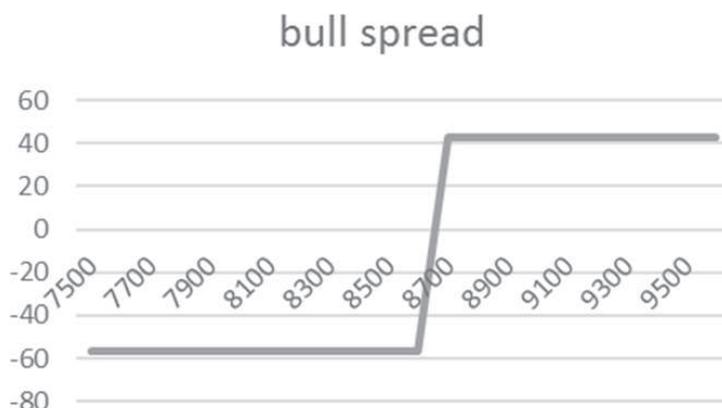


Figure 1. Bull spread with calls

Here, the maximum loss under the position is 57 as against the maximum loss of Rs. 43 (100-57).

The question arises as to whether the above profit position indicates that the market is really bullish as perceived by the majority of the market. The underlying prices are determined by a demand/supply equation and is the result of the bids and asks by all potential buyers and sellers. In the same way, the call prices have only to conform to bounds and can freely move around based on perceived volatility. So, the prices as determined by the market forces for calls indicate what the forces are believing the market will turn into at the expiry of the option?

If such a question is even partially true, this will be a good lead indicator for the eventual underlying prices. If the profit pattern on bull spreads indicate more profits than potential

losses, then the lead indicator is that markets are bullish and vice versa. But this is only an armchair hypothesis. This would need to be tested out with real data over long periods

### **Scope and methodology**

This is an exploratory study and so is confined to a limited period. The postulates are:

- National Stock Exchange data has been used ([www.nseindia.com](http://www.nseindia.com))
- On the first of every month starting from April 2016 through September 1, 2016, the underlying NIFTY index value is ascertained
- The strike prices two levels in the money and two levels out of the money are taken and the call prices are ascertained
- Bull spread positions are drawn up with following combinations:
  - Long just in the money strike and short just out of the money strike
  - Long more in the money strike and short just out of the money strike
  - Long just in the money strike and short more out of the money strike
  - Long more in the money strike and short more out of the money strike

- The net premium payable will be the maximum loss in the position
- The difference between the strike prices concerned and the net premium will be the maximum gain in the position.
- This process is carried out for entry positions and expiry dates as follows:

*Table 1 : Data used for analysis*

<b>Sl. No.</b>	<b>Entry date</b>	<b>Option expiry date</b>
1	April 1 2016	April 28, 2016
2	April 1 2016	May 26, 2016
3	April 1, 2016	June 30, 2016
4`	May 2 2016	May 26, 2016
5	May 2 2016	June 30, 2016
6	May 2, 2016	July 28, 2016
7	June 1, 2016	June 30, 2016
8	June 1, 2016	July 28, 2016
9	June 1, 2016	August 25, 2016
10	July 1, 2016	July 28, 2016
11	July 1, 2016	August 25, 2016
12	July 1, 2016	September 29, 2016
13	August 1, 2016	August 25, 2016
14	August 1, 2016	September 29, 2016
15	September 1, 2016	September 29, 2016

- For each of the above dates, the maximum potential profit and maximum potential loss from the position is ascertained. The maximum potential loss is the net premium (the premium paid on the long in-the-money call less the premium received on the short out-of-the-money call). The net premium will invariably involve an outflow since the in-the-money call is costlier than the out-of-the-money call. The maximum loss is the difference between the strike prices of the long and the short position minus the net premium
- After listing out all the profit and loss patterns, outliers involving extraordinary imbalance between the profit and loss positions are eliminated. These outliers come about because of low volumes in those strike prices and consequent absence of trade. The prices indicated are therefore misleading. To make the analysis realistic, these have then been eliminated.
- Now a ratio of the gain potential against the loss potential is taken. The hypothesis is that if this ratio is greater than 1 we have a bullish outlook
- Side by side, we ascertain the NIFTY index value on the beginning of the relevant month and the expiry of the relevant option. Thus if we are taking the call entered into on April 1, 2016 and expiring on May 26, 2016, we take the NIFTY index values on April 1 and May 26. The ratio of the two indicates whether the market has gone up or not.
- So the ratio of the potential profit pattern is now compared with the ratio of NIFTY and we run a regression.

## Findings

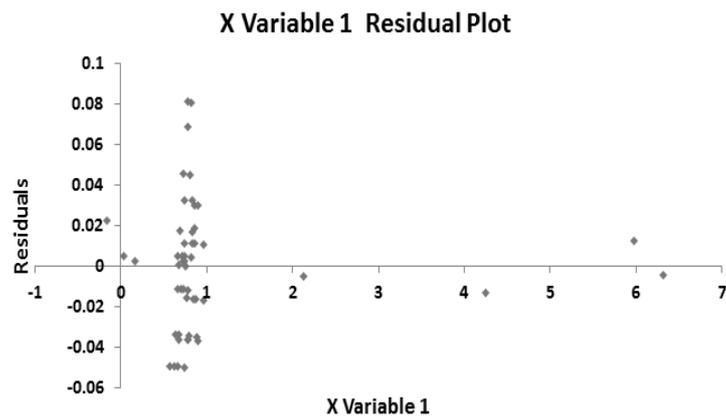
The regression results are shown below:

*Table 2 : Summary of findings*

<b>Regression Statistics</b>	
Multiple R	0.144477
R Square	0.020874
Adjusted R Square	0.000891
Standard Error	0.03189
Observations	51

With such a low regression, it is clear that the relationship can hardly be established. This comes as a surprise. How else would the premium show a higher profit pattern than a loss pattern.

*Table 3 : residual plot of the regression analysis*



Now, bull spreads could also have been performed with puts. Here, the in-the-money put is sold and the out-of-the-money put is bought. The net receipt of premium is the maximum potential gain from the position and the difference in strike prices minus the maximum potential gain is the maximum loss from the position. A comparison of the profit to loss potential ratio with the NIFTY index ratio throws in the same result as the bull spread with calls.

In order to make the study more broad-based the following can be done:

- Take stock options across the horizon
- Ascertain the position at the beginning of a month and see the profit and loss potential for a bull spread with calls
- Ascertain the end spot value and compare with the original to see the presence of actual bullish movement
- A regression on the results of the profit potential against the spot final movement ratio to see if a relationship does exist.

### **Conclusion**

From the exploratory study it is clear that the existence of profit patterns in bull spreads cannot be taken as a real indication of the bullishness of the market. Call option premiums are the result of the interplay of the stock price, the strike price, interest rate, time to go and volatility. So the implied volatility and the resultant volatility smile might

have resulted in a particular profit pattern which need not be readily comparable with the actual movement of stock prices. At the time of entering into the position, it is not clear as to what the market postulates to be. In fact the bull spread is recommended only when the market is steady and slightly bullish. From the evidence given above, we can conclude that bull spreads and similar vertical spreads are not lead indicators of stock prices. However, a comprehensive conclusion can be reached only on the basis of a wider range of data across several years.

### References

- Avraham Kamara and Thomas W. Miller, Jr. (1995), Daily intra-day tests of European put-call parity, *Journal of Financial and Quantitative Analysis*, Vol. 30, No. 4, December 1995.
- Ben Nissim and Taylor Tchahi, An empirical test of 'put call parity', *Applied Financial Economics*, 2011, 21, 1661-1664
- Bouzoubaa, M., & Osseiran, A. (2010). *Exotic Options and Hybrids: A Guide to Structuring, Pricing and Trading*. John Wiley & Sons.
- Chaput, J. S., & Ederington, L. H. (2005). Vertical Spread Design. *Journal of Derivatives*, 12(3), 28–46.
- Cremers, Martjin and Weinbaum, David (2010), Deviations from put-call parity and stock return predictability, *Journal of Financial and Quantitative Analysis*, April 2010, Vol. 45, Issue 2, p335-367.

- Gander, J. P. (2011). Equity valuation under Bull and Bear market regimes in South East Asia firms: a switching regression approach. *Applied Economics*, 43(7), 837–844. <https://doi.org/10.1080/00036840802599966>
- Hull John and Basu Sankarshan, Options, Futures and other derivatives, Prentice-Hall, 7<sup>th</sup> edition
- Johannes Ruf (2013), Hedging under arbitrage, *Mathematical Finance*, Vol. 23, No. 2, (April 2013), 297-317.
- Mayhew. Stewart. (2002). Competition, market structure, and bid-ask spreads in stock option markets. *The Journal of Finance*, 57(2), 931-958.
- .Parasuraman N.R., Fundamentals of Financial Derivatives, Wiley Precise, 3<sup>rd</sup> edition
- Vipu (2008), Cross-market efficiency in the Indian derivatives market: A test of put-call parity, *The journal of futures markets*, Vol. 28, No., 889-910 (2008).
- Wen-Liang, Chin-Shen and Shu-Fang (2008), Price discovery in the options markets: An application of put-call parity, *The journal of futures markets*, Vol. 28, No. 4, 354-375 (2008).

