An Empirical Study on the Behaviour of Nifty Index by Examining the Derivative Contract

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Abstract

The term "Derivative" indicates that it has no independent value, i.e. its value is entirely "derived" from the value of the underlying asset. The basic purpose of it is to transfer the price risk from one party to another, and mitigate the risk arising from the future uncertainty of prices. It is generally used as an instrument to hedge risk, but can also be used for speculative purpose. Prices in an organized derivatives market reflect the perception of the market participants about the future and lead the prices of the underlying to the perceived future level. This research is an attempt to find the efficiency of the sentimental indicators of financial derivatives in predicting the trend of the market (behaviour of NIFTY index). Participants in the stock markets believe that the amount of open interest (OI) in a particular contract has a bearing on the behavior of the price of the contract. This perception is put to test in the present research using the end of the day data (historical data) from August 2011 to February 2012, and examined the correlation between the cumulative percentage changes in open interest and cumulative percent change in the price of future contract of NIFTY index. The put-call ratio (PCR) is widely used by technical analysts as an indicator of the investor sentiment concerning future equity price trends. Many stock market experts cite the put-call ratio as an important indicator of investor sentiment, with a low (high) value indicating excessive optimism (pessimism). It is believed that the ratio is a useful contrarian indicator for future stock market behavior. In the present research paper, the value of the put-call ratio as an indicator of future stock market trend is put to test. The research is further extended towards application and analysis of the stock and option strategies in different market conditions and their pay-off using end of the day (EOD) data.

Keywords: **derivatives, put-call ratio, open interest, NIFTY, sentimental indicators**
JEL Classification: G13, G14

Securities Markets is a place where buyers and sellers of securities can enter into transactions to purchase and sell shares, bonds, debentures, etc. Further, it performs an important role of enabling corporates and entrepreneurs to raise resources for their companies and business ventures through public issues. Transfer of resources from those having idle resources (investors) to others who have a need for them (corporates) is most efficiently achieved through the securities market. Stated formally, securities markets provide channels for reallocation of savings to investments and entrepreneurship.

The primary market is the market where the securities are sold for the first time. In a primary issue, the securities are issued by the company directly to the investors. In the secondary market, investors purchase securities or assets from other investors, rather than from the issuing companies themselves. The Indian securities market is considered as one of the most promising emerging markets, and is among the top eight markets of the world. At present, 24 stock exchanges operate all over India. As of March 2012, BSE had over 5133 companies listed and had a market capitalization of around US$ 1 trillion (December 2011). NSE had around 1646 companies listed, and had a capitalization of US$ 985 billion (December 2011). Trading volume in NSE is twice as that of BSE. And the securities market is regulated by Securities and Exchange Board of India (SEBI). Over a period, the Indian securities market has undergone remarkable changes and has grown exponentially, particularly in terms of resource mobilization, intermediaries, the number of listed stocks, market capitalization, and the number of investors.

One of the most significant events in the securities markets has been the development and expansion of financial derivatives (June 2000). Trading volumes in equity derivatives is three and half times more than cash equity markets. Prices in an organized derivatives market reflect the perception of the market participants about the future and lead the prices of the underlying to the perceived future level.

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Review of Literature

Wen and Lin (2011) in their paper titled "Does the Put-Call Ratio Forecast Market Returns? Evidence from an Emerging Market" investigated the predictability of popular market-based sentiment indicator, the put-call ratio, for future stock price movements using the non-publicly unique and publicly observed stock index option volume obtained from the emerging Taiwan Futures Exchange. They found that the non-public open-buy put-call ratio contains information content about future stock index movements, while the predictability of publicly observed put-call ratio is statistically insignificant.

Garg and Ramesh (2010) in their paper "Relationship between Futures Price and Open Interest in Stock and Index Futures in the Indian Stock Markets: An Empirical Analysis" revealed that open interest changes as and when the number of open positions increase or decrease in a given contract, and it has no bearing over the direction of the market. Thus, a change in open interest will not lead to a change in futures price in any direction. A corollary of the conclusion is that open interest is a measure of liquidity in the futures contract, and not a forebearer of the price direction of the futures contract.

Andy and Doran (2010) in their paper "Do Option Open-Interest Changes Predict Future Equity Returns?" found that information is first revealed in option markets. Specifically, changes in call and put open interest levels have predictive power for future equity returns. Large increases in put open interest are followed by poor equity returns. Call open interest increases precede relatively strong future returns, but the relationship is considerably less pronounced.

Ramchandra, Satish, and Krishnamurthy (2010) in their research paper on the topic "Option Trading Strategies for Different Market Conditions for Hedging the Portfolio and Trading for Profits" used multi – leg option strategies like condor, butterfly, guts, and spread for different market conditions, and analyzed the pay-off.

Maniar and Maniyar (2008) in their paper "Impact of Option Interest Information in Derivatives Markets - An Empirical Study of Stock Options Market, NSE (National Stock Exchange of India)" found that the prediction of stock price movement based on the distribution of options open interest to have reasonably good accuracy. In the sample, the open interest-based active trading strategies generated better returns as compared with the passive benchmarks.

Pan and Poteshman (2004) in their research work on the topic "The Information of Option Volume for Future Stock Prices" presented strong evidence that option trading volume contains information about future stock price movements. Taking advantage of a unique dataset from the Chicago Board Options Exchange, they constructed put-call ratios from option volume initiated by buyers to open new positions. It was found that on a risk adjusted basis, stocks with low put-call ratios outperformed stocks with high put-call ratios by more than 40 basis points on the next day and more than 1% over the next week.

Mukherjee and Mishra in their research work (2004) on the topic "Impact of Open Interest and Trading Volume in Option Market on Underlying Cash Market: Empirical Evidence from Indian Equity Option Market" found that the open interest based predictors are significant in predicting the spot price index in the underlying cash market in both the periods, just after the initiation of the index option in the market and in the later sub-period. However, as far as the volume-based predictors are concerned, it shows some changing evidence. Though being insignificant just after the initiation, the volume-based predictors showed significant explanatory power in the later sub-period. Again, though both the predictors in the option market in the recent sub-period were significant at 1% level of significance, the trading volume showed more impact as compared to open interest in the matter of price prediction in the cash market. The value of adjusted R-square and F-statistics in two sub-periods also confirmed how the option market tends to improve its power in discovering the price index in the underlying cash market.

Bhuyan and Chaudhury (2001) in their working paper "Trading on the Information Content of Open Interest: Evidence from the US Equity Options Market" examined the role of option market's open interest in conveying information about the future movement of the underlying asset and showed that the trading strategies based on this predictor yield better results as compared to the buy-and-hold and passive covered call strategies.

Srivastava (2001) in his research work on the topic "Informational Content of Trading Volume and Open Interest – An Empirical Study of Stock Option Market in India" found that open interest based predictors are statistically more significant than volume-based predictors in the Indian context.

Objectives of the Study

❖ To study the behaviour of the NIFTY index by examining the derivative contracts.

❖ To analyze the efficiency of sentimental indicators of future contracts in predicting the behaviour of the NIFTY index.

❖ To analyze the efficiency of sentimental indicators of option contracts in predicting the behaviour of the NIFTY index.

❖ To formulate and suggest suitable future and option strategies for different market conditions with their pay-off.

Methodology of the Study

❖**Research Design :** The study aimed to actually test pre-planned hypothesis - The open interest and put-call ratio are indicators of future stock market trend based on the findings and ,therefore, the research design used is analytical in nature. Historical data of future and option (F&O) contract of the NIFTY index for 9 months was collected from the NSE website. The data was further refined based on the market condition. The period of the study is limited to 9 months from July 2011 – March 2012.

❖ **Tools and Techniques Used for Data Analysis:**

❖ **Percentage Analysis :** Percentage analysis is the method to represent raw streams of data as a percentage for better understanding of collected data.

$$\text{Percentage change} = \frac{\text{New value} - \text{Old Value}}{\text{Old Value}} \times 100$$

Percent increase and percent decrease are measures of percent change. Percent changes are useful to understand changes in a value over time.

$$\%\text{ of Carry Forward contracts} = \frac{\text{Change in Open Interest Contracts}}{\text{No. of contracts Traded (Volume)}} \times 100$$

❖ **Karl Pearson's Coefficient of Correlation :** Pearson's coefficient reflects the linear relationship between two variables. If the correlation coefficient is +1, then there is a perfect positive linear relationship between variables, and if it is -1, then there is a perfect negative linear relationship between the variables. 0 denotes that there is no relationship between the two variables. The degrees -1, +1, and 0 are theoretical results and are not generally found in normal circumstances. That means that the results cannot be more than -1, +1.

❖ **Put- Call Ratio :** The put/call ratio is a popular sentiment indicator based upon the trading volumes and open interest of put options compared to call options. The ratio attempts to gauge the prevailing level of bullishness or bearishness in the market.

$$\textbf{PCR} = \frac{\text{Open Interest of Put Options to No. of Put contracts traded}}{\text{Open Interest of Call Options to No. of Call contracts traded}}$$

❖ **Option Greeks :** The option Greeks were calculated using the software called "Options oracle".

❖ Delta (Greek Symbol δ) - a measure of an option's sensitivity to changes in the price of the underlying asset.

❖ Gamma (Greek Symbol γ) - a measure of delta's sensitivity to changes in the price of the underlying asset.

❖ Vega - a measure of an option's sensitivity to changes in the volatility of the underlying asset.

❖ Theta (Greek Symbol θ) - a measure of an option's sensitivity to time decay.

Analysis and Discussion

❖ $\%\text{ change in Price} = \frac{\text{Current day's LTP} - \text{Previous day's LTP}}{\text{Previous day's LTP}} \times 100$

Table 1 : Relationship between the Behaviour of NIFTY and the Sentimental Indicators of Future Contracts for the months of Jan & Feb '12

Date	LTP (Future contract)	% Change in Price		Cumulative % change in Price	(Volume) No. of contracts	Change In Open Interest Contracts	% of carry forward Contract		Cumulative % of cry frwd.cnt	Trend
02-Jan-12	4,650.30	0.53	0.53	0.53	2,77,565	4358	1.57	1.57	1.57	Bullish
03-Jan-12	4,777.50	2.74	2.74	3.26	3,62,152	15485	4.28	4.28	5.85	Bullish
04-Jan-12	4,753.00	-0.51	-0.51	2.75	3,53,400	-1948	-0.55	-0.55	5.29	Bearish
05-Jan-12	4,753.00	0.00	0.00	2.75	2,71,152	10166	3.75	3.75	9.04	Bullish
06-Jan-12	4,782.95	0.63	0.63	3.38	4,50,646	-16199	-3.59	3.59	12.64	Bullish
07-Jan-12	4,766.00	-0.35	-0.35	3.02	29,134	14	0.05	-0.05	12.59	Bearish
09-Jan-12	4,757.70	-0.17	-0.17	2.85	3,21,543	-9188	-2.86	-2.86	9.73	Bearish
10-Jan-12	4,871.65	2.40	2.40	5.24	3,92,413	28773	7.33	7.33	17.07	Bullish
11-Jan-12	4,873.40	0.04	0.04	5.28	2,66,376	267	0.10	0.10	17.17	Bullish
12-Jan-12	4,867.95	-0.11	-0.11	5.17	3,87,900	726	0.19	-0.19	16.98	Bearish
13-Jan-12	4,886.00	0.37	0.37	5.54	3,72,229	2913	0.78	0.78	17.76	Bullish
16-Jan-12	4,897.00	0.23	0.23	5.76	2,67,867	-6613	-2.47	2.47	20.23	Bullish
17-Jan-12	4,972.50	1.54	1.54	7.31	3,15,725	24353	7.71	7.71	27.94	Bullish
18-Jan-12	4,947.80	-0.50	-0.50	6.81	2,89,545	-27990	-9.67	-9.67	18.28	Bearish
19-Jan-12	5,020.35	1.47	1.47	8.28	2,90,059	-21608	-7.45	7.45	25.73	Bullish
20-Jan-12	5,058.00	0.75	0.75	9.03	5,05,947	62077	12.27	12.27	38.00	Bullish
23-Jan-12	5,078.00	0.40	0.40	9.42	3,23,377	26126	8.08	8.08	46.07	Bullish
24-Jan-12	5,080.00	0.04	0.04	9.46	5,91,320	17274	2.92	2.92	49.00	Bullish
25-Jan-12	5,159.00	1.56	1.56	11.02	5,33,204	-6035	-1.13	1.13	50.13	Bullish
27-Jan-12	5,212.80	1.04	1.04	12.06	2,49,035	2451	0.98	0.98	51.11	Bullish
30-Jan-12	5,105.00	-2.07	-2.07	9.99	3,07,899	-37721	-12.25	-12.25	38.86	Bearish
31-Jan-12	5,230.00	2.45	2.45	12.44	3,36,757	16075	4.77	4.77	43.63	Bullish
01-Feb-12	5,269.75	0.76	0.76	13.20	3,14,945	-11276	-3.58	3.58	47.21	Bullish
02-Feb-12	5,273.30	0.07	0.07	13.27	3,76,463	1825	0.48	0.48	47.70	Bullish
03-Feb-12	5,339.00	1.25	1.25	14.51	2,93,530	12528	4.27	4.27	51.97	Bullish
06-Feb-12	5,360.80	0.41	0.41	14.92	3,35,710	34393	10.24	10.24	62.21	Bullish
07-Feb-12	5,357.95	-0.05	-0.05	14.87	3,46,422	20361	5.88	-5.88	56.33	Bearish
08-Feb-12	5,394.75	0.69	0.69	15.55	3,92,016	7937	2.02	2.02	58.36	Bullish
09-Feb-12	5,448.00	0.99	0.99	16.54	3,22,410	11607	3.60	3.60	61.96	Bullish
10-Feb-12	5,388.05	-1.10	-1.10	15.44	4,24,467	-19773	-4.66	-4.66	57.30	Bearish
13-Feb-12	5,415.00	0.50	0.50	15.94	2,79,196	-10267	-3.68	3.68	60.98	Bullish
14-Feb-12	5,452.20	0.69	0.69	16.63	2,41,590	-9507	-3.94	3.94	64.91	Bullish
15-Feb-12	5,551.40	1.82	1.82	18.45	3,50,865	14459	4.12	4.12	69.03	Bullish
16-Feb-12	5,529.50	-0.39	-0.39	18.05	2,91,926	-21308	-7.30	-7.30	61.74	Bearish
17-Feb-12	5,596.95	1.22	1.22	19.27	3,66,610	-34172	-9.32	9.32	71.06	Bullish

*Source : Column Nos. 1, 2, 6, and 7 in the Table 1 were retrieved from
http://www.nseindia.com/products/content/derivatives/equities/historical_fo.htm

❖ $\%\ \text{of Carry Forward contracts} = \dfrac{\text{Change in Open Interest Contracts}}{\text{No. of contracts Traded (Volume)}} \times 100$

Price	Open Interest	Market Trend	
Rising (+)	Rising (+)	Market is Strong	(Bullish)
Rising (+)	Falling (-)	Short Covering	(Bullish)
Falling (-)	Rising (+)	Market is Weak	(Bearish)
Falling (-)	Falling (-)	Profit Booking	(Bearish)

Retrieved from http://www.investopedia.com/articles/technical/02/112002.asp#axzz2EuOJKmLB

From the Table 1, after comparing the % change in price and % of carry forward contracts using the following test and predicting the trend of the market, it was found that :

❖ If the market trend is overall bullish, cumulate the % change in price and % of carry forward contracts by adding the bullish trends and subtracting the bearish trends.

❖ If the market trend is overall bearish, cumulate the % change in price by adding the bullish trend and subtracting the bearish trend. Then, cumulate the % of carry forward contracts by adding the bearish trends and subtracting the bullish trends.

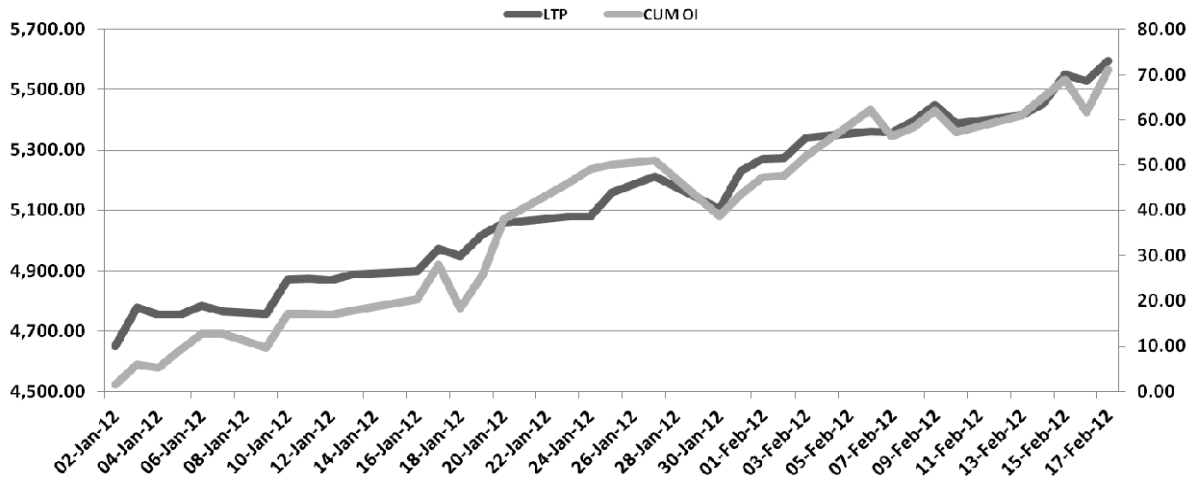
❖ Draw a chart using the cumulative data and check if the sentimental indicators are efficient in predicting the trend of the market.

It can be inferred from the Table 1 that in the months of January and February 2012, the market was overall bullish by 1000 points. The market had moved from 4600-5600.

❖ The % of change in open interest to the number of contracts traded i.e. % of carry forward contracts was drastically built-up during the months of January and February, which indicated that the market is clear-cut bullish.

❖ Whenever the market showed a bearish trend, it was only an indication of profit booking and no new short positions were created.

Figure 1 : Relationship between Last Traded Price and Cumulative % of Carry Forward Contracts for the month of January and February 12



Source: The Figure 1 was formed using the data from the Table 1

The following inferences are drawn from the Table 2 :

❖ Number of days taken for comparison – 35.

❖ The Karl Pearson's coefficient of correlation between the last traded price and cumulative % change in open interest to the total number of contracts traded i.e. the cumulative % of carry forward contracts is 0.98.

❖ The last traded price (LTP) and open interest are positively correlated and there is a high level of significance between them.

Table 2 : Correlation between Last Traded Price and Cumulative % change in Open Interest of Future Contract for the months of January and February 2012			
		LTP	Open Interest (Carry Forward contract)
LTP	Pearson Correlation	1	**.976****
	Sig. (2-tailed)		.000
	N	35	35
Open Interest (Dlv Cnt)	Pearson Correlation	**.976****	1
	Sig. (2-tailed)	.000	
	N	35	35
**. Correlation is significant at the 0.01 level (2-tailed).			
*Source : The Table 2 is formed using a statistical tool SPSS			

The following inferences are drawn from the Table 3:

❖ Change in Price = Current day's Price – Previous day's Price.

❖ The change in open interest of active strike prices (in-the-money, at-the-money, and out-of-the money) of call and put options are added instead of taking the open interest of all the strike prices.

❖ The total number of contracts traded for the active strike prices (in-the-money, at-the-money, and out-of-the money) of call and put options are added instead of taking the volume of all the strike prices.

❖ Then, total % of call carry forward contract $= \frac{\text{Change in call open interest}}{\text{No. of call contracts traded}} \times 100$

❖ Total % of put carry forward contract $= \frac{\text{Change in put open interest}}{\text{No. of put contracts traded}} \times 100$

❖ Cumulate the % of call and put carry forward contracts.

❖ Put Call Ratio $= \frac{\text{\% of put carry forward contract}}{\text{\% of call carry forward contract}} \times 100$

❖ On January 3, 2012, when the market was up by 127.20 points, the put-call ratio rose to 3.88 from 1. 84.

❖ On January 30, 2012, when the market was down by 107.80 points, the put-call ratio had fallen to 1.53 from 2. 72.

❖ During the entire months of January and February, when the market rose by 1000 points, the put-call ratio was above 2 and it kept rising.

This indicates that the put-call ratio is a contrarian indicator, i.e. when there is an increase in the price of the underlying stocks, the put- call ratio also increases; similarly, when there is a fall in the price, the put-call ratio also decreases.

The following inferences were drawn from Table 4 :

❖ No of days taken for comparison - 36.

❖ The Karl Pearson's coefficient of correlation between the last traded price and put-call ratio is 0.613.

❖ The last traded price (LTP) and put-call ratio are positively correlated and there is a moderate level of significance between them.

Market Outlook for Table 5 :

❖ Since the beginning of 2012, foreign institutional investors (FIIs) have infused a total of ₹ 24,225 crores into the Indian stocks because of the turnaround in RBIs monetary policy, and the consequent impact on the improved liquidity position and ,therefore, the market outlook is bullish.

Table 3 : Relationship between put-call ratio (PCR) and the behaviour of NIFTY for the months of January and February 2012

Date	Expiry	LTP	Change in Price	cumulative Call (CE)	Cumulative Put (PE)	PCR
02-Jan-12	25-Jan-12	4,650.30		3.85	7.08	1.84
03-Jan-12	25-Jan-12	4,777.50	127.20	4.22	16.35	3.88
04-Jan-12	25-Jan-12	4,753.00	-24.50	5.88	18.79	3.20
05-Jan-12	25-Jan-12	4,753.00	0.00	7.80	22.75	2.92
06-Jan-12	25-Jan-12	4,782.95	29.95	8.11	22.96	2.83
07-Jan-12	25-Jan-12	4,766.00	-16.95	13.48	30.38	2.25
09-Jan-12	25-Jan-12	4,757.70	-8.30	15.77	32.32	2.05
10-Jan-12	25-Jan-12	4,871.65	113.95	17.05	41.67	2.44
11-Jan-12	25-Jan-12	4,873.40	1.75	19.93	45.35	2.28
12-Jan-12	25-Jan-12	4,867.95	-5.45	20.88	44.59	2.14
13-Jan-12	25-Jan-12	4,886.00	18.05	20.30	48.28	2.38
16-Jan-12	25-Jan-12	4,897.00	11.00	21.75	51.31	2.36
17-Jan-12	25-Jan-12	4,972.50	75.50	22.30	63.54	2.85
18-Jan-12	25-Jan-12	4,947.80	-24.70	22.07	65.47	2.97
19-Jan-12	25-Jan-12	5,020.35	72.55	18.91	69.44	3.67
20-Jan-12	25-Jan-12	5,058.65	38.30	17.21	73.22	4.25
23-Jan-12	25-Jan-12	5,052.25	-6.40	20.52	77.98	3.80
24-Jan-12	25-Jan-12	5,108.00	55.75	14.97	78.36	5.24
25-Jan-12	25-Jan-12	5,158.20	50.20	14.87	85.54	5.75
27-Jan-12	23-Feb-12	5,212.80	54.60	5.02	13.64	2.72
30-Jan-12	23-Feb-12	5,105.00	-107.80	8.16	12.52	1.53
31-Jan-12	23-Feb-12	5,230.00	125.00	10.09	23.36	2.32
01-Feb-12	23-Feb-12	5,269.75	39.75	11.79	28.92	2.45
02-Feb-12	23-Feb-12	5,273.30	3.55	11.44	33.45	2.92
03-Feb-12	23-Feb-12	5,339.00	65.70	9.43	39.69	4.21
06-Feb-12	23-Feb-12	5,360.80	21.80	10.14	45.30	4.47
07-Feb-12	23-Feb-12	5,357.95	-2.85	12.58	47.11	3.74
08-Feb-12	23-Feb-12	5,394.75	36.80	14.74	49.04	3.33
09-Feb-12	23-Feb-12	5,448.00	53.25	12.83	47.08	3.67
10-Feb-12	23-Feb-12	5,388.05	-59.95	14.61	48.21	3.30
13-Feb-12	23-Feb-12	5,415.00	26.95	14.74	47.62	3.23
14-Feb-12	23-Feb-12	5,452.20	37.20	12.52	49.88	3.98
15-Feb-12	23-Feb-12	5,551.40	99.20	8.76	55.06	6.28
16-Feb-12	23-Feb-12	5,529.50	-21.90	9.32	57.55	6.17
17-Feb-12	23-Feb-12	5,596.95	67.45	7.85	60.95	7.77
21-Feb-12	23-Feb-12	5,620.20	23.25	4.85	62.75	12.95

Source : Column Nos. 1, 2 , and 3 in the Table 3 were extracted from
http://www.nseindia.com/products/content/derivatives/equities/historical_fo.htm

Table 4 : Correlation between LTP and put-call Ratio of option-contracts for the months of January & February 2012

Correlations		
	LTP	**PCR**
LTP		
Pearson Correlation	1	.613
Sig. (2-tailed)		.000
N	36	36
PCR	.613	1
Pearson Correlation	.000	
Sig. (2-tailed)		
N	36	36

Source : The Table 4 was created using SPSS

Table 5 : Synthetic Long Call Strategy and Pay- Off - Future Long & Buy Put (January 2012)

		PAY- OFF (₹)			
Date	**LTP**	**Future Long**	**Long Put**	**Net Pay-off**	**Profit / Loss**
30-12-11	4626	-	-	-	-
02-01-12	4650.3	24.3	-9.85	14.45	722.5
03-01-12	4777.5	151.5	-41.95	109.55	5477.5
04-01-12	4753	127	-36.4	90.6	4530
05-01-12	4753	127	-41.05	85.95	4297.5
06-01-12	4782.95	156.95	-51.95	105	5250
07-01-12	4766	140	-50	90	4500
09-01-12	4757.7	131.7	-52.05	79.65	3982.5
10-01-12	4871.65	245.65	-78.05	167.6	8380
11-01-12	4873.4	247.4	-79	168.4	8420
12-01-12	4867.95	241.95	-82.5	159.45	7972.5
13-01-12	4886	260	-90.5	169.5	8475
16-01-12	4897	271	-94.75	176.25	8812.5
17-01-12	4972.5	346.5	-117.6	228.9	11445
18-01-12	4947.8	321.8	-117.4	204.4	10220
19-01-12	5020.35	394.35	-128.45	265.9	13295
20-01-12	5058.65	432.65	-134.6	298.05	14902.5
23-01-12	5052.25	426.25	-138.15	288.1	14405
24-01-12	5108	482	-141.2	340.8	17040
25-01-12	5158.2	532.2	-143.35	388.85	19442.5

Source : Column No. 1 & 2 in the Table 5 were extracted from
http://www.nseindia.com/products/content/derivatives/equities/historical_fo.htm

The following strategy is presented in the Table 5 :

❖ As per this strategy, a trader purchases a stock since he/she feels bullish about it. But what if the price of the stock goes down? The trader wishes he had some insurance against the price fall. So, he buys a put on the stock. This gives the trader the right to sell the stock at a certain price, which is the strike price. The strike price can be out-of-the money (OTM).

❖ This strategy consists of buying one lot of NIFTY futures and a PE option (OTM strike price). It should be noted

that this strategy could be held till the expiry and is subject to revision during the month thereby, adjusting the put position as per the movement of the NIFTY index.

❖ Total amount invested = PE premium + Margin required for future contract (₹ 7167.5 + ₹ 25, 000 = ₹ 32,167.5).

❖ Break- Even Point = 4769.35 (Stock price + Put premium)

❖ Total profit earned = ₹19,442.5

❖ Return on Investment = 60%

❖ Risk is limited to the put premium paid = ₹ 7167.5

This is a low risk strategy which limits the loss in case of fall in the market, but the potential profit remains unlimited when the stock price rises.

Table 6 : LTP of put option for the month of January 2012

Date	LTP	Put-4500	put-4600	Put-4700	put-4800	put-4900	put-5000
30-12-11	4626	**77.95**	114.05	162.95	225	297.05	385
03-01-12	4777.5	**36**	**55.1**	84	125.7	182.5	254
10-01-12	4871.65	10.5	**19**	**34.45**	61	103	163.2
16-01-12	4897	4.3	8.1	**17.75**	**37.9**	74	130
19-01-12	5020.35	1.2	1.6	2.35	**4.45**	**13.25**	38
24-01-12	5108	0.3	0.25	0.3	0.35	0.5	**1.9**
25-01-12	5158.2	0.05	0.05	0.05	0.05	0.05	0.05

Source : The present table was retrieved from
http://www.nseindia.com/products/content/derivatives/equities/historical_fo.htm

The Table 6 is included to support the data provided in the Table 5. The following inferences were drawn from the Table 6 :

❖ It should be noted that this strategy is held till the expiry and is subject to revision during the month by selling the inactive or out of the money put option and buying the in the money put option as per the movement of the underlying stocks.

❖ As per the Table 6, a put option with the strike price of ₹ 4500 was purchased for ₹ 77.95 on December 30, 2011, when the underlying stock was priced at ₹ 4626. On January 3, 2012,when the market moved to 4777.5, put option with strike price 4500 was sold for ₹ 36 and 4600 strike price was purchased at a premium of ₹ 55.1.

❖ Similarly, all the inactive put options were sold, and active put options were purchased throughout the month.

Findings

❖ During the month of January & February 2012, when the NIFTY index was bullish by 1000 points (4600-5600), there was a high degree of strong and positive correlation between the sentimental indicators of future and option contracts to the last traded price (LTP) of the underlying stocks.

Similar kind of analysis was done for the months of August, September, November , and December 2011 :

❖ During the month of August 2011, when the NIFTY index was bearish by 700 points (5500 – 4800), there was a high degree of negative correlation between the sentimental indicators of future contracts to the LTP of the underlying, whereas there was a strong and positive correlation between the put-call ratio (PCR) of option contracts to the LTP of the underlying.

❖ During the month of November 2011, when the market was bearish by 700 points (5500 – 4800), there was a high degree of negative correlation between the sentimental indicators of future contracts to the LTP of the underlying; whereas, there was a strong and positive correlation between PCR of option contracts to the LTP of the underlying.

❖ During the month of September 2011, when the market was range bound with very low volatility, there was no

significant relationship between the sentimental indicators of future contracts and LTP of the underlying, whereas there was a moderate level of positive significance between PCR of option contracts and the underlying.

❖ During the month of December 2011, when the market was range bound by 400 points, there was no significant relationship between the sentimental indicators of future contracts and LTP of the underlying, whereas there was a moderate level of positive significance between PCR of option contracts and the underlying.

❖ Synthetic long call is a suitable strategy for the bullish market that yields maximum return with limited risk. The strategy yielded 60% returns for the month of January 2012.

❖ Synthetic long put is a suitable strategy for the bearish market that yields maximum return with minimum risk. The strategy yielded 57.8% return for the month of November 2011.

❖ Delta neutral strategy – short straddle yielded a better return when the market is less volatile and range –bound. The strategy yielded 26% returns for the month of September 2011; short straddle yielded 22% returns for the month of December 2011.

Suggestions

❖ Average risk takers can adopt synthetic long call strategy when the market is bullish and synthetic long put strategy when the market is bearish.

❖ Aggressive risk takers can make money even when the market does not show any movement by adopting short straddle strategy.

❖ Awareness programs on the benefit of using sentimental indicators in predicting the behaviour of the market can be conducted for equity dealers and clients at stock broking firms.

❖ The sentimental indicators can also be jointly used with technical indicators to find out profitable buying and selling points.

Conclusion

There are many indicators which can be used while trading in the derivatives market, but the widely used and most effective are open interest & put call ratio. The findings of this study have strengthened the argument of Bhuyan and Chaudhury (2001), Srivastava (2001), and Maniar and Maniyar (2008) that open interest and volume based predictors are significant in predicting the future movement of the underlying index.

The corollary of the present study concludes that the sentimental indicators of index futures (open interest, volume, and price) are efficient in predicting the future trend of the underlying (NIFTY).Whereas the sentimental indicator of option contract (index put/call ratio) is proved to be a contrarian indicator i.e. trading more put options are supposed to be the indication of bearishness, but in the present study, it was observed that more put options are traded when the market is bullish, which means when the market is bullish, the investors always take a long position in future contract and buy a put option to hedge their position. When the market is bearish, the investors always take a short position in the future contract, and buy a call option to hedge their position. Hence, it can be concluded that trading strategies based on sentimental indicators yield good results.

Scope for Future Research

❖ The present research is limited only to NIFTY index futures and options. Thus, stock specific futures and options could be analyzed.

❖ The research can be further extended to global markets like Dow Jones, Hang Seng, etc.

❖ Multi-leg strategies and their pay-off could be analyzed in future research.

❖ Gamma neutral strategies and their pay-off could also be analyzed.

❖ Similar studies can be applied to intra-day data also.

❖ Derivative contracts of the past 5 to 10 years could be analyzed for strong justification.

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