

Bull and Bear Phases: An Empirical Perusal of Indian Stock Market

Sunaina Kanojia*, Neha Arora**

Abstract

In general, any one known to stock market is acquainted with the phenomenon of bull and bear phases, but whether the traders or investors put air to these phases while making a decision to buy, sell, or stay invested. The present paper attempts to identify and analyse the two most popular market phases, i.e. bull and bear, for better investment decisions with the use of Bry and Boschan Algorithm and time series data. Further, it seeks to analyse the distributional characteristics of the variances in stock returns and search evidence of asymmetries, if any, in volatility under different market conditions which may help to shed light on the bull and bear phases of Indian equity market. The study arrange for evidence that in bull markets, stock prices run far ahead of earnings and for fairly long periods of time. The paper indicates 12 bull and bear phases in the Sensex and Nifty during the sample period of 19 years with the associated factors responsible for the shift of bull and bear market phases. The results provide considerable support for the view that markets choose to ignore adverse possibilities and react with zest to favourable possibilities and market declines can partly be explained by increases in risk.

Keywords: Bull Market, Bear Market, Volatility, Bry and Boschan Algorithm

1. Introduction

Although there is no clear classification of stock market regimes i.e. bull or bear in the literature but few studies by researchers like Fabozzi and Jack (1977), Kim and Zumwalt (1979) and Chen (1982) have defined bull regime on the basis of returns exceeding certain threshold value (Ahmad & Kamaiah, 2011). As the stock market exhibits different phases of increasing and decreasing stock prices, analysing the volatility and risk of stock market returns in two phases of stock market, namely bull and bear has become imperative. The investment decisions by investors

may undergo changes due to high volatility, which may lead to a fall in the long-term capital flows from foreign as well as domestic investors (Bordoloi & Shankar, 2008). Investment and trading in stock market have increased manifold in the recent past due to widespread information, ease of technology and high returns. India is now perceived as one of the most expensive equity markets in terms of price-earnings ratios. The markets have run up considerably and the BSE Sensex was at a new high of over 27,000 in September 2014.¹ Volatility in the stock return is an integral part of stock market with the share prices soaring high in bull run and falling down in the bearish market and these ups and downs determine the return and volatility of the stock market (Pandian & Jeyanthi, 2009). A stable government support has created positive sentiments about the performance of Indian economy in the world market thus, it is pertinent at this stage to study and understand the nature of volatility in Indian Stock Market. The strong growth potentials of Indian economy amongst the emerging economies have amplified the interest of foreign investors towards the capital markets of India. In view of analysing the distributional characteristics of the variances in stock returns and searching evidence of asymmetries, if any in volatility under different market conditions which may help to shed light on the bull and bear phases of Indian equity market. Therefore, to address the issues of bull and bear market phases and to draw logical conclusions for both long term and short term investor, it is required to examine the trends of volatility and returns in the Indian stock market. Tu (2006) opined that the economic value of incorporating regime-switching by identifying the bull and bear market is substantial from an investment perspective.

¹ "Stay invested, market in a structural bull run" TNN | Jul 8, 2014

* Associate Professor, Department of Commerce, Delhi School of Economics, University of Delhi.
Email: sunaiankanojia@gmail.com (corresponding author)

** Research Scholar, Department of Commerce, Delhi School of Economics, University of Delhi, Delhi, India.
Email: neha.ar05@gmail.com

2. Review of Literature

The review of existing literature presented in this section attempts to gauge the relationship of volatility and returns generated in different market scenarios. Roy and Karmakar (1994) found that much of the movement in stock market return volatility isn't explained by the fundamental economic factors but the presence of 'fads' introduced by noise traders in stock price induces the elements of stock price volatility. Harvey (1995) found that serial correlation in emerging market returns are much higher than observed in developed markets because of that lack of diversification and trading depths in emerging markets. While examining the conditional asset pricing model wherein the expected returns are functions of global and local information variables, it was found that the world risk premiums are dependent only on global information, and the conditional risk is a function of both global and local information. On analysing the predictability of returns he found that emerging market returns are more likely to be affected by local information than the developed market returns. Aggarwal, Inclan, and Leal (1999) found that volatility was high in emerging markets and shifts in volatility are related to important country specific political, social, and economic events while simultaneously analysing the events of large changes in volatility in emerging stock market returns and the changes in global and local events (social, political and economic) during the periods of increased volatility. Tripathy and Garg (2013) established the presence of leverage effect in the returns series in emerging markets indicating that volatility tend to rise more with bad news rather than with good news of same magnitude. They advise the investors to formulate future investment strategies by analysing recent and historical news for efficient management of financial risks and to reap benefits in the stock markets.

2.1 Volatility in the Bull and Bear Market

Various researchers have used Bry and Boschan (1971) turning point algorithm to identify market phases. Gonzalez, Powell, Shi, and Wilson (2005) using the algorithm identified phases and found that the bull and bear market phases are associated with distinct and persistent mean return shifts. They presented that early warning signs of subsequent poor returns provided by turning points in share price index and volume data can be important to investors, along with large and persistent return differences between bull and bear markets. They

found that during the first 6 months a bull market displays very strong return momentum that never fully disappears throughout bull markets. They found that falling volume is associated with higher monthly return volatility, an unexpected result that contrasts with empirical results for daily return data.

Raju and Ghosh (2004) found that mature or developed markets continue to provide high return with low volatility over long time period. Amongst emerging markets except India and China, all other countries exhibited low returns (sometimes negative returns with high volatility). They found that Indian markets have started becoming more efficient in terms of availability of information with intraday volatility under control compared to past years.

Shawky and Marathe (1995) found no significant relationship between market volatility and excess return in "rising" stock market but found in periods of "falling" stock market prices using two-regime switching regression model. However, by decomposing volatility into its predictable and unpredictable components, they show that in rising market periods, there is a positive and statistically significant relationship between excess returns and ex ante market volatility. Cuñado, Gil-Alana, and Gracia (2008) found that in many cases the volatility is more persistent in the bear market than in the bull market. Ekwall (2012) in his thesis considered the performance of variance forecasting in bull and bear markets.

3. Formulation of Hypothesis

Pandian and Jeyanthi (2009) analysed the return and volatility in bull and bear market phases in Indian stock market. They found that open-close volatility is lower than the high-low volatility in intra-day volatility for the bull and bear phases. Further they found that the close to close volatility and the open to open volatility in the Nifty and the Sensex moved in tandem. Another method used in literature to detect bull and bear phases is two state Markov switching autoregressive model (MS (2)-AR (2)). Ahmad and Kamaiah (2011) using this method found that during bear regime the average expected returns are negative with high volatility compared to the bull regime in Sensex. They also inferred from Nifty returns that the market is more biased towards bull regime with very high persistence with positive returns and there is very high probability of occurrence of extreme events. Bordoloi and Shankar (2008) found that stock returns possess asymmetrical property in Indian stock market and that

the volatility increases due to certain negative factors in the equity market. Various studies used the conditional volatility models to estimate volatility clustering in Indian stock market. Karmakar (2005), Joshi and Pandya (2008), and Goudarzi and Ramanarayanan (2010) found that vanilla GARCH (1, 1) model satisfactorily explains volatility clustering and its high persistence and is the most appropriate for the series under analysis. Karmakar (2005) stated that volatility show high persistence and are predictable and that periods of high and low volatility tend to cluster. Tripathy and Gil-Alana (2010) concluded that the AGARCH and VIX models proved to be the best methods. Pandey (2005) analysed the estimation and forecasting ability of different traditional and modern volatility estimators and found that for estimating the volatility, the extreme value estimators perform better on efficiency criteria than the conditional volatility models. Following the Hamilton's (1989) path-breaking work provides a rigorous econometric model for analyzing bull and bear markets and the switching between the two regimes. Based on this framework, Schwert (1989) and Hamilton and Susmel (1994) study regime changes and market volatility, while Turner, Startz, and Nelson (1989) find that the S&P 500 index can have different mean and variance across bull and bear markets. Further, Ang and Bekaert (2002) and Guidolin and Timmermann (2004) examine portfolio decisions when asset returns are subject to regime-switching that provide insights on investments across bull and bear markets.

The evidence reported here-above makes it imperative to study the pattern of volatility to frame policies to protect the interest of investors along with the fund managers, traders and investors. Therefore, the present study aims on exploring and analysing the two phases of stock market, namely Bull and Bear phases in context of Sensex and Nifty the two primary indexes in the Indian Stock Market. It is indispensable for the investors to explore the risk involved while investing in different phases of the stock market. Formulating an investment strategy in bull or bear market condition becomes tedious without knowing the return and variance pattern in the two phases and their implications for an investor and how far they affect the naïve investor. Therefore, the paper aims to identify bull and bear market turning points using a formal turning point identification procedure and study the effects of bull and bear on the stock return and volatility.

4. Data & Methodology

The present study attempts to identify and analyse the bull and bear phases in Indian stock market using monthly closing data from Sensex and Nifty indices for a span of 19 years from April 1995 to June 2014. The monthly closing data of each index for the period of nineteen years were taken to detect Bull and Bear phases and to analyse stock market returns and volatility in each phase. The data have been collected from the archives of Bombay Stock exchange website, website of National Stock Exchange, CMIE software Prowess, website of Reserve Bank of India, SEBI, etc. Many international and national journals have also been consulted for existing literature relating to methods and models to detect bull and bear phase in stock market. The log returns are calculated for yearly index data and also for each bull and bear phases. A monthly index data of nominal returns is employed because bull and bear markets are broad market movements which would be best captured using low-frequency data.² Schwert (1990) reports that the variation in dividend returns is small relative to the variation in stock prices, thus, the cyclical nature of bull and bear markets can be conveyed using capital returns. (Gonzalez *et al.*, 2005).

The study uses unconditional method, i.e. standard deviation to measure volatility (risk) and descriptive statistics to analyse the study on yearly basis for both Sensex and Nifty. For the purpose of estimating returns and volatility for an investor's the following equations have been used. Return R_t is defined as,

$$R_t = \log(P_t / P_{t-1})$$

Where R_t is logarithmic daily return at time, t and P_{t-1} and P_t are monthly closing prices of the index at two successive days, $t-1$ and t respectively. Volatility measures the risk and is estimated using a traditional unconditional method, i.e. standard deviation of inter-day returns.

$$\sqrt{\frac{1}{N-1} \sum_{i=1}^N (x_i - \bar{x})^2}$$

Further, the study uses time series data which requires the transformation of original series. Thus we have transformed series by taking natural logarithm of the series. The two advantages of going for the transformation of original

² Two centuries of bull and bear market cycles (Gonzalez, Powell, Shi, & Wilson, 2005)

series are elaborated in literature by eminent researchers like Bollerslev (1986), Schewert (1989), Engle and Patton (2001) etc. The first advantage is that it removes the likely dependence of changes in stock price on the price level of the index. Second, the change in the log of the stock price index yields continuously compounded series. In order to identify the bull and bear phases one of the mostly used Dating method has been applied to identify turning points. Dating method refers to the techniques used for dating and detecting conjuncture changes in the historical evolution of an economic variable. Dating methods depend on the adopted definition for turning points (Youssef & Trabelsi, n.d.). A turning point is a date that separates two phases of the business cycle or stock market. Lunde & Timmermann (2000) proposed a new definition of bull and bear market states based on sequences of stopping times tracing local peaks and troughs in stock prices. This definition essentially implies that the stock market switches from a bull to a bear state if stock prices have declined by a certain percentage since their previous (local) peak within that bull state. Likewise, the stock market switches from a bear to a bull state if stock prices experience a similar percentage increase since their previous local minimum within that bear state.

4.1 Bry and Boschan Algorithm

Gerhard Bry and Charlotte Boschan (1971) have proposed an algorithm which has been applied in several researches like Layton (1997), Artis *et al.* (1997, 2004), Jorrat (1998), Bruno and Otranto (2004), Gonzalez *et al.* (2005) either absolutely or with some variations. Pagan and Sossounov (2003) outline the difficulties involved in altering the Bry and Boschan Algorithm (BB algorithm) for its application on asset price, but they stick fairly close to the original BB algorithm. BB algorithm identifies bull and bear market cycle, i.e. turning points essentially utilises a pattern recognition algorithm that seeks to find local peaks and troughs in the data. A local minimum is a trough and the following local maximum a peak so that the period between trough and peak is an expansion, and from peak to trough a recession (Berge & Jordà, 2011). The trough marks the end of the declining phase and the start of the rising phase of the business cycle. Two major alterations are made to the original BB algorithm, due to volatile nature of the stock market. The first change to the BB algorithm is not to smooth the data series. Secondly, a rule is applied to ensure that the censoring rules do not eliminate any phase in which very large movement in the index occurred. Thus, the rule states that if any month shows a return of positive or negative 20%, then the other

rules regarding the length of phases shall no longer apply. The procedure for programmed determination of turning points based on Bry & Boschan (1971) adopted from Pagan and Sossounov (2003) has been followed.

1. Determination of initial turning points in raw data.
 - a. By choosing local peaks (troughs) as occurring when they are the highest (lowest) values in a window eight months on either side of the date.
 - b. Enforcement of alternation of turns by selecting highest of multiple peaks (or lowest of multiple troughs).
2. Censoring operations (ensure alternation after each).
 - a. Elimination of turns within 6 months of beginning and end of series.
 - b. Elimination of peaks (or troughs) at both ends of series which are lower or higher.
 - c. Elimination of cycles (peak to peak or trough to trough) whose duration is less than 16 months.
 - d. Elimination of phases (peak to trough or trough to peak) whose duration is less than 4 months (unless fall/rise exceeds 20%).
3. Statement of final turning points.

5. Estimation and Empirical Analysis

Summary statistics for BSE-Sensex stock index returns are presented in Table 1 along with graph of stock returns. The mean monthly capital return over the sample data is positive (0.86) showing that the long term investors have earned a positive capital return over 19 years with volatility (standard deviation) of 7.39%. Skewness is a measure of asymmetry and it tells whether the series is a normal distribution or asymmetrical distribution. The skewness of Sensex return series is negative (-0.35) which implies that the series is distorted towards the left and is asymmetrical. Kurtosis is the measure of flatness or sharpness of a curve. The observed kurtosis value of Sensex return series is 3.638 indicated to be leptokurtic which is a typical characteristic of stock returns and is thus not a normal distribution. The Jerque-Bera test of normality is an asymptotic, or large-sample test. The null hypothesis is that the distribution is normally distributed. The Jerque-Bera statistics is 8.500 with a p-value of 0.0142 which is very small and less than .05, hence we may reject the null hypothesis to conclude that the Sensex return series is not a normal distribution.

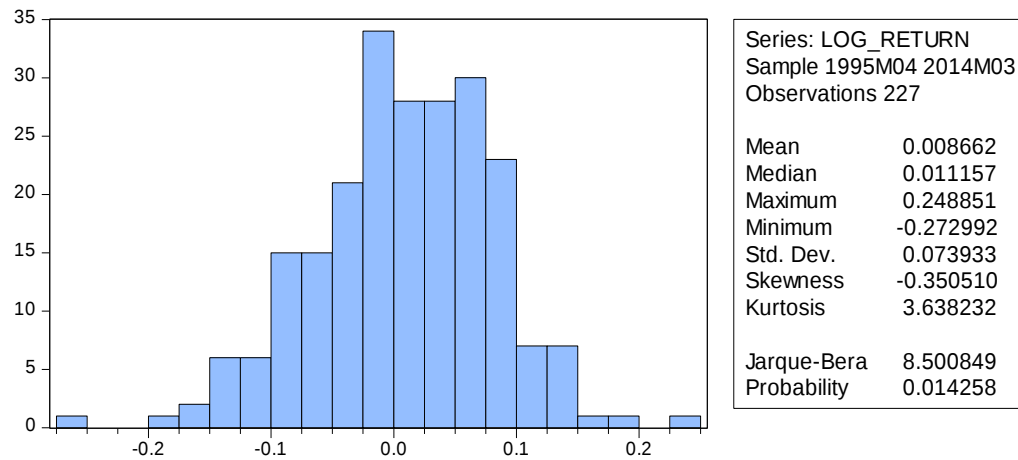
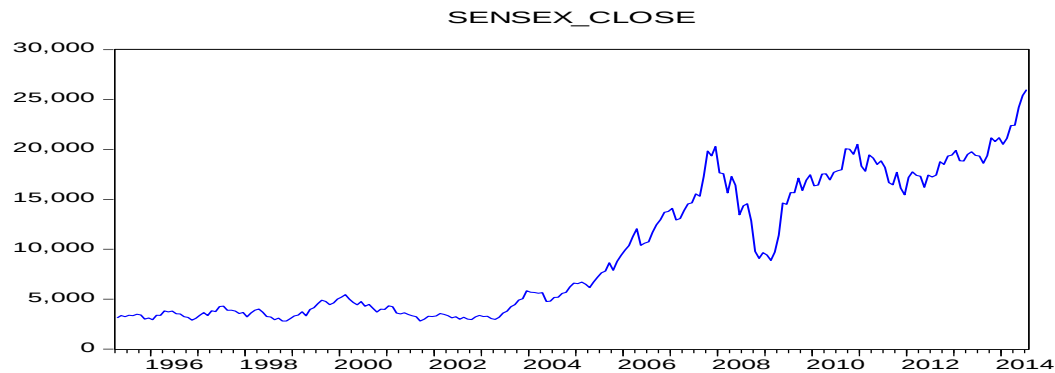
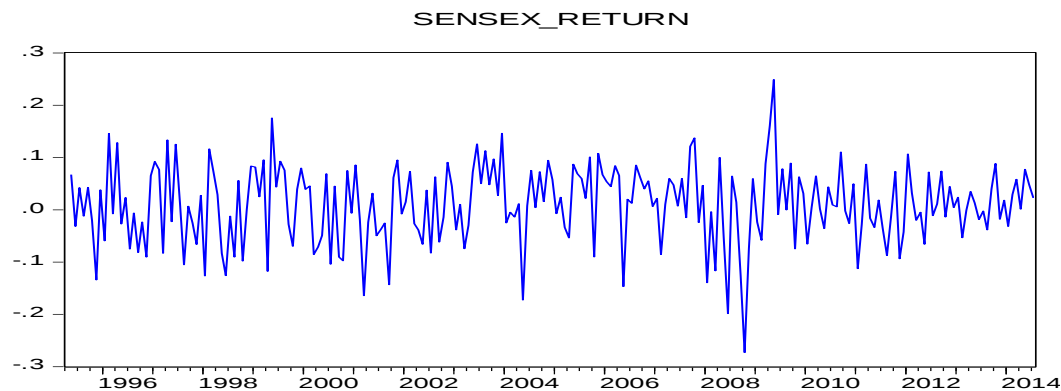
Table 1. BSE Descriptive Statistics for Log Returns

Fig. 1 & 2 show the graph of raw stock price series and log-returns of Sensex, respectively. The graph of raw monthly data shows that the Sensex has been continuously going northward with plunging south only in 2008 and then again taking upward course of direction breaking all

previous records to cross 26000 level in July 2014. The graph of log returns of Sensex shows that there is volatility clustering as returns whether positive or negative tend to cluster closely at noticeable time periods in the sample data series.

**Fig. 1: Graph of Raw Data of Sensex for the Study Period****Fig. 2: Graph of Log Returns of Sensex**

Further, the NSE-Nifty monthly capital return series gives similar results as Sensex and the mean is positive (0.86%)

which is similar to mean return of Sensex return series, which implies investors earned similar returns on both

indices. The standard deviation of Nifty returns is 7.41%, which is higher than Sensex returns which indicate that the volatility and risk of Nifty is higher than Sensex

returns. Observing the skewness, kurtosis and Jarque-Bera statistics in Table 2 it is displayed that Nifty returns series is also not normally distributed and is leptokurtic for the study period in India.

Table 2: NSE-Nifty Descriptive Statistics for Log Returns

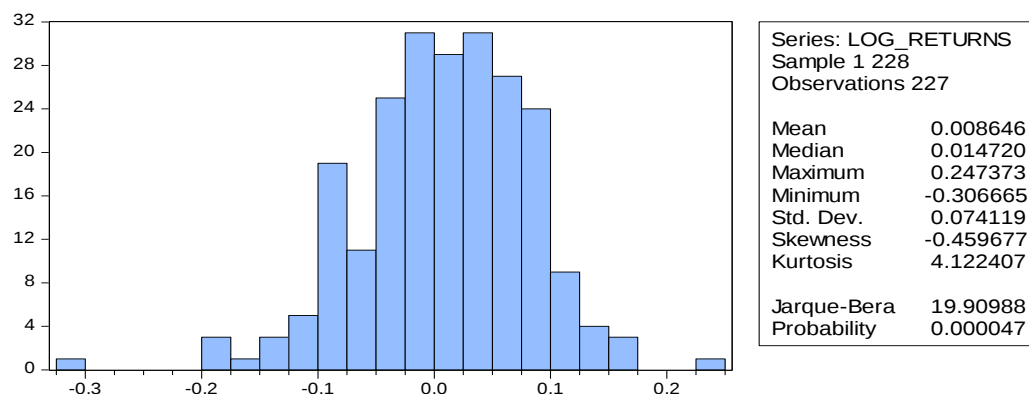


Fig. 3 & 4 demonstrate the graph of raw stock price series and log-returns of Nifty, respectively. The graph of raw monthly data shows that the Nifty has continuously been going northward with plunging south only in late 2008 during sub-prime crisis and then again taking upward direction and breaking all previous records in 2014 and

reaching just near level of 8000. The Nifty log returns graph shows that returns whether positive or negative tend to cluster closely at noticeable time periods in the sample data series. Thus, we may state that volatility clustering is a common feature of Sensex and Nifty returns.

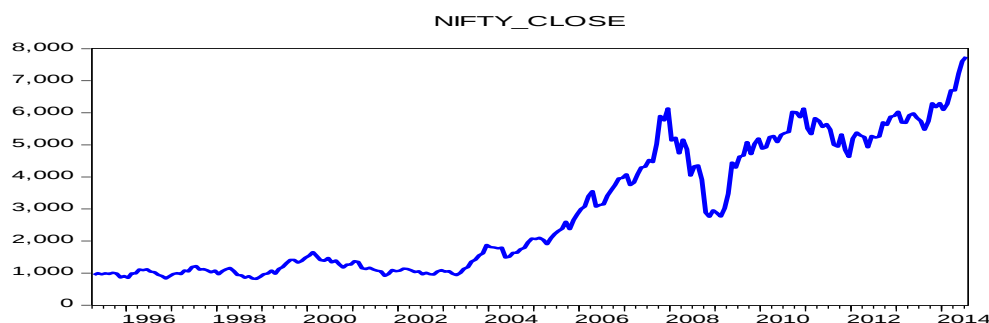


Fig. 3: Graph of Raw Data of Nifty for the Study Period

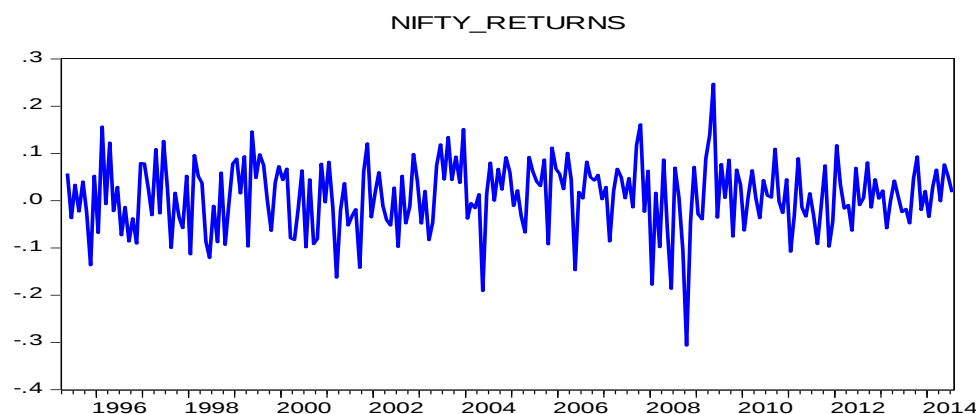


Fig. 4: Graph of Nifty Log Returns

Volatility clustering where tranquil periods of small returns are interspersed with the volatile periods of long returns is one of the oldest noted characteristic of

financial data (Joshi & Pandya, 2008). In the following section descriptive statistics has been used to present the characteristics of return of the Nifty and Sensex during the study period in Table 3.

Table 3: Descriptive Statistics of Nifty and Sensex

Year	Indices	Index Level		Average Monthly Return	Standard Deviation
		Min	Max		
1995-96	Sensex	2931.84	3493.21	0.0065	0.073
	Nifty	848.42	1011.97	0.0040	0.077
1996-97	Sensex	2890.50	3826.72	-0.0001	0.076
	Nifty	830.32	1122.00	-0.0010	0.070
1997-98	Sensex	3224.36	4305.76	0.0122	0.087
	Nifty	963.45	1221.50	0.0120	0.080
1998-99	Sensex	2810.66	4006.81	-0.0033	0.079
	Nifty	817.75	1159.35	-0.0030	0.078
1999-2000	Sensex	3325.69	5446.98	0.0242	0.084
	Nifty	978.20	1654.80	0.0290	0.075
2000-01	Sensex	3604.38	4748.77	-0.0273	0.082
	Nifty	1148.20	1471.45	-0.0240	0.080
2001-02	Sensex	2811.60	3631.91	-0.0032	0.064
	Nifty	913.90	1167.90	-0.0010	0.067
2002-03	Sensex	2949.32	3377.28	-0.0108	0.059
	Nifty	951.40	1093.50	-0.0120	0.060
2003-04	Sensex	2959.79	5838.96	0.0505	0.061
	Nifty	934.05	1879.75	0.0500	0.067
2004-05	Sensex	4759.62	6713.86	0.0125	0.070
	Nifty	1483.60	2103.25	0.0120	0.074
2005-06	Sensex	6154.44	11279.96	0.0460	0.060
	Nifty	1903.00	3402.55	0.0430	0.064
2006-07	Sensex	10398.61	14090.92	0.0123	0.066
	Nifty	3071.50	4082.70	0.0100	0.064
2007-08	Sensex	13872.37	20286.99	0.0150	0.083
	Nifty	4087.90	6138.60	0.0180	0.091
2008-09	Sensex	8891.61	17287.31	-0.0398	0.116
	Nifty	2755.00	5165.90	-0.0370	0.119
2009-10	Sensex	11403.25	17527.77	0.0492	0.091
	Nifty	3474.00	5249.00	0.0460	0.090
2010-11	Sensex	16944.63	20509.09	0.0087	0.059
	Nifty	5086.30	6134.50	0.0090	0.059
2011-12	Sensex	15454.92	19135.96	-0.0092	0.059
	Nifty	4624.00	5750.00	-0.0080	0.062
2012-13	Sensex	16218.53	19894.98	0.0066	0.043
	Nifty	4924.25	6034.75	0.0060	0.044
2013-14	Sensex	18619.72	22386.27	0.0144	0.038
	Nifty	5471.80	6704.20	0.0140	0.044

The Sensex marginally increased over the year 1995-96 from 3,206.96 on March 31st 1995 to 3,366.61 on 31st March 1996, an increase of 105.65 points or 3.2%. The trend for most part of the year was bearish with sentiments becoming positive in some months while mostly being negative. The tightness of monetary policy and its consequential effects on liquidity attributed to the market participant's negative behaviour. However, Nifty reached its highest till that date on September 1995 crossing 1000 mark for the first time since its inception. The share of NSE in total turnover increased from 1.1% in 1994-95 to 28.7% in 1995-96 (equity trading in NSE commenced on 3rd November 1994). The bearish sentiments developed in year 1995-96 continued for major part in the next year. Thereafter, the Indian stock markets witnessed high price volatility during 1996-97 with a negative mean return of -0.01 percent in Sensex and -0.10 percent in Nifty. The tight liquidity conditions, high interest rates and poor results of the corporate sector were some of the main reasons of the depressed sentiment in the stock markets.

The performance of Sensex improved from the past years by increasing 15.82 percent or 531.86 points over the year 1996-97. Sensex reached that years' highest in July 1997 of 4305.76 while dropping to lowest in January 1998 to 3224.36, i.e., a drop of 1081.4 points in seven months.

This affected the monthly average return for both Sensex and Nifty for the year 1998-99 which was negative with -0.33 percent and -0.30 percent respectively. The primary reason of this decline may be said to be the national security concerns with the pressure of impending sanctions following India's nuclear test and recurrence of turmoil in international stocks and currency markets. The FIIs inflows were negative for many months during 1998-99 on account of the East Asian Crisis. The market sentiments however improved in the last quarter of the year due to positive inflows by FIIs along with the Reserve Bank of India's announcement to reduce cash reserve ratio and Bank Rate and downward movement in deposit rates of commercial banks which increased liquidity in the stock market. Further, in June 1998, The Securities Exchange Board of India (SEBI) prescribed the volatility margins to curb excess volatility in the market and to act as a deterrent to building up of excessive outstanding positions. This step had a salutary impact and volatility was reduced during the year.

The year 1999-2000 reflected a phase of bull market wherein the S&P CNX Nifty closed at 1078.05 on March

31st 1999 climbed up to 1528.45 on March 31st 2000, registering an increase of 41.8 per cent or 450.4 points. This financial year gave a monthly mean return of 2.42 percent in Sensex while 2.90 percent in Nifty. The spurt in stock prices was to some extent assisted by massive inflow of funds by FIIs and mutual funds. The volatility measured by standard deviation of returns was 0.084 for Sensex and 0.075 for Nifty.

The BSE Sensex fell sharply from 5001 as on March 31, 2000 to 3604.38 as on March 30, 2001 registering a decline of 28 percent, while CNX Nifty decreased from 1528 to 1148, loss of 25% to investors. There was a large sell off in new economy stocks in global markets. The intermittent trends over the year were quite erratic, with Sensex reaching to the year's lowest level in March 2001 which was last seen in 1999. The earthquake in Gujarat, rising oil prices, devaluation of rupee vis-a-vis dollar, rising interest rates and inflation, the proposal to increase the tax on distribution of dividend by companies and by MFs from 10 percent to 20 percent did not speak well of the corporate sector. The problem got accentuated when the fresh scams exposed the vulnerability of the regulatory network and system of the finance and capital markets in the year 2001. The growth rate of GDP and the industrial sector declined from 6.4 percent to 6 percent and from 6.6 percent to 4.9 percent respectively. Within the industrial sector, the growth rate of manufacturing sector declined to 5.2 per cent and the infrastructure sector also registered a lower growth as compared to that of the previous year. This brought down the Nifty from the height of 1471.45 in June, 2000 to the lower level of 1148.20 in March, 2001 and the Sensex from 4748.77 in June, 2001 to 3604.38 in March, 2001.

The year 2001-02 again recorded a negative return of 0.32 percent for Sensex and negative return of -0.10 per cent for Nifty. However, the volatility for both Sensex and Nifty decreased to 0.064 and 0.067 respectively. The introduction of rolling settlement and derivatives encouraged FIIs and domestic investment to some extent. However, the market sentiments were affected by riots in Gujarat, cyclone in Orissa, suspension of repurchase facility under UTI's US 64 scheme, attacks on Indian Parliament and Jammu and Kashmir Assembly. The bearish movement in stocks prices were further precipitated by stock market crash in USA following the terrorist attack on September 11, 2001 and massive sales of stocks by FIIs in September 2001. The bearish trend

from 2001-02 continued to affect market sentiments in the year 2002-03 which recorded negative mean return in both Sensex (-1.08 percent) and Nifty (-1.20 percent) with a volatility of 0.059 and 0.060 respectively.

The SEBI has been continuously engaged in improving the functioning of secondary securities market for which it introduced reforms during the year 2002-03. Trading, clearing and settlement in equity shares were contracted to T+3 from April, 2002 and further contracted to T+2 from April, 2003. In addition to it, to make markets more efficient and provide more investment opportunities to the investors, trading in government securities on stock exchange was permitted. The year 2003-04 finally saw a reversal in market trend with Sensex returning a positive mean monthly return of 5.05% and Nifty of 5%. Markets sentiments turned bullish from the May 2003 till December 2003 giving a return of 83% in Sensex while 94% return from Nifty in eight months period. Keeping the bull run swing the Sensex surged from 2959.79 in April 2003 to 5590.6 in March 2004, giving a return of 89%. The daily average return in the Nifty and the Sensex was the highest in the year 2003-04. The positive sentiments were the outcome of strong economic fundamentals demonstrated by the fall in interest rates, strong GDP growth rate, increase in foreign exchange reserves and increase in exports by Indian companies. This was accompanied with the huge expenditure by the Government on infrastructure sector which enhanced the morale and motivation levels of Corporate India which provided a boost to the stock market returns. The SEBI's ban on the Participatory Notes issued by unregulated entities made the markets more disciplined and investor friendly.

The markets enjoyed the bullish phase over next four financial years from July 2004 till December 2007. India's growth story was well established over the coming years and money started pouring in from all over the world. A new industrial resurgence; a pickup in investment; modest inflation in spite of spiralling global crude prices; rapid growth in exports and imports with a widening of the current account deficit made India an attractive destination to park fund in the world market. The mean monthly return in 2004-05 for Sensex and Nifty was 1.25% and 1.20% respectively with standard deviation of 0.070 and 0.074 respectively. Barring a temporary phase of turbulent condition around the middle of May 2004, the stock market in India gradually gathered momentum with benchmark BSE Sensex crossing 6000-

mark on November 17, 2004 and reached an all-time high of 6915.05 on March 8, 2005 before closing at 6492.82 on March 31, 2005. Strong macroeconomic outlook, encouraging corporate results, high and sustained portfolio investments by the foreign institutional investors (FIIs) and sector specific developments contributed to the sustained rally in the stock market. The mean monthly return for Sensex and Nifty in the year 2005-06 increased to 0.0460 and 0.0430 as compared to previous year, whereas the volatility decreased over the same period.

Notwithstanding concerns over surge in the international crude oil prices, the benchmark indices surpassed several milestones during 2005-06. Sensex and Nifty bypassed all previous records in year 2005-06 with Sensex crossing 10,000 marks in February 2006 while Nifty crossed 3000 level for the first time only to keep moving upward in coming days. The Sensex increased from 6492.82 in March 2005 to close at 11279.96 in March 2006, an increase of 4787.14 points or 74% increase. Likewise Nifty closed at a high level of 3402.55 on March 2006 which was an increase of 1366.9 points or 67% from the level of 2035.65 on March 2005. The mean monthly return in 2006-07 was 1.23% in Sensex and 1.0% in Nifty. The Sensex and Nifty again climbed heights in 2006-07 with the highest level in Sensex reached at 14090.92 and 4082.7 level in Nifty in February 2007. However this year there was a decrease in annual return to 16% in Sensex and 13% in Nifty over a period from March 2006 to March 2007. The sentiments were positive throughout the year but towards the end of the year, a higher than expected inflation rate coupled with rise in interest rates somewhat dampened the sentiment.

Equity markets witnessed unparalleled enthusiasm as well as steep corrections in the year 2007-08 with Sensex crossing another milestone and doubling within two years to reach 20286.99 in December 2007 while Nifty crossed the support level of 6000 in the same month. However, the impending global recession created its ripple effects on Indian economy in the last quarter of 2007-08 with Sensex (Nifty) plunging 4642 (1404.1) points in mere three months, a fall of 22.8% (22.8%). FII flows in 2006, at about \$8.5 billion (around Rs 38,000 crore), were lower by 20 percent than in 2005.

The Sensex continued to fall in 2008-09 with plunging 37.9% or 5935.94 points from March 2008 (15644.44) to March 2009 (9708.5). Indian markets had recorded

severe volatility at the close of 2007-08 reflecting largely reflected the uncertainties in international financial market. However, equity markets witnessed significant up trend during 2009-10 and 2010-11 as compared to downward and volatile trend in 2008-09. In tandem with the increase in stock prices in 2009-10, there was a significant increase in turnover and market capitalisation across the board. In 2009-10, global equity markets improved significantly and some markets especially emerging markets showed sharp turnaround. After reaching year maximum in mid-

December 2010, the markets again started to decline till February 2011 on account of significant FII outflows and concerns raised on domestic and international issues. This downward trend continued for the year 2011-12 with Sensex and Nifty giving negative mean monthly return of -0.92% and -0.80 respectively. However the markets sentiments again revived from January 2012 giving positive returns to investor of 0.66% and 0.60% in Sensex and Nifty respectively in 2012-13. During 2012-13, Sensex and Nifty appreciated by 8.2 percent and 7.3 percent respectively.

Table 4: Sensex and Nifty Bull-Bear Phases

Sensex Phases & Dates		D	Mean Return	Std. Dev	Kurtosis	Skewness
Bear Phase: A	Sen: 03-04-1995 : 29-11-96	20	-0.004	0.072	0.155	0.426
	Nif: 03-04-1995 : 29-11-96	20	-0.007	0.074	0.25	0.52
Bull Phase: I	Sen: 02-12-1996 : 31-07-97	8	0.050	0.075	-0.376	-0.741
	Nif: 02-12-1996: 31-07-97	8	0.048	0.059	-1.47	-0.17
Bear Phase: B	Sen: 01-08-1997: 30-11-98	16	-0.027	0.075	-1.006	0.272
	Nif: 01-08-1997 : 30-11-98	16	-0.025	0.071	-1.44	0.16
Bull Phase: II	Sen: 01-12-1998 : 29-02-00	15	0.044	0.072	1.177	-0.749
	Nif: 01-12-1998 : 29-02-00	15	0.047	0.063	1.13	-1.03
Bear Phase: C	Sen: 01-03-2000 : 30-04-03	38	-0.016	0.067	-0.676	-0.080
	Nif: 01-03-2000: 30-04-03	38	-0.015	0.068	-0.508	-0.024
Bull Phase: III	Sen: 02-05-2003 : 31-12-03	8	0.085	0.042	-1.426	0.101
	Nif: 02-05-2003 : 31-12-03	8	0.087	0.044	-1.696	0.244
Bear Phase: D	Sen: 01-01-2004: 30-06-04	6	-0.033	0.070	5.236	-2.251
	Nif: 01-01-2004 : 31-05-04	5	-0.047	0.083	4.012	-1.96
Bull Phase: IV	Sen: 01-07-2004 : 31-12-07	42	0.034	0.058	1.524	-1.015
	Nif: 01-06-2004 : 31-12-07	43	0.033	0.059	1.5	-0.823
Bear Phase: E	Sen: 01-01-2008: 27-02-09	14	-0.059	0.105	-0.182	-0.417
	Nif: 01-01-2008 : 27-02-09	14	-0.057	0.112	0.42	-0.766
Bull Phase: V	Sen: 02-03-2009 : 31-12-10	22	0.038	0.074	1.938	1.081
	Nif: 02-03-2009 : 31-12-10	22	0.036	0.073	2.033	1.035
Bear Phase: F	Sen: 03-01-2011 : 30-12-11	12	-0.024	0.061	-0.131	0.492
	Nif: 03-01-2011 : 30-12-11	12	-0.024	0.062	-0.135	0.519
Bull Phase: VI	Sen: 02-01-2012 : 30-07-14	31	0.017	0.042	-0.340	0.203
	Nif: 02-01-2012 : 30-07-14	31	0.017	0.045	-0.42	0.284
Average Duration Sensex		Bear	17.6	Average Duration Nifty		17.5
		Bull	21			21.17

The Sensex peaked to new high of 26000 and Nifty reaching close to 8000 in first quarter of 2013-14, with markets moving with the hope of witnessing only upward movement in future. A noteworthy observation from Table 4 is that bull markets consistently display kurtosis of higher than of bear markets meaning that bull markets are more likely to show larger movements; thus, bull markets are more likely to be prone to outliers than are bear markets. Both types of markets display platykurtosis. Return volatility during bear and bull market months is insignificantly different, a finding that implies that bear markets are unlikely to be exclusively high-volatility states.

The definition of bull and bear (B&B) markets seems to correspond to that given in Chauvet and Potter (2000, p. 90, fn. 6): 'In stock market terminology, bull (bear) market corresponds to periods of generally increasing (decreasing) market prices.' We adopt the definition of bull and bear as given by Pagan (2003) that "the stock market has gone from a bull to a bear state if prices have declined for a substantial period since their previous (local) peak". Using this definition along with the version of Bry and Boschan algorithm used by Pagan (2003), we detected bull and bear phases in Indian stock market indices, BSE-Sensex as given in Table 4.

From Table 4, it is clear that bull markets tend to be longer than bear markets, which is in accordance with the work attributed to Hamilton in 1921 where in the average duration of a bear phase is 17.6 years while that for bull is 21 years. Over the time it can be seen that bear markets have become shorter and weaker while bull markets have become stronger and longer.

During the initial period in our sample the Sensex fell to the minimum of Rs. 2,994.29 in November 1995 as during that time the turnover of NSE crossed that of BSE's leading to fall in Sensex. The monthly turnover at BSE dropped by 17% in November 1995 from the previous month levels. In the bear phase-A, both (Sensex & Nifty) had negative return of -0.004 and -0.007 percent respectively. The markets remained bearish from 03-04-1995 to 29-11-96. The highest index value in 1996 went to Rs. 4049.32 on June 14, 1996, with monthly turnover reaching 120 Billion, 31.5% increase from May '96, which led to an upward movement in coming months but again started to decrease since October dropping to the lowest at Rs. 2745.06 on December 4, 1996 (a trough) which also ended the bear phase in the Indian stock market. The tightening of monetary policy and its consequential effects

on liquidity were attributed by most market participants for this behaviour of the stock prices. The Indian stock markets witnessed high price volatility during 1996-97 as for major part of the year was bearish from May 1996 till November 1996 with a mean return of -0.04.

The Indian stock markets witnessed a gradual rise in stock prices during the first half of the year 1997-98, but thereafter the various macro-economic factors both at the national and international levels brought the valuations down again. The duration of this cycle (Bear, A to Bull, I) was 28 months. The next bear run (phase B) started from August 1997 which continued for next sixteen months ended at lowest Rs. 2810.66 in November 1998. Nuclear tests conducted in May, 1998 and imposition of economic sanctions by the US, Japan and other industrialized countries resulted in uncertainty in the Indian stock market.

The next bull phase (phase II) started in 01-12-1998 lasted till 29-02-2000, returning a mean monthly return of 4.4% and 4.7% in Sensex and Nifty respectively lasting fifteen months. Even in bull markets, there are periodic corrections. Some issues that could drive corrections are already evident — rise in global oil prices, continued high inflation, a grim monsoon outlook, among others.

Thereafter, it started sliding down slowly taking a downward turn reaching 5001.28 in March 31, 2000, initiating a bearish trend (bear phase C) in the stock market. This downward movement of Sensex which originated in the month of March 2000 was because of poor market sentiments following the Union Budget 2000-01 bearing neutrality to market. The S&PCNX Nifty movement also reflected the same pattern during this period. The stock market in India experienced several reversals during 2000-01 leading to sharp decline in total market capitalisation, turnover and trading activity particularly more persistently towards the end of the year. The momentum in stock market remained at a low pace till April 2003 with mixed sentiments of the investors. Fall in the market was not specific to India alone and was seen as a global phenomenon. This bear phase (phase C) lasted from 01-03-2000 till 30-04-03 giving a negative return of 0.016 and 0.015 in Sensex and Nifty respectively.

The markets sentiments remained bullish (phase III) for the period of May 2003 till December 2003 giving a mean monthly return of 8.5% and 8.7% in Sensex and Nifty within eight months.

The markets sentiments remained bullish and stock market only took northward direction for over two years. This bull phase (IV) continued for next 42 months from July 2004 till December 2007 giving a positive mean monthly return of 3.4% and 3.3% in Sensex and Nifty respectively. This bullish trend was the outcome of strong macro-economic fundamentals, robust corporate results, positive investment climate, sound business outlook and continued foreign institutional investment supplemented by the active participation of the Indian mutual funds. Notwithstanding concerns over surge in the international crude oil prices, the benchmark indices surpassed several milestones during 2005-06. After Sensex reached its historical high in mid-December 2007, the fear of credit squeeze and global recession owing to sub-prime crisis in US developed, creating turmoil in Indian equity market. The Indian stock market turned volatile and negative sentiments created a chaos in the investors whereby equity markets witnessed downward trend instigating a bearish phase. This bear phase initiated in January 2008 lasted for next 14 months to end in February 2009. This phase gave the highest negative mean monthly return of 5.9% and 5.7% in Sensex and Nifty respectively with the highest volatility.

However, the financial year 2009-10 witnessed substantial rebound in stock market and decrease in volatility as compared to 2008-09. Positive sentiments prevailed in the market from the start of financial year 2009 and the year ended giving a return of 53.7% to investors in a year. Thus, again bullish trend emerged in the market with a mean monthly return of 3.8% with a standard deviation of 7.4% which signalled decrease in volatility in Indian stock market (bull phase V: 1-03-2009: 1-12-2010, lasted for 22 months).

The last bull phase (bull phase VI) in the sample data initiated from January 2012. The markets started to pick up in last quarter of 2011-12 led by the rebound in the global equity markets, sustained FII inflows, fall in inflation and softening interest rates. The global financial markets were again hit hard due to Euro zone crisis during first quarter of 2012-13 which prompted huge inflow into emerging markets like India which were considered safe haven. The Sensex closed to a high of 21164.52 after two years on account of India seen as a safe haven amidst global turmoil.

6. Findings of the Study

The study used the Bry and Boschan Algorithm to detect two most prominent market phases in stock market-

namely bull and bear phase. The study detected six bull and six bear market phases using the algorithm adopted from Pagan and Sossounov (2003) which is a slightly modified version of original Bry and Boschan Algorithm. It has been observed that the various factors like investment inflows by FII, macro-economic policy of Reserve Bank of India, economic condition in world market, inflation, interest rates in domestic market affect the sentiments of the market. The crisis in world economies also has a negative impact on emerging economy stock market. Indian stock market was severely affected in 2008 due to US sub-prime crisis for over two years before coming back to the normal conditions. However, the markets sentiments again turned bearish and stock market started to go southward after the euro zone crisis revealed its effect on world economies. Reserve Bank of India from time to time took measures to curb inflation and after-effects of economic crisis on Indian stock market and economy as a whole.

The last bull phase seems to continue over 2014 bringing a new bull cycle into existence. A strong export sector, revival in investment activity, continued recovery in US & a stable Euro area are significant positives for equity markets. With domestic macro-economic data also on the mend, the foreign market investors are aggressive buyers of Indian equity.

The market up-move since budget day has been largely on the back of positive macro cues both in the domestic as well as in global front. Sensex earnings growth has improved from 5% in FY13 to about 10% in FY14 on the back of INR depreciation. The Nifty touched an all-time high of 7,809.20 intraday, surpassing its earlier record high of 7808 hit on July 8, 2014. Even the Sensex rose 144.71 points to 26170.51 after hitting day's high of 26188.64, just a few points shy from the record high of 26190.44 of July 8. The positive sentiments in July 2014 are attributed to the domestic macro front, better IIP numbers than expected, and the inflation numbers have been better in a sense that CPI and WPI came lower than expected along with exports growing at a good pace and with the pick-up in non-oil imports.

7. Conclusion

The evidence of empirical analysis exhibits that in bull markets, stock prices run far ahead of earnings and for fairly long periods of time. Markets choose to ignore adverse possibilities and react with zest to favourable

possibilities. This is evident in the continued rally despite some macro level issues such as oil prices and inadequate rainfall. The rally that began with hopes of a strong and stable government at the Centre continues to be hope-driven, especially in Indian markets (Stay invested, market in a structural bull run, 2014). The results provide considerable support for the view of Malkiel (1979) and Pindyck (1984) that stock market declines can be explained partly by increases in risk. However, Poterba and Summers (1986, p. 1150) report that changes in market volatility are short-lived and hence, are unlikely to 'explain a large fraction of the variation in the stock market's level'. Analysing the volatility in different phases of the market helps the investors to make wise investment decisions to earn higher return with controlling the risk. The study of volatility also helps the policy makers, government institutes and corporates while making financial and economic decisions. For the retail investors who wish to make fresh investments, a relatively safe option would be to start a systematic investment plan (SIP) in an index fund. For the more seasoned investors, who wish to invest in stocks directly, the identification of bull and bear phases is vital. While building portfolio, however, focus on business fundamentals is crucial to act or react in any phase. Thus, we may state that the valuations in Indian stock market looks a bit stretched in the bull phase due to euphoria and sentimental hopes attached as most stocks have rallied ahead of fundamental. It somehow makes the Indian stock market more lucrative and potential for exponential gains as well.

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