



# Does Daily or Monthly Index Returns Make Difference in Market Efficiency? An Empirical Study of BSE and NSE Indices

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## Abstract

*Stock market efficiency refers to an ability of the concern stock market to obtain, incorporate in and replicate out the significant information in stock prices rapidly and perfectly, and reflected in corresponding indices. The present study explored and tested empirically Weak Form of Stock Market Efficiency of selected sectoral indices of Bombay Stock Exchange and National Stock Exchange by taking Daily and Monthly Index Returns. Natural returns in the index values have been considered by taking log difference changes for period from April, 2006 to March, 2015. Descriptive Statistics was used to test the normality of the Daily Index Returns and Monthly Index Returns. Weak Form Stock Market Efficiency of the selected sectoral indices of BSE and NSE were tested by non-parametric Runs Test by taking daily index returns and monthly index returns separately to judge difference in the result outcome of Weak Form Efficiency of stock market arising out of returns type.*

**Keywords:** Bombay Stock Exchange, National Stock Exchange, Sectoral Indices, Weak Form of Stock Market Efficiency, Daily Index Returns; Monthly Index Returns.

## Introduction

Indian Stock Market is considered as health barometer of Indian economy and is considered to be one of the earliest stock market in Asia. The Indian Stock Market comprises of two major nationalized stock exchanges, i.e., Bombay Stock Exchange (BSE) and National Stock Exchange (NSE). The BSE is among the oldest exchanges across the entire world. The NSE is one of the best stock exchanges in terms of its sophistication and technological advancement. Index of any stock market can measure overall sentiment of the market through a bunch of stocks that may be considered as representative of the stock market. Stock market index shows the direction of the stock market. The index also indicates day to day fluctuations happening in stock price quotations.

A well constituted and constructed index is expected to capture overall behavior of the stock market. The stock index is to represent returns gained by a portfolio investment made in the stock market. An ideal stock index of the market represents price changes of the scripts. It reflects price movements of shares for the better representation of the market. Stock market index is to act as national economic health barometer because the market prices are to reflect expectations regarding performance of the economy. The indices of the stock market are the foremost economic indicators, because they show and indicate that what is going to happen in future in the economy. The stock market returns are based on futuristic expectations. The stock market index functions to provide investors

information about the average share prices in the market. In India there are various sectoral indices which are coated in NSE and BSE<sup>1</sup>.

The concept of market efficiency is connected to the informational efficiency in the market. In the context with financial market, market efficiency refers to the assimilation of available information in setting up of current security prices. Stock market efficiency refers to the quality of the stock market to gain and receive incorporate in and show and reflect significant information in terms of share prices rapid as well as perfectly, and reflected in corresponding indices. The present study is aimed at empirically exploring Weak Form of Stock Market Efficiency of selected sectoral indices of BSE and NSE by taking Daily Index Returns and as well as Monthly Index Return to find difference in results, if any, and arising due the types of index returns considered.

**Stock Market Indices:** The index of the stock market is prepared by selecting a set of stocks, which works as representative of the entire stock market or a specific sector of the economy or any segment of the stock market. Any stock index is a measure of relative value of a set of stocks exhibited in numerical terms. Index is determined by referencing to a base period and a base value. Index is give information's regarding stock price movements in the market. Any stock market index is to capture an overall behavior of the market. All indices are imperative to determine performance of the investments made against a relevant stock market index<sup>2</sup>.

**Sectoral Indices:** Indices based on sectors produce a single sum value against the aggregate performance of a set of companies which are representing group made out of connected industry or within the sector of economy. The analysis of sectoral indices is normally deployed and employed by the investors who plan to invest in stock market in diversified stocks and for this purpose the investors usually identify the most promising sectors of the economy. Investor reviews the performance of companies within the specific sector of the economy to test and verify which individual stock would yield comparatively better return and make investment strategy accordingly. The formation of sectoral index is based on compilation of the share prices of a set of representative stocks in the sector. Sector based indices creates a basis for diversified portfolio trading for investors in the stock market. An investor is able to compare how well an individual stock and index were performing against the contemporary market indicators in the same period with the help of sector based indices<sup>3</sup>.

**Rationale:** In a specific economy the growth of all kinds of industries from various sectors is not supposed to be same at any point of time. In an economy sector wise differential growth is a common phenomenon. For making the investment decision in the stock market the investors try to select the most promising and appealing sectors. The investors also review performance of various companies from the same sector, to find out which individual stock is expected to give better returns. An analysis of sector based indices of any stock exchange is one of the traditions of measuring economic growth of the country. Stock market indices helps investors to compare how well the individual stock of a company and the index performed against the market indicators at a given period of time. Thus, it is necessary to explore stock market efficiency of any sectoral index of the concerned stock exchange, to guide investors to explore investment opportunities available in the stocks of the various sectors of the specific economy and manage their portfolio in a vibrant business environment.

**Review of Literature:** On finding Weak Form of Stock Market Efficiency in Malaysian by using daily index return of nine sectoral indices, the empirically found results were in disparity with conventional Unit Root Test. On empirically investigation it was discovered that Malaysian Stock Markets sectoral indices were not Weak Form Efficient, with an exception of the property index<sup>4</sup>. Another research examined performance and relationship of six sectoral indices in comparison with BSE SENSEX index by applying Correlation Analysis. The Major six sectoral indices were taken for this analysis, which had a significant impact on the total economic situation of the country, i.e., BSE FMCG, BSE IT, BSE BANKEX, BSE Oil and Gas, BSE Metal and BSE Realty. The results indicated that all the indices had high range of positive correlation with BSE SENSEX Index. It was further concluded that investors could follow the leading index for their investments in various sectors<sup>5</sup>.

An another study investigated the possibility of co-integration among the four main indices of National Stock Exchange, viz., CNX Nifty, CNX Mid Cap, CNX Small Cap and CNX Nifty 500. Engle-Granger Test and Johansen Co-integration Test were applied to find the presence of long term relationships if any, between the selected indices. The Trace Statistic suggested presence of two co-integrating vectors while the Max Eigen Value Statistic suggested occurrence of a single co-integrating vector. Result confirmed the existence of at least one co-integrating relationship between the four indices. This showed that the four indices moved in equilibrium which exposes inefficiency of Indian Stock Markets for the long run<sup>6</sup>. One study examined the relationship between CNX Nifty Index and sectoral indices of NSE by using Correlation Analysis. It was found that NSE Nifty monthly average returns for diverse time periods was correlated with most of the selected sectoral indexes monthly average returns, it shows that many indexes were perform along with NSE Nifty Index. Some of the index stock weightages was more in NSE Nifty, but influence was less than other index stocks, it meant that weightage was not influencing the correlations between indexes. On the basis of further analysis, it was concluded that Nifty influenced the performance of sectoral indices performance and FMCG and Pharma indexes were less influenced by other sectoral indexes<sup>2</sup>.

An attempt was made to find Weak Form of Stock Market Efficiency in Indian by examining returns of nine sample indices, using Descriptive Statistics, Augmented Dickey Fuller Test, Runs Test and Autocorrelation Test. It was found that out of nine indices, one index (CNX FMCG Index) was good compared to other sample indices. On the basis of Runs Test and Autocorrelation Function Test, it was concluded that the returns of the stock market of NSE did not follow random distribution nor did they support the Weak Form of Market Efficiency. Finally, this study suggested that retail investors may invest their money in CNX FMCG Index which performed well during the period of study<sup>7</sup>.

**Objectives:** i. To Check the Normality of Selected BSE and NSE Sectoral Indices on the Basis of Daily Index Returns. ii. To Check the Normality of Selected BSE and NSE Sectoral Indices on the Basis of Monthly Index Returns. iii. To Test the Weak Form Stock Market Efficiency of Selected BSE and NSE Sectoral Indices on the Basis of Daily Index Returns as well as Monthly Index Returns and also to compare the results.

**Hypothesis:** Following Null Hypothesis were drawn to test the above objectives: i.  $H_{01}$ : *Daily Index Returns* of Selected BSE and NSE Sectoral Indices are Normally Distributed. ii.  $H_{02}$ : *Monthly Index Returns* of Selected BSE and NSE Sectoral Indices are Normally Distributed. iii.  $H_{03}$ : *Daily Index Returns* of Selected BSE and NSE Sectoral Indices are Random, i.e., Weak Form Efficient. iv.  $H_{04}$ : *Monthly Index Returns* of Selected BSE and NSE Sectoral Indices are Random, i.e., Weak Form Efficient.

### Methodology

**The Study:** The present study is an empirical study. Weak Form Efficiency of Selected Sectoral Indices of BSE and NSE of Indian Stock Market were tested by taking Daily Returns and the Monthly Returns. The main objective of the research is to judge and find out the variation in results of Weak Form of Market Efficiency, if any, arising due to different parameters of index returns taken into consideration.

**Data:** Secondary data was used for the present research. For this, Daily Index Values and Monthly Index Values of Selected BSE and NSE Sectoral Indices of Indian Stock Market have been used. Study used data for a time period of 6 years (1<sup>st</sup> April, 2009 to 31<sup>st</sup> March, 2015). The secondary data were collected from various official websites of stock exchanges like, www.bseindia.com, http://www.nse.com, http://www.moneycontrol.com, etc.

**Sample Size:** BSE Comprises of 18 sectoral indices representing different sectors of economy. Out of 18 sectoral indices 06 sectoral indices were selected. NSE comprises of 12 sectoral indices representing different sectors of economy. Out of 12 sectoral indices 06 sectoral indices were selected. The selected indices from BSE and NSE were from same sector of economy. The list of selected indices is shown in Table-1.

**Tools for Analysis:** Descriptive Statistics was applied to check normality of the data set. Non-parametric Runs Test was used to

test the Weak Form of Market Efficiency of the selected indices, using software SPSS 17 version.

### Results and Discussion

**Descriptive Statistics:** Normality of the financial data series can be tested by using Descriptive Statistics. It includes calculation of values of Skewness, Kurtosis and Jarque-Bera. Under the normal distribution the values of Skewness and Kurtosis are equal to 0 and 3 respectively. Under the assumptions of normal distribution the value of Jarque-Bera is equal to 0<sup>8</sup>.

**Table-1**  
**List of Selected BSE and NSE Sectoral Indices**

BSE Sectoral Indices	NSE Sectoral Indices
BSE Auto	CNX Auto
BSE BANKEX	CNX Bank Index
BSE Finance	CNX Finance
BSE FMCG	CNX FMCG
BSE IT	CNX IT
BSE METALS	CNX METALS

**Table-2(a)**  
**Descriptive Statistics of Daily Returns of BSE Sectoral Indices**

Indices	BSE Auto	BSE BANKEX	BSE Finance	BSE FMCG	BSE IT	BSE METALS
Mean	0.001234	0.001031	0.001046	0.000912	0.001058	0.000329
Median	0.00099	0.001006	0.001113	0.001213	0.001071	0.000181
Maximum	0.106266	0.175483	0.173459	0.070216	0.103407	0.149282
Minimum	-0.048973	-0.08522	-0.083882	-0.039776	-0.111568	-0.072254
Std. Dev.	0.013716	0.017124	0.016212	0.01072	0.014388	0.018983
Skewness	0.413513	0.81797	0.777984	0.213979	-0.210439	0.422968
Kurtosis	6.124813	11.45601	13.24115	6.000844	11.55614	6.677591
Jarque-Bera	648.6734	4605.365	6661.678	570.435	4555.963	884.0845
Probability	0	0	0	0	0	0
Sum	1.839	1.536019	1.559163	1.35909	1.577084	0.490662
Sum Sq. Dev.	0.280142	0.436633	0.391334	0.171113	0.308233	0.536556
Observations	1490	1490	1490	1490	1490	1490

The results of Descriptive Statistics of Daily Index Returns of Selected BSE and NSE Sectoral Indices were shown in Table 2a and 2b. On analysis of results of Descriptive Statistics of Daily Index Returns of Selected BSE and NSE Sectoral Indices, it was revealed that the calculated values of Skewness and Kurtosis were not equal to 0 and 3 respectively, for the selected sectoral indices. The calculated value of Jarque-Bera was also not equal

to 0. Hence, the Null Hypothesis,  $H_{01}$ : *Daily Index Returns of Selected BSE and NSE Sectoral Indices are Normally Distributed*, was rejected. It indicated that as per Descriptive Statistics the *Daily Index Returns of Selected BSE and NSE Sectoral Indices were not Normally Distributed*, by taking Daily Index Returns as parameter.

**Table-2(b)**  
**Descriptive Statistics of Daily Returns of NSE Sectoral Indices**

NSE Indices	CNX Auto	CNX BANKEX	CNX Finance	CNX FMCG	CNX IT	CNX METAL
Mean	0.001267	0.000992	0.001009	0.000898	0.001093	0.000221
Median	0.001039	0.001007	0.000866	0.001102	0.001039	0.000203
Maximum	0.140046	0.172394	0.178069	0.083038	0.117203	0.161869
Minimum	-0.051468	-0.08544	-0.087199	-0.047434	-0.124903	-0.068703
Std. Dev.	0.013646	0.017225	0.016458	0.011434	0.015009	0.01882
Skewness	0.765093	0.758287	0.903057	0.166478	-0.182191	0.523803
Kurtosis	10.7293	10.80126	13.41197	6.476732	13.34102	7.555187
Jarque-Bera	3854.358	3921.166	6932.914	757.325	6647.229	1356.347
Probability	0	0	0	0	0	0
Sum	1.887725	1.477679	1.503654	1.338261	1.628285	0.329023
Sum Sq. Dev.	0.277287	0.441804	0.403321	0.194662	0.335437	0.527404
Observations	1490	1490	1490	1490	1490	1490

**Table-2(c)**  
**Descriptive Statistics of Monthly Returns of BSE Sectoral Indices**

Indices	BSE Auto	BSE BANKEX	BSE Finance	BSE FMCG	BSE IT	BSE METALS
Mean	0.005077	0.004906	0.000147	-0.001249	-0.00087	0.004369
Median	0.003779	0.005101	0.000266	-0.002032	0.001105	0.00438
Maximum	0.046283	0.043769	0.059814	0.027687	0.029627	0.045954
Minimum	-0.019975	-0.036571	-0.041047	-0.035726	-0.100042	-0.034843
Std. Dev.	0.012576	0.016816	0.015484	0.011178	0.016249	0.017291
Skewness	0.476262	-0.065807	0.502402	-0.145508	-3.201651	0.057885
Kurtosis	3.785424	2.956518	5.392123	3.784198	20.72597	2.721012
Jarque-Bera	4.572573	0.057638	20.19565	2.098969	1065.637	0.273711
Probability	0.101643	0.971592	0.000041	0.350118	0	0.872096
Sum	0.365516	0.353253	0.01058	-0.089945	-0.062611	0.31459
Sum Sq. Dev.	0.01123	0.020077	0.017023	0.008871	0.018747	0.021228
Observations	72	72	72	72	72	72

The results of Descriptive Statistics of *Monthly Index Returns* of Selected BSE and NSE Sectoral Indices were shown above in Table-2.c and 2.d. On testing normal distribution of *Monthly Index Returns* of Selected BSE and NSE Sectoral Indices by Descriptive Statistics, it was revealed that the calculated values of Skewness and Kurtosis were not equal to 0 and 3 respectively, for all the selected sectoral indices. The calculated

value of Jarque-Bera was also not equal to 0. Hence, the Null Hypothesis,  $H_{02}$ : *Monthly Index Returns* of Selected BSE and NSE Sectoral Indices are Normally Distributed, was rejected. This indicates that as per Descriptive Statistics the *Index Returns* of Selected BSE and NSE Sectoral Indices were not normally distributed, taking *Monthly Index Returns* as parameter.

**Table-2d**  
**Descriptive Statistics of Monthly Returns of NSE Sectoral Indices**

Indices	CNX Auto	CNX BANKEX	CNX Finance	CNX FMCG	CNX IT	CNX METAL
Mean	0.004975	0.004865	0.004694	0.003074	0.004434	0.004144
Median	0.003794	0.005119	0.003569	0.003315	0.004419	0.004309
Maximum	0.045052	0.039688	0.045427	0.043604	0.045501	0.042136
Minimum	-0.019699	-0.037852	-0.035568	-0.044561	-0.022015	-0.037222
Std. Dev.	0.012157	0.016972	0.016111	0.014098	0.010673	0.017391
Skewness	0.459546	-0.130346	-0.18051	-0.029836	0.792239	-0.045222
Kurtosis	3.717563	2.927593	3.156287	4.738422	5.183092	2.742423
Jarque-Bera	4.078885	0.219608	0.464281	9.077012	21.82938	0.223578
Probability	0.130101	0.89601	0.792835	0.010689	0.000018	0.894233
Sum	0.358203	0.350296	0.337948	0.221307	0.319222	0.298358
Sum Sq. Dev.	0.010493	0.020452	0.018429	0.014112	0.008088	0.021474
Observations	72	72	72	72	72	72

**Table-3a**  
**Runs Test of BSE Sectoral Indices Daily Return**

Runs Test						
	BSE Auto	BSE BANKEX	BSE Finance	BSE FMCG	BSE IT	BSE METALS
Test Value <sup>a</sup>	.000989	.001006	.001112	.001212	.001071	.000181
Cases < Test Value	745	745	745	745	745	745
Cases >= Test Value	745	745	745	745	745	745
Total Cases	1490	1490	1490	1490	1490	1490
Number of Runs	701	686	690	736	708	704
Z	-2.332	-3.110	-2.902	-.518	-1.970	-2.177
Asymp. Sig. (2-tailed)	.020	.002	.004	.604	.049	.029

The results of Runs Test, taking Median as base, were shown in Table-3a and 3b. On application of Runs Test to test the Weak Form Market Efficiency of Daily Index Returns of Selected BSE and NSE Sectoral Indices, the study comes out with mixed results. The result of Runs Test showed that, in case of FMCG and IT Index of BSE and NSE, the calculated P Values were more than 0.05. It was also found that the calculated Z Values for these indices fall in the acceptance region limited by the critical value  $\pm 1.96$ , at 5% level of significance. Hence, the Null Hypothesis,  $H_{03}$ : Daily Index Returns of Selected BSE and NSE Sectoral Indices are Random, i.e., Weak Form Efficient, was accepted. It indicates that, on the basis of Runs Test there is an

existence of Weak Form Efficient, taking Daily Index Returns as parameter in case of FMCG and IT Index of BSE and NSE.

For Auto, BANKEX, Finance and METAL indices the calculated P Values were less than 0.05. It was also found that the calculated Z Values for these indices do not fall in the acceptance region limited by the critical value  $\pm 1.96$ , at 5% level of significance. Hence, the Null Hypothesis,  $H_{03}$ : Daily Index Returns of Selected BSE and NSE Sectoral Indices are Random, i.e., Weak Form Efficient, was rejected for these indices. It indicates that there was no Weak Form Efficient for Auto, BANKEX, Finance and METAL indices on the basis of Runs Test, taking Daily Index Returns as parameter.

**Table-3b**  
**Runs Test of NSE Sectoral Indices Daily Returns**

Runs Test						
	CNX Auto	CNX BANKEX	CNX Finance	CNX FMCG	CNX IT	CNX Metal
Test Value <sup>a</sup>	.001039	.001006	.000865	.001101	.001039	.000202
Cases < Test Value	745	745	745	745	745	745
Cases >= Test Value	745	745	745	745	745	745
Total Cases	1490	1490	1490	1490	1490	1490
Number of Runs	701	702	700	737	710	704
Z	-2.332	-2.281	-2.384	-.466	-1.866	-2.177
Asymp. Sig. (2-tailed)	.020	.023	.017	.641	.062	.029

**Table-3c**  
**Runs Test of BSE Sectoral Indices Monthly Returns**

BSE Indices	BSE Auto	BSE BANKEX	BSE Finance	BSE FMCG	BSE IT	BSE METALS
Test Value <sup>a</sup>	.003779	.00510	.000266	-.002031	.0011051	.004379
Cases < Test Value	36	36	36	36	36	36
Cases >= Test Value	36	36	36	36	36	36
Total no. of Cases	72	72	72	72	72	72
Number of Runs	37	42	35	32	30	40
Z	.000	1.187	-.475	-1.187	-1.662	.712
Asymp. Sig. (2-tailed)	1.000	.235	.635	.235	.097	.476

a. Median

**Table-3d**  
**NSE Sectoral Indices Monthly Returns**

NSE Indices	CNX Auto	CNX Bankex	CNX Finance	CNX FMCG	CNX IT	CNX Metal
Test Value <sup>a</sup>	.0037939	.005119	.003569	.003315	.0044194	.0043090
Cases < Test Value	36	36	36	36	36	36
Cases >= Test Value	36	36	36	36	36	36
Total no. of Cases	72	72	72	72	72	72
Number of Runs	35	42	34	40	40	40
Z	-.475	1.187	-.712	.712	.712	.712
Asymp. Sig. (2-tailed)	.635	.235	.476	.476	.476	.476

a. Median

The results of Runs Test of Monthly Index Returns of Selected BSE and NSE Sectoral Indices were shown in Table 3.c. and 3.d as presented. On testing Weak Form Market Efficiency of Monthly Index Returns of Selected BSE and NSE Sectoral Indices by application of Runs Test, taking Median as base, it was found that the calculated P Values were more than 0.05 for all the selected indices. It was also found that the calculated Z Values fall in the acceptance region limited by the critical value ±1.96 at 5% level of significance for all the selected indices. Hence, the Null Hypothesis, H<sub>0</sub>: *Monthly Index Returns of Selected BSE and NSE Sectoral Indices are Random*, i.e., Weak Form Efficient, was accepted. It indicates on the basis of Runs Test there is an existence of Weak Form Efficient, taking Monthly Index Returns as parameter.

**Conclusion**

Descriptive Statistics showed that the Daily Index Returns and Monthly Index Returns of selected BSE and NSE Sectoral Indices were not normally distributed during the study period. It showed that there is no difference in the results of testing normality of data taking daily index returns or monthly index returns as parameter. Runs Test taking Median as base, showed that no Weak Form of Efficiency was found in case of daily index returns as a base for both BSE and NSE Sectoral Indices taken separately. But, Weak Form Market Efficiency was observed when monthly index returns were taken for BSE and NSE Sectoral Indices taken separately. It is concluded that the method of returns calculation i.e., daily index returns and monthly index returns defined Weak Form of Market Efficiency differently.

**Suggestions and Implications:** As the two methods of index returns calculations based on different time period decides Weak Form Market Efficiency differently, the stakeholders in stock market should take a note of it.

Intraday traders may undertake market efficiency based on daily index returns and long term investors should consider weak from market efficiency on the basis of monthly index returns. But at the same time it is also to note that index played in on daily basis in cash segment is negligible. But the results may be used judiciously with reference to the constituents companies of the index. It is implicated that method of calculation of index returns puts an impact on market efficiency determination. There is a scope of further research in this area in context to weekly and annual returns.

**Table-4**  
**Conclusion**

For Testing	Tools Used	On Taking Daily Index Returns of BSE & NSE	On Taking Monthly Index Returns of BSE and NSE
Normality	Descriptive Statistics	Not Normally Distributed	Not Normally Distributed
Weak Form of Efficiency	Runs Test (Median as Base)	Not Weak Form Efficient (on majority basis)	Weak Form Efficient

**References**

1. Mir Rouf Ahmad and Wani Arshad Nabi (2012). Benchmark Indices of Indian Economy: A Comparative Analysis of SENSEX and Nifty. *ABHINAV, National Monthly Refereed Journal of Research in Commerce & Management*, 2(6), 9-15, Cited in: [http://www.abhinavjournal.com/images/Commerce\\_ & \\_ Management/ Jun13/2.pdf](http://www.abhinavjournal.com/images/Commerce_&_Management/Jun13/2.pdf).

2. Nagendra M., Haritha M. and Ravi V. (2014). NSE NIFTY and its Correlation with Sectoral Indexes. *International Journal of Conceptions on Management and Social Sciences* 2(1), 9-13, Cited in: <http://www.worldairco.org/IJCMSS/March2014Paper27.pdf>.
3. Shanmugasundram G. and John D. (2013). Volatility of the Indian Sectoral Indices: A Study with Reference to National Stock Exchange. *International Journal of Marketing, Financial Services and Management Research*, 2(8), 1-11.
4. Chin Wen Cheong (2008). A Sectoral Efficiency Analysis of Malaysian Stock Exchange under Structural Break. *American Journal of Applied Sciences*, 5(10), 1291-1295.
5. Madhavi M. and Radhika Ravi (2010). BSE and Sectoral Indices: A Comparative Study. *International Journal of Research in Commerce and Management*, 1(6), 71-75.
6. Deo Vishal (2014). Investigating Co-integration between Some Indian Stock Indices. *International Journal of Scientific and Engineering Research*, 5(1), 1869-1872.
7. Selvam Murugesan, Ramkumar R. and Lingaraja Kasilingam (2016). Testing the Weak Form Efficiency with Respect to Sectoral Indices of National Stock Exchange Limited, India. *Indian Journal of Research in Capital Markets*, 1(1), 7-20, Cited at: <https://www.researchgate.net/publication/301301624>.
8. Totala N.K., Saluja H.S. and Totala Sunita (2014). Testing Market Efficiency of Selected S&P CNX Nifty Companies: A Comparative Study Using Daily And Monthly Stock Returns. *Altius Shodh Journal of Management*.