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Revisiting the Random Walk Hypothesis in Indian Stock Market – A Design Thinking Approach

By

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Abstract

Predicting the stock price movement is always attractive for the investors and analysts in the capital market. Random Walk Hypothesis is a well-known the widely accepted model in the capital market to test its efficiency in the weak form of efficient market hypothesis. Surprisingly, many research works found to be with mixed results, and the variation is due to the different market conditions, time horizon, etc. Considering the need, the present study is aimed to revisit the random walk hypothesis in Indian Stock market. 11 sectoral indices of National Stock Exchange are considered as sample for this study and analysed using both traditional and modern statistical tools such as Jarque-Bera, Autocorrelation Test, Box-Ljung Test, Run Test, Dicky-Fuller Test, Philips-Perron Test and Variance Ratio Test. The outcome of empirical study supports and concludes that the daily returns of selected sectoral indices has a non-random walk and do not satisfy the Random Walk Hypothesis.

Keywords: Design Thinking, Random Walk, Efficient Market Hypothesis, Strong Form, Weak Form, Indian Stock Market, National Stock Exchange

Introduction

An investor who wants to gain from the stock market investment can be classified into risk taker, risk averter and moderate risk taker. In order to satisfy all categories of investors, the financial analyst must understand the market clearly. At many times, predicting the stock price and tracking the future movement of the market is useless since the stock price movements are random and hence the market is unpredictable. The treasure behind the stock price prediction and market movement prediction leads to a famous theory in the history of finance – the Random Walk Hypothesis.

Numerous studies were conducted in the stock market to test the market efficiency using Random Walk Hypothesis [RWH] and arrived at mixed results. The present study is

aimed to revisit the Random Walk Hypothesis [RWH] considering the stock listed in the Indian Stock market. A Design Thinking approach is adapted in this study which focuses mainly on emphasizing the requirements of the customers. Based on the customer requirements, the stock market analyst could use Random walk Hypothesis. Random Walk Hypothesis focuses on the past price behaviour of the stock market which helps to assess and create a prototype behaviour in future.

Concept of Random Walk Theory

Random walk Hypothesis model assumes that the stock market prices move in completely unpredictable way. It is suggested the future price of each stock or sector is independent of its own historical movement and the movement of other sectors. The small and medium investors can be motivated to save and invest in the capital market only if their securities in the market are appropriately priced. Since the real markets are not perfectly efficient, three levels of efficiency have been defined, based on the information that is reflected in prices. Fama (1970) classified the market efficiency into the three categories as: Weak Form Efficiency, Semi Strong Efficiency and Strong Form Efficiency.

The market is considered to be weak form efficiency if the stock prices reflect past prices. The financial market is considered to be semi strong form efficient if the current market prices not only reflect all information content of historical prices, but also reflect all information publicly available. The market is said to be a strong form of efficiency where the stock prices reflect public and private information rather than historical prices.

Empathy Stage

A design thinking approach guides the present study to view from the eye point of the end users. Here the end users are the stock market analysts, traders, investors who would like to predict the stock price and market movement. The present chapter summarizes the previously published research works in the world market pertaining to stock market efficiency using Random Walk theory. Jules Augustin Frederic Regnault was the first person to record the stock price movement and suggested a modern theory of stock price changes during the year 1963, (Regnault, 2019).

(Fama, 1965) described three forms of market efficiency subject to three different information sets. A market where future prices cannot be predicted using past historical price data exhibits weak-form market efficiency. Under the semi-strong form of market efficiency prices instantaneously adjust to other relevant information that is publicly available. The strong form takes the theory of market efficiency to the ultimate extreme and suggests that even if some investors have monopolistic access to any information relevant for price formation that will not help to predict future prices. The definition of the strong form of market efficiency is ambiguous and, in general, it is not possible to empirically test this hypothesis. Hence, the existing literature has primarily focused on testing the weak and semi-strong forms of market efficiency using stock price indices.

Much of the existing literature used traditional techniques to assess the randomness in the stock price movement and few recent studies have adapted the advancements in the time series analysis to predict the efficiency of the stock market, (Sarkar, 2014 & 2015). (Mathivannan & Selvakumar, 2015) used run test, serial correlation test and finally concluded that share price do not follow any pattern and hence the movement is purely random. The

historical stock prices do not influence the future price of stocks and hence concluded that the Random Walk Theory still holds good in the National Stock Exchange. The conventional unit root test is biased with the high level of data and in the presence of heteroscedasticity, (Mishra, Mishra, & Smyth). The outcome of unit root test with the structural breaks concludes that the Indian stock market indices are mean reverting.

(Dash, 2019) used Run Test, ADF and ARIMA model to test the Random Walk Hypothesis. Contrary to the existing literature, run test and ADF test supports the RWH while, the ARIMA model provides some evidence of stock price pattern and hence concluded that the stock price do not follow randomness in Indian Stock market Supporting to the same, (Yadav, 2018) used five test namely, Run Test, ADF test, Phillips Perron test, Normality Test and Variance Ratio test and proved that the stock price do not follow any random walk and proved the existence of some pattern in the stock price movement.

Other than the historical price of shares, at times few variables such as exchange rates, fluctuation in the crude oil rate also significantly disturb the stock price movement in the Indian market, (Prabakaran, 2014). Similarly, the declaration of dividends, stock split and rights issue has created a significant positive impact on share price and its traded volume of companies listed in sectoral indices of NSE and BSE, (Ganesan & Prabakaran, 2016). (Prabakaran, Krishnaveni, & Mohanraj, 2019) and (Prabakaran, Krishnaveni, & Shamini, 2019) proved that the announcements of dividend did not affect the share price, however it significantly influenced the traded volume of shared listed in Bombay Stock Exchange and National Stock Exchange.

(Dupernex, 2007) proved in his research that the stock prices are predictable, however, that may not give an opportunity for the arbitrage to generate additional revenue. His study also supports the result of (Fama and French, 1995) where the stock prices are affected by the other parameters as well. The stocks listed in Karachi Stock Exchange are predictable with its historical stock price and it gives opportunities for the arbitrages to generate additional revenue, (Habibah, Ghumro, & Mirani, 2017). The existence of stock price patterns confirms that the Karachi Stock Exchange does not reflect the weak form of efficiency.

Define Stage

The capital market is one of the yardsticks to measure the country's economic development. Investors of capital market are always keen on stock related information and its influence on stock price and traded volume. If an investor can predict the stock price with the available historical price or with the help of publicly available information, then they can generate additional revenue out of this. Random Walk Theory suggests that the stock price reflects all publicly available information and the movement of stock price is purely by random. As per this theory, no investors can predict the stock price movement in a weak form of efficient market hypothesis. Many studies have been conducted in this area and got mixed results. The varying result is due to different market conditions, time period, etc. Hence the present made an attempt to revisit the Random Walk Hypothesis in National Stock Exchange considering the sectoral indices as the samples.

Objectives of the Study

The present study is primarily intended to revisit and to validate the random walk hypothesis in the Indian Stock Market with special reference to selected sectoral indices of National Stock Exchange.

Ideate Stage

The third stage of the Design Thinking process is the ideate stage where, idea or methodology can be defined to meet the stated objectives. In order to meet the mentioned objective, the present study adapted the structured method of data selection and its subsequent research methodology. In India, National Stock Exchange and Bombay Stock Exchange are the leading two stock exchanges and National Stock Exchange leads by its trading volume / values per day. Considering the high frequency of trading and volume of trading in a day, the present study has taken the National Stock Exchange as market and within that, sectoral indices are considered as the samples for this study. A total of 13 sectoral indices are available in the National Stock Exchange which is the true representation of the respective sectors in India. Out of 13 sectoral indices, 11 sectoral indices are taken for analysis, and two more sectoral indices namely, CNX Private Bank and CNX PSU Bank are not considered, as most of the stocks listed in those two indices are already listed in CNX Bank indice.

For the purpose of having accurate results in stock price prediction, a decade of historical stock price is mandatory, and hence the present study has taken stock price from 01.04.2011 to 31.03.2021. The historical stock prices during the study period are taken from the official website of National Stock Exchange; www.nseindia.com. The daily return of sectoral indices is calculated using logarithmic difference between closing share price of two consecutive periods. The reason behind taking logarithmic return is to ensure normal distribution which is mandatory of most of the statistical tools.

The present study used varieties of statistical tools right from basic descriptive statistics to advanced and traditional / modern statistical tools such as Autocorrelation Test, Box-Ljung Test, Run Test, Dicky-Fuller Test, Philips-Perron Test and Variance Ratio Test. The serial correlation [also called as auto-correlation] test indicates the degree of relationship between the stock prices of two consecutive periods. The Box-Ljung Test used to test the significant random movement of stock prices during the study. The major disadvantage of using serial correlation is that it works only on the normally distributed data, and if the data is not normal, the serial correlation test outcome may not be suitable and hence, used run test as a non-parametric test. The Dicky-Fuller test and Philips-Perron Test were applied on the samples selected considering all three forms of random walk; random walks without drift, with drift and with drift & trend.

Testing

The fourth stage of Design Thinking is the prototype stage wherein a model can be created for the defined problem statement. The scope of present study is limited to revalidate the Random Walk Hypothesis which is already a defined and a very famous model, hence, next stage of Design Thinking can be worked out. The last stage of Design Thinking is the testing stage wherein, the developed model can be tested at different conditions. Since, the Random Walk Hypothesis is already a developed model and established in the capital market, the testing stage is carried out in this study, as given below.

Descriptive Statistics

The daily price of selected sectoral indices was collected from its official website of National Stock Exchange and analysed using descriptive statistics. In order to ensure equality among the price of the indices, its daily return is calculated as the logarithmic difference between two consecutive periods. Theoretically the logarithmic returns are more tractable and are more likely to be distributed normally, which is the most important parameter for many statistical tools for analysis. The outcome of descriptive statistics is displayed in table 1, as given below.

Table 01 *Descriptive Statistics Of Selected Sectoral Indices*

Indices	N	Min.	Max.	Mean	SD.	Skewness	Kurtosis	JB Test
CNX Auto	2468	8.10	9.39	8.85	0.366	-0.51	-1.09	229.16*
CNX Bank	2468	8.96	10.53	9.78	0.393	-0.17	-1.22	164.94*
CNX Consumer Durables	2468	8.05	10.00	8.99	0.538	-0.02	-1.37	193.17**
CNX Financial Services	2468	8.10	9.77	8.92	0.421	-0.05	-1.20	149.11*
CNX FMCG	2468	9.12	10.46	9.93	0.351	-0.59	-0.56	175.43*
CNX Healthcare	2468	7.80	8.97	8.46	0.314	-0.65	-0.77	234.76*
CNX IT	2468	8.53	10.20	9.28	0.370	0.02	-0.47	22.88*
CNX Metal	2468	6.89	8.20	7.59	0.313	-0.08	-0.99	103.42*
CNX Oil & Gas	2468	7.67	8.79	8.15	0.307	0.14	-1.49	236.36*
CNX Pharma	2468	8.39	9.53	9.05	0.306	-0.62	-0.68	205.67*
CNX Realty	2468	4.85	5.92	5.43	0.215	-0.09	-0.76	62.73*

*Significant @ 1% LOS **Significant at 5% LOS

The data displayed in table 1 indicates the outcome of descriptive statistics applied on the daily logarithmic returns of selected sectoral indices. A total of 2468 samples have been selected for the study, and among that the lowest daily logarithmic return value of 4.85 was observed in CNX Realty indice and the highest value of 10.53 was observed in CNX Bank indice. The highest mean value of 9.93 was observed in CNX FMCG followed by CNX Bank indices, similarly, the lowest mean value of 5.43 and 7.59 was observed in CNX Realty and CNX Metal indices respectively. The highest standard deviation of 0.538 indicates that the daily logarithmic returns are highly volatile in CNX Consumer Durables indice. The Jarque-Bera statistics and its significance values confirm that the daily return series are not normal.

Autocorrelation and Box-Ljung Test

Autocorrelation test has been applied on the selected sectoral indices of National Stock Exchange. The table 2 and 3 indicates the outcome of the Autocorrelation [AC] test and Box-Ljung [BL] test applied up to 16 lags.

Table 02 *Autocorrelation Test and Box-Ljung Test – Part I*

Lag	CNX Auto		CNX Bank		CNX CD		CNX FS		CNX FMCG	
	AC	BL	AC	BL	AC	BL	AC	BL	AC	BL
1	.047	5.4**	.07	13.76*	.08	15.26*	.06	8.78*	.00	.00*
2	.026	7.1**	-.03	15.30*	.04	19.76*	-.03	11.75*	.02	.93*
3	-.031	9.5**	-.02	16.39*	.00	19.83*	-.04	15.98*	-.01	1.11*
4	-.007	9.6**	.01	16.54*	-.03	22.01*	.01	16.31*	-.01	1.18*
5	.001	9.6*	.05	21.69*	.01	22.30*	.06	25.33*	.05	8.52*
6	-.008	9.8*	-.01	21.83*	.01	22.39*	-.03	27.76*	-.03	10.95*
7	.076	24.2*	.03	23.44*	.05	28.88*	.03	30.24*	.03	13.96**
8	-.017	24.9*	-.03	26.40*	.00	28.88*	-.02	30.82*	-.08	31.72*
9	.030	27.2*	.05	33.21*	.00	28.91*	.03	33.15*	.05	38.34*
10	-.004	27.3*	.02	34.25*	-.01	29.15*	.01	33.25*	-.03	40.40*
11	.005	27.3*	-.02	35.35*	.01	29.32*	-.03	35.85*	-.05	45.96*
12	.016	27.9*	.03	37.61*	.01	29.39*	.03	38.77*	.00	45.96*
13	-.038	31.6*	-.05	43.19*	-.01	29.46*	-.04	42.42*	-.04	49.57*
14	.003	31.6*	.01	43.26*	.02	30.53*	.01	42.59*	.02	50.14*
15	.017	32.3*	-.01	43.37*	.00	30.57*	.00	42.59*	-.04	53.73*
16	.007	32.4*	-.01	43.48*	.01	30.81*	.00	42.59*	-.04	57.24*

*Significant @ 1% LOS **Significant at 5% LOS

Table 03 *Autocorrelation Test And Box-Ljung Test – Part Ii*

Lag	CNX HC		CNX IT		CNX Metal		CNX OG		CNX Pharma		CNX Realty	
	AC	BL	AC	BL	AC	BL	AC	BL	AC	BL	AC	BL
1	.07	13.2*	.00	.0	.03	2.3	.01	.3	.05	7.1*	.09	20.6*
2	.04	17.6*	-.01	.2	.01	2.4	.03	2.5	.04	11.9*	.01	20.9**
3	.00	17.7*	.00	.3	-.01	2.8	-.02	4.0	.00	12.1*	.00	21.0**
4	.01	17.7*	.00	.3	-.03	4.4*	-.01	4.3	.01	12.5	-.01	21.5*
5	.02	19.2*	.06	9.8	.04	8.1**	.04	7.9	.03	14.1**	.03	23.1*
6	-.02	20.4*	-.03	11.7	-.01	8.1**	-.06	15.4**	-.02	14.9**	-.01	23.3*
7	.02	21.8*	.03	14.6**	.01	8.2**	.03	17.35**	.02	15.90**	.04	28.29*
8	-.02	23.1*	-.01	14.9	-.05	13.7**	-.03	19.4**	-.02	16.6**	-.02	28.9*
9	.00	23.1*	.02	16.1	.05	19.3*	.03	21.2**	.00	16.6**	.01	29.4*
10	-.03	25.5*	-.01	16.3	.06	27.1*	.01	21.7**	-.04	19.4**	.01	29.7*
11	-.01	26.0*	-.02	17.4	.03	29.8*	.01	22.0**	-.01	19.8**	-.02	30.2*
12	.00	26.0*	.02	18.2	.01	30.4*	.01	22.4**	.00	19.8	.02	31.1*
13	.00	26.1*	-.02	18.9	.00	30.4*	-.04	27.3**	.01	20.2	.02	32.3*
14	-.03	28.5*	-.02	19.6	-.01	30.8*	.04	32.3*	-.03	22.2	.01	32.4*
15	-.06	38.8*	.01	19.9	-.02	31.9*	-.01	32.5*	-.06	31.1*	.00	32.4*
16	-.01	39.3*	-.01	20.1	.01	31.9*	.01	32.8*	-.02	31.8**	-.01	32.7*

*Significant @ 1% LOS **Significant at 5% LOS

The outcome of the Box-Ljung test confirms its significant level either at 1% or 5% level of significance and it gives clear indication that all the indices [except CNC IT] return series have failed to demonstrate the random movement. The significant value was not found in CNX IT for all lags except lag 7 and confirms that the daily return series may have random movement.

Run Test

The descriptive statistics and the result of Jarque-Bera test confirms the absence of normal distribution in the data collected, and hence, used non-parametric test for further analysis. The Run Test has been used as a harmonizing test for the autocorrelation test with median values and zero values are used as cut off points. The outcome of the run test with different cut off points is displayed in table 4, as given below.

Table 04 *Run Test with Different Cut Off Points*

Indices	No. of Runs	Z Value @ K = Median	No. of Runs	Z Value @ K = 0
CNX Auto	1134	-4.05*	1112	-4.79*
CNX Bank	1166	-2.76*	1154	-3.09*
CNX Consumer Durables	1143	-3.69*	1127	-3.99*
CNX Financial Services	1174	-2.44**	1174	-2.3**
CNX FMCG	1236	0.06**	1234	0.249
CNX Healthcare	1140	-3.81*	1120	-4.43*
CNX IT	1214	-.82**	1202	-1.2**
CNX Metal	1188	-1.87**	1188	-1.84**
CNX Oil & Gas	1209	-1.03**	1189	-1.74**
CNX Pharma	1141	-3.77*	1147	-3.44*
CNX Realty	1140	-3.81*	1142	-3.58*

*Significant @ 1% LOS **Significant at 5% LOS

It is clear that more than 1000 runs were carried out to arrive at the Z values and its significance for the planned cut off points. The Z values for the different cut off points indicate its significant level and confirm that the data are not random at any level.

Dicky-Fuller Test

Dicky-Fuller test was applied on the samples selected considering all three forms of random walk; random walks without drift, with drift and with drift & trend. MacKinnon's critical values are used as a benchmark to assess its significant level. The outcome of Dicky-Fuller [DF] test for the three forms of random walks is given in table 5, as given below.

Table 05 *Dicky-Fuller Test*

Indices	Without Drift	With Drift	With Drift & Trend
CNX Auto	-47.313*	-47.355*	-47.350*
CNX Bank	-46.001*	-46.043*	-46.039*
CNX Consumer Durables	-45.723*	-45.877*	-45.874*
CNX Financial Services	-46.685*	-46.747*	-46.746*
CNX FMCG	-49.549*	-49.679*	-49.686*
CNX Healthcare	-46.060*	-46.127*	-46.121*
CNX IT	-49.548*	-49.639*	-49.664*
CNX Metal	-48.134*	-48.129*	-48.141*
CNX Oil & Gas	-49.100*	-49.135*	-49.146*
CNX Pharma	-46.988*	-47.042*	-47.040*
CNX Realty	-45.276*	-45.272*	-45.284*
Test Critical Values			
1%	-2.56	-3.43	-3.96
5%	-1.94	-2.86	-3.41

*Significant @ 1% LOS **Significant at 5% LOS

It is very clear that the test statistics for all three forms of random walks for all the selected sectoral indices are negative and are lesser than the critical values of 1% and 5% level. Since the calculated values are lesser than the standard values, the null hypothesis is rejected and concludes that the selected sectoral indices do not show the characteristics of random walk and also the same is not efficient in the weak form as suggested in Efficient Market Hypothesis.

Philips-Perron Test

In addition to the Dicky-Fuller test, Philips-Perron [PP] test also performed as a confirmatory data analysis using E-Views 11. As like in DF test, the PP test was also carried out in the three forms of random walk namely, without drift, with drift and with drift & trend. MacKinnon's critical values are used as a benchmark to assess its significant level. The outcome of Philips-Perron [PP] test for the three forms of random walks is given in table 6, as given below.

Table 06 *Philips-Perron Test [Pp Test]*

Indices	Without Drift	With Drift	With Drift & Trend
CNX Auto	-46.124*	-47.421*	-48.482*
CNX Bank	-46.425*	-46.627*	-45.524*
CNX Consumer Durables	-45.427*	-45.004*	-46.487*
CNX Financial Services	-46.018*	-46.407*	-46.842*
CNX FMCG	-48.247*	-49.503*	-48.927*
CNX Healthcare	-46.824*	-46.014*	-47.997*
CNX IT	-49.082*	-48.402*	-48.742*
CNX Metal	-48.924*	-47.405*	-49.425*
CNX Oil & Gas	-48.301*	-48.493*	-49.140*
CNX Pharma	-46.100*	-47.085*	-47.482*
CNX Realty	-45.490*	-45.107*	-45.402*
	Test Critical Values		
1%	-2.56	-3.43	-3.96
5%	-1.94	-2.86	-3.41

*Significant @ 1% LOS **Significant at 5% LOS

It is understood that the test statistics for all three forms of random walks for all the selected sectoral indices are negative and are lesser than the critical values of 1% and 5% level. Since the calculated values are lesser than the standard values, the null hypothesis is rejected and concludes that the selected sectoral indices do not show the faces of random walk and also the same is not efficient in the weak form as suggested in Efficient Market Hypothesis.

Variance Ratio Test

Variance Ratio test has been performed on the selected sectoral indices of National Stock Exchange by considering the assumptions of homoscedasticity and heteroscedasticity increments. Since there is no standard interval suggested, the study has taken the interval of 2, 4, 8 and 16 as referred to in the literature reviews. The calculated variance, variance ratios, Z values and its significance are tabulated as given below.

Table 07 *Variance Ratio Test*

Indices	Parameter	m = 2	m = 4	m = 8	m = 16
CNX Auto	Variance	1.92794	1.92945	1.92850	1.92999
	Variance Ratio	-0.50012	-0.74986	-0.87499	-0.93745
	Z Value	-24.84544*	-19.91230*	-14.69512*	-10.58033*
CNX Bank	Variance	2.45998	2.46181	2.46437	2.46835
	Variance Ratio	-0.50006	-0.74984	-0.87479	-0.93729
	Z Value	-24.84247*	-19.91176*	-14.69174*	-10.57859*
CNX Consumer Durables	Variance	1.61187	1.61237	1.61168	1.61497
	Variance Ratio	-0.50005	-0.74995	-0.87503	-0.93739
	Z Value	-24.84210*	-19.91455*	-14.69571*	-10.57963*
CNX Financial Services	Variance	2.19621	2.19791	2.19950	2.20057
	Variance Ratio	-0.49997	-0.74979	-0.87480	-0.93737
	Z Value	-24.83790*	-19.91033*	-14.69196*	-10.57946*
CNX FMCG	Variance	1.21365	1.21461	1.21604	1.21621
	Variance Ratio	-0.49988	-0.74974	-0.87472	-0.93735
	Z Value	-24.83359*	-19.90908*	-14.69060*	-10.57926*
CNX Healthcare	Variance	1.27670	1.27767	1.27918	1.28238
	Variance Ratio	-0.49983	-0.74972	-0.87471	-0.93720

	Z Value	-24.83085*	-19.90850*	-14.69043*	-10.57752*
	Variance	1.78424	1.78538	1.78706	1.76950
CNX IT	Variance Ratio	-0.50033	-0.75000	-0.87488	-0.93806
	Z Value	-24.85578*	-19.91599*	-14.69329*	-10.58720*
	Variance	2.50527	2.50653	2.50738	2.51122
CNX Metal	Variance Ratio	-0.49980	-0.74977	-0.87484	-0.93733
	Z Value	-24.82962*	-19.90990*	-14.69263*	-10.57895*
	Variance	1.80766	1.80910	1.80982	1.81293
CNX Oil & Gas	Variance Ratio	-0.49991	-0.74976	-0.87483	-0.93731
	Z Value	-24.83508*	-19.90943*	-14.69236*	-10.57873*
	Variance	1.52076	1.52188	1.52373	1.52764
CNX Pharma	Variance Ratio	-0.49982	-0.74972	-0.87471	-0.93719
	Z Value	-24.83037*	-19.90856*	-14.69036*	-10.57746*
	Variance	4.35972	4.35854	4.35589	4.36276
CNX Realty	Variance Ratio	-0.49980	-0.74997	-0.87506	-0.93743
	Z Value	-24.82943*	-19.91501*	-14.69623*	-10.58013*

*Significant @ 1% LOS **Significant at 5% LOS

The above table displays the outcome of the variance ratio test for the different interval selected for the study. The empirical findings proves that the null hypothesis of random walks under the assumption of homoscedasticity and heteroscedasticity increments are rejected for all selected indices for the different interval levels such as 2, 4, 8 and 16. Thus by concluding that the daily returns of selected sectoral indices have serial dependency which marks the series is a non-random walk and proved that the selected sectoral indices in National Stock Exchange do not satisfy the Random Walk Hypothesis.

Findings and Conclusion

The study used both conventional as well unconventional tests to check the legitimacy of Random Walk Hypothesis in the selected sectoral indices of National Stock Exchange. The Jarque-Bera statistics and its significance values confirm that the daily return series are not normal. The outcome of the Box-Ljung test also proves that all the indices [except CNC IT] return series have failed to demonstrate the random movement. The result of the Run test also supports the absence of random walk.

The DF test and PP test statistics for all three forms of random walks for all the selected sectoral indices are negative and conclude that the selected sectoral indices do not show the faces of random walk and also the same is not efficient in the weak form as suggested in Efficient Market Hypothesis. The findings from variance ratio test proves that the null hypothesis of random walks under the assumption of homoscedasticity and heteroscedasticity increments are rejected for all the selected indices and concludes that the daily returns of selected sectoral indices has a non-random walk and do not satisfy the Random Walk Hypothesis.

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