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An Empirical Investigation of Day of the Week Effect in Stock Return: Evidence from CNX Nifty

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Abstract

Purpose of the Study: Indian markets have shown prompt response to the financial crisis in the year 2008 and the results affected the stock returns critically. An earnest attempt is made in this study to know the existence of weak form of efficiency in Indian market. Increased trade volumes in CNX Nifty have gained leading position within world indices. Therefore, it is essential that supplementary researches should be made for better understanding of efficiency in Indian market.

Methodology Adopted: During the crisis, each index is likely to lose its efficiency. The efficiency in the stock market returns of India has been estimated using two parametric and two non-parametric tests. The daily data sample employed is from 01 April 2007 through 31 March 2012. The model used in this study will test the hypothesis of equal mean returns for each trading day of the week. This is the most common anomaly found in the stock market, which promotes investors to achieve abnormal gain in the market.

Findings of the Study: It has been found that the crisis period (2007- 2012) had no impact on the returns of Indian market. In addition, it is interesting to see that the tests applied to know the randomness of the return is supporting the weak form of efficiency in the market. The results reveal that Indian stock market (CNX Nifty) is following weak form of efficiency.

Research Limitations: As far as limitations of the study are concerned, the research has been done by taking into account the Indian perspective only. Therefore, a major limitation is that it will not be applicable to other stock exchanges due to the cultural differences and trading background. Another limitation is that this study has brought together the data of market Index and individual scrips are not considered in it. This study is basically aiming at testing the efficiency of the CNX Nifty and creating an investment strategy through these findings which may not provide accurate results to marketers.

Future Aspects:The study attempts to fill the gap of research in this area and suggests the nature of efficiency in CNX Nifty. Further research could be done on other indices, we can also test the efficiency of various other countries during the era of global crisis.

Keywords: Weak form Market Efficiency, Runs test, Unit Root test and Ordinary least square method.

Introduction

The efficient market hypothesis (EMH), a concept introduced by Fama (1970), postulates that stock prices must efficiently reflect all available information about their intrinsic value. An efficient market is one where all unexploited profit opportunities are eliminated by arbitrage (Richard et al., 2004). Over the last decades, many empirical studies have indicated persistent and potentially exploitable anomalies in both stock returns and volatility in several countries. Financial literature has showed a trend of the studies which is consisting of study of anomalous patterns and seasonal anomalies such as DOW effect (Day- of- the-week effect), and January effect etc. The studies of Balaban, E. (1995), French, K. R. (1980) and Jaffe, J. and Westerfield, R. (1985)have seen such anomalies patterns in their study.It indicates that returns are abnormally higher on some days of the week than on other days. From a financial perspective, it is important to examine the daily anomalies in markets due to several reasons:

- The discovery of anomalous patterns in stock returns is important to know their impact on the trading strategies of investors (Cemal and Sibel, 2003).
- Besides returns, the risk factors and volatility perspective should be kept into account prior to any in-

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vestment decisions.High or low returns are associated with a high or low volatility for a given day. If investors can identify a certain pattern of volatility, it is easier to make investment decisions based on both the projected returns and the risks associated with the specific security (Balaban *et al*., 2001; Berument and Kiymaz, 2001; Kiymaz and Berument, 2003).

- Thus, the investigation of anomalous patterns may reveal evidence about the extent of market efficiency.

The existence of efficiency in stock markets is one of the most contentious and well-researched propositions in the literature of capital market. Even if many of the researches and journal articles are already available on this topic, but still economists have not yet reached a commonconsensus.

Market efficiency is a condition where all available public information is perfectly reflected into the current prices of the shares and it leads to no further scope for gaining the abnormal return in the informationally adjusted stock market.The basic idea behind efficiency is that market competition will drive all information into the stock price quickly. Thus, the crux of the market efficiency is that the only way to obtain higher returns in the stock market by an investor is by dealing in those stocks which are more risky in its investments.Expert stock selection and perfect market timings will never be able to outperform theoverall market.

Historical Background

The efficient market hypothesis was first expressed by Louis Bachelierin 1900. He was a Frenchmathematician and in his Ph.D. thesis entitled, *Théorie de la speculation*, this terminology was introduced. His work was way ahead of his time and was overlooked. Further it was rediscovered by Savage in 1955. Also, work by Cowles in 1930 and 1944 again described that investment professionals cannot ever beat the market.The efficient market hypothesis has grabbed its prominent theoretical position in the mid of 1960s. Paul Samuelson had instigated Bachelier'scontribution among economists. Bachelier's dissertation along with many of the works mentioned above waspublished in1964, together by Paul Coonter in his classic book, *The Random Character of Stock Market Prices*. In 1965, Eugene Fama, the father of modern finance, published his dissertation arguing for the random walk hypothesis in the market and Samuelson published a well-proofed for the efficient market hypothesis. In 1970, Eugene Famaagain published a review of the theory along withthe evidence for the efficient market hypothesis. Fama has given three different forms of market efficiency and has extended the definition of the given theory.He was also the first to think about the "joint hypothesis problem".

The efficient market hypothesis is commonly divided into three different forms: strong form, semi-strong form and weak form of efficiency.

Weak form suggests that current price has already reflected the past information which is available in the market. Thus, the market sentiments will never be revealed though the help of technical analysts.

Semi-strong form of efficiency suggests that the stock prices adjust to any new information in very small amount of time that no fundamental analyst will able to retrieve the excess return in that short span of time.

Strong form efficiency involves that share prices reflect all existing information and an investor cannot earn abnormal returns. For testing the strong form efficiency, a market is required where investors cannotconstantly earn abnormal returns over a large span of time.

Weak form of market efficiency is also tested for the day-of-the-week and calendar anomaly. The market is said to be weak form of efficient if no day or no month outperform or underperform in any circumstance. In other words, there should not be a specific day or month which can predict the price momentum of the stock market.The day-of-the-week effect, in which the mean returns are observed to be different on each day of the week, is one of the most eminent stock market anomalies. Theoccurrence or absence of this effect has important implications for investment decision makers.

There are two different groups of findings; the first group supporting weak-form efficiency in emerging and less developed markets hasBarnes, P. (1986), (for the KualaLumpur Stock Exchange); Chan, K.C., Gup, B.E. and Pan, M.S. (1992) (the major Asian markets); Dickinson, J. P. and Muragu, K. (1994) (in the Nairobi Stock Exchange) and Karemera, D., Ojah, K., and Cole, J. A. (1999)(on the four Latin American countries market) regardless of the issues of thin trading in the market.

On the other hand, the next group, which evidences thatthe market of developing and less developed

marketsare not efficient in weak-form hasWong, K. A., Hui, T. K. and Chan, C. (1992) on the stock market of Korea and Taiwan;in a world bank study by Claessens, S.; Dasgupta, S.; and Glen, J. (1995) report in 19 emerging markets stock prices violates weakform EMH; similar findings are reported by Harvey, C. and Huang, R. (1991) and Khababa, N. (1998). Some of the studies conducted by Kulkarni (1978); Chaudhury (1991); Kim, Nelson and Startz (1991); Shiguang and Barnes (2001) also evident the existence of weak form of efficiency in capital markets. Considering the mixed empirical results found in the literature, we are motivated to examine the weak form of efficiencyin Indianstock market indices covering the period of five years (i.e. 2007-2012).

The Indian stock exchanges namely National Stock Exchange (CNX Nifty) and Bombay Stock Exchange (BSE Sensex) holds a well-established place not only in Asia but also at the global level.

NSE came into existence in 1992.A well-diversified index of Indian economy is CNX Nifty; it consists of 50 stocks which accurately reflect the overall market conditions. CNX Nifty is higher than other leading indices and this can be clearly noticed by the reward-to-risk ratio of the various indices. This makes Niftyas a more attractive portfolio which offers better returns, but at lower risk. CNX Nifty has got recognition internationally because its methodology is based upon solid economic research. It makes a pioneering effort in creating a better understanding of the stock market index.

This study had been undertaken in the Indian context to validatethe weak form of market efficiency by testing the day of the week effect and calendar anomaly for the period of five year starting from April 1, 2007 to March 31, 2012.The next section gives a brief literature review on market efficiency. The latter section enunciates the methodology and test used in this study. The fourth section examines the results obtained from the study and the fifth and the last section concludes with the limitation and final conclusions.

Literature Review

The existing form of efficiency or inefficiency of securities market has generated a lot of controversies and theories in finance and economics. Many of the attempts are made to investigate the behaviour of stock markets in various countries.

In developed economies the studies of Kendall(1943, 1953); Cootner (1962); Osborne, (1962) and Fama(1965) havesupported the proposition that price changes are randomand past changes were not much useful in forecasting the future price changes predominantly after taking into account the transaction costs. All these studies are has given their consents on the weak form of efficiency as a part of efficient market hypothesis.

Sharma and Kennedy (1977)made a comparison in the behaviour of stock market indices of the London,Bombay, and New York Stock Exchanges during the year 1963-73 using run test and spectral analysis. They discovered therandom movement of stock indices for all the three exchanges. They concluded that stock onthe BSE follow a random walk.

Kulkarni (1978) has investigated the stock prices by using the spectral analysis. He made his study on Ahmedabad, Bombay, Calcutta, Delhi, and Madras stock exchanges of India. His study summaries that there is a replication cycle of four weeks for the weekly and seasonal prices of the stock market. The hypothesis of randomness is rejected in his study.

Roux and Gilberson (1978) and Poshakwale S.(1996) evident the non-randomness stock price behaviour and themarket inefficiency (not weak-form efficient) onthe Johannesburg Stock Exchange and on the Indian Stock Market.

Sharma (1983) had taken into account 23 Indian companies listed on the BSE by using the integrated moving average form of random walk and assured that the previous shocks do not apparently influence future shocks.

Yalawar (1988) studied the month endclosing prices of 122 stocks listed at Bombay Stock Exchange during the period 1963-82. Heused only the non-parametric tests such as Spearman's rank correlation test and runs test. Thus, his study did not support the random walk of the market.

Madhusoodanan (1998) concluded that BSE sensitivity and national indices did not follow random walk.

Chaudhary (1991) tested the equality of monthly and daily returns in the IndianStock Markets.

Ramasastri (1999) deliberated the Indian stock markets for random walk during post liberalization erathrough

Dickey-Fuller hypotheses. Unlikely, other studies he accepted the null hypothesis of the random walks in the movements of the share prices.

Mitra (2000) has rejected the criteria of unpredictability of stock prices in BSE (Bombay Stock Exchange). He has developed the ANN model based on past stock market prices and suggested that the network performs well in forecasting.

Parameswaran (2000) revealed that eight out of tensize selected portfolios do not follow the random walk. He furtheradded to his research that non-tradingis not any source of serial correlation in the large sized firms of the industry.

Pant and Bishnoi (2002) analysed the daily and weekly effect of five Indian stock market indices for random walk during the period of 1996 to 2001. Their study is also not supporting the random walk theory in the Indian stock market.

Pandey (2002) inferred in his study that there was a tax loss selling effect in the Indian stock market returns.

Bhattacharya *et al*. (2003) used GARCH framework for knowing day-of-the-week effect. Theyhave used the methodology of reporting and non-reporting weeks of the month to study the day-of-the-week effect.

Nathand Dalvi (2004) examined the day-of-the-week effect in the Indian equity market. He used robust regression with bi-weights and dummy variables; thestudy summarizes that before introduction of rolling settlement in India during January 2002, Mondayand Friday were significant days.

Cooray and Wickremasingle (2005) examined weak-form efficiency in the stock markets of India, Sri Lanka, Pakistan and Bangladesh. They found that stock markets of India, Sri Lanka and Pakistan were weak-form efficient, whereas Bangladesh is lacking the same.All these studies have used end of day data.

The studies for knowing the day of the week effect are still a few in Indian stock markets as compared to other developing economies. Hence, this article is emphasising on an attempt to re-examining the weak form efficiency in the Indian capital market.

Methodology and Tests Used in the Study

Problem of the Study

This study deals with the following issues in context of Indian stock market:

- Whether the prices in Indian stock market show any systematic patterns or are they impossible to differentiate from those of random walks?
- Do stock prices over the short periods, such as a day, week or month display random effect?
- Do the stockreturns follow the normal distribution curve?

The above issues are identified on the basis of review of literature. The present study is an attempt to address these issues.

Objective of the Study

The prime objective of this research is to test the weak form of market efficiency at the National Stock Exchange. The sub-objectives are:

- To demonstrate the existence of the day of the week effect in National Stock Exchange.
- To examine the weak form of efficiency in CNX Nifty.

Data

The daily data sample employed is from 01 April 2007 through 31 March 2012, daily returns are computed as:

$$R_t = \text{In}\ (P_t / P_{t-1}\ )*100$$

Market holidays are excluded from the data in order to remove biasness of seasonality.

This ‘close toclose’ data does not contain information aboutthe payment of dividends, with the obvious implicationthat this study cannot extend its analysis to consider previous research which has concentrated explicitly on the roleof dividends in return anomalies.

Methodology

The model used in this study will test the hypothesis of equal mean returns for each trading day of the week. The specific hypothesis tested is:

$$H_0: \alpha_1 \text{ (Monday)} = \alpha_2 \text{ (Tuesday)} = \alpha_3 \text{ (Wednesday)} = \alpha_4 \text{ (Thursday)} = \alpha_5 \text{ (Friday)}$$

Empirical Results Obtained from the Study

The statistical summary for daily index returns over theentire study period is reported in Table 1. Thesestatistical tests are providing a simple analysis of thedistribution of the logarithmic returns on the days of the week. For the entire period, the mean return is least for Monday andThursday. Wednesday has the largest positive mean return. The median return is also highest on Wednesday and then on Friday. However, the maximum return is attained on Friday and the minimum return is negative on Monday. Monday shows positiveskewness and the other days demonstrate negativeskewness. The distribution can be called as leptokurtic, due to the relative normal distribution and this is exhibited by the value of the kurtosis which is more than 3 for all 5 days in aweek. All the Jarque–Bera test results are demonstrated as significantat the 1% significance level. The null hypothesisof normal distribution is rejected which indicates that the distribution of the returns is abnormal for each day.

As the returns considered in the study do not fulfil the assumptions of normality, thus, the preference should be given to median return as compared to mean. The absence of normality in the data also suggests the use of nonparametric tests for the study.

Runs Test

We employed the Wald-Wolfowitz Runs Test for knowing the randomness of the series. This test is considered as a strong test for investigating the randomness in share price movements. It compares the expected number of runs with the observed number of runs through a random process. The test is non-parametricandis independent of the normality. Theruns test observes whether the value of one observationaffects the valuestaken by next observations or not. It also predicts the sequence considered is random. Runs test demonstrates the Z statistics with its observed level of significance. The total number of runs is a gaugeto calculate the randomness, as too many or too few runs, suggests dependence between observations.We will code values above the median as positive and values below the median as negative.

H_0: The series was produced in a random manner

H_1: The series was not produced in a random manner

The test statistic is:

$$Z = \frac{O\ R\ -\ E\ (R)}{\sigma\ (S.E)}$$

where O (*R*) is the observed number of runs, E(*R*), is the expected number of runs, and σ is the standard deviation of the number of runs. The values of E(*R*) and *σ* are computed as follows:

$$E\ R\ = \frac{2\ n_1\ n_2}{n_1 + n_2} + 1$$

$$\sigma = \frac{2\ n_1\ n_2 (2 n_1\ n_2 - n_1 - n_2)}{n_1 + n_2}$$

where n_1 and n_2 are the number of positive and negative values in the series.

Table 1: Logarithmic returns on NSE by day of week

Days	*Monday*	*Tuesday*	*Wednesday*	*Thursday*	*Friday*
Mean	0.000349	2.000151	2.000672	1.999363	2.000104
Median	0.000332	2.000214	2.000669	1.999964	2.000252
Maximum	0.070939	2.026756	2.026153	2.023372	2.029347
Minimum	-0.03954	1.970079	1.972291	1.977273	1.94348
Std.Dev.	0.009817	0.007269	0.00766	0.00682	0.008687
Skewness	1.060555	-0.03301	-0.0855	-0.09796	-0.98994
Kurtosis	14.21036	5.642242	4.755925	4.420727	10.7479
Jarque-Bera	1350.526	72.76874	32.55172	20.91131	655.4856
Prob.	0.0000	0.0000	0.0000	0.0000	0.0000

Table 2: Runs Test

	Monday	*Tuesday*	*Wednesday*	*Thursday*	*Friday*
Test Value[a]	2.00033	2.00021	2.00067	1.99996	2.00025
Cases < Test Value	124	125	125	122	123
Cases >= Test Value	125	125	126	122	123
Total Cases	249	250	251	244	246
Number of Runs	141	115	144	130	117
Z	1.969	-1.394	2.214	.898	-.894
Asymp. Sig. (2-tailed)	.049	.163	.027	.369	.371
a. Median					

The negative Z value for return indicates the sign of positive autocorrelation. Alternatively, the null hypothesis will be rejected at five percent level of significance if the observed value of Z is follows the condition that Z > 1.96.The results of the runs tests for day of the week are reported in Table 2. For each of the day, the runs testshows that Indian stock market index is revealing different results for various days of a week.The estimated Z-values are insignificant at the5% level of significance and thenull hypothesis of return independence isaccepted in Tuesday, Thursday, and Friday.CNX Nifty on Tuesday and Friday reveals the positive sign of auto correlation as its Z value is negative. Monday and Wednesday are significant at 5% level of significance which indicates inefficiencies on Monday and Wednesday in CNX Nifty. Hence, runs test in day of the week indicates a random walk in all days except in Monday followed by Wednesday. The result of this test indicates some randomness but itcan be clearly decided only after the test of autocorrelation which will lead towards weak form of efficiency in market.

Autocorrelation Test

Autocorrelation test has been widely used in the literatures to test the serial dependence of a series at different lags or periods. The series display randomness if the autocorrelation coefficient at any lag is zero and if the coefficient is different from zero then we can summarize that the present value is dependent on the previous value and therefore the random walk in series will not exist. Q-statistic is generally used to test the joint hypothesis of no auto-correlation up to a specified number of lags. If the Q-statistic is greater than the critical value from the Chi-square distribution then the null hypothesis of no autocorrelation is rejected.

H_o = No Significant autocorrelation at lag (n).

H_1 = Significant auto Correlation at lag (n).

The Q-statistic is calculated as follows:

$Q = n (n+2)$

where

n= Number of Observations

K= Number of Lags

Table 3exhibits that the first ten sample autocorrelation coefficients and Ljung-Box Q-statistics of daily data for NSE in the selected period. The results reveal that the sample autocorrelation coefficient and the Ljung- Box statistics for the daily returns in the index for CNX Nifty. All returns are compounded continuously. Q (1) to Q (10) are the Ljung-Box statistic which shows the sign of the presence of first to tenth order autocorrelation in the series.

The autocorrelation coefficients at lag one to tenth are shown as insignificant in all the days of the week. This may suggest that the CNX nifty is following the theory of random walk. While the Q-Stats signifies that the historical information well-established in longer period of lags would be as influential in determining the future price of the index as that of information was unshakable for the longer lag lengths.

Positive autocorrelation points towardthe predictability of returns in short period of time. This is the general supportagainst market efficiency. However, the presence

Table 3: Autocorrelation for daily return of NSE

Monday	*Lag*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
	AC	-0.006	-0.005	0.000	0.000	0.001	-0.003	-0.003	0.000	0.002	0.000
	PAC	-0.006	-0.005	0.000	0.000	0.001	-0.003	-0.003	0.000	0.002	0.000
	Q-Stat	0.0081	0.0138	0.0139	0.0139	0.0139	0.0157	0.0188	0.0188	0.0196	0.0196
	Prob.	0.928	0.993	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Tuesday	AC	0.103	0.02	-0.128	0.048	-0.039	-0.094	-0.003	0.016	-0.047	-0.085
	PAC	0.103	0.01	-0.132	0.076	-0.049	-0.109	0.04	0.002	-0.078	-0.057
	Q-Stat	2.6659	2.7703	6.9179	7.4995	7.8981	10.19	10.193	10.26	10.841	12.718
	Prob	0.103	0.25	0.075	0.112	0.162	0.117	0.178	0.247	0.287	0.24
Wednesday	AC	-0.073	0.101	0.095	-0.02	0.012	-0.015	0.018	0.033	-0.069	0.008
	PAC	-0.073	0.096	0.111	-0.015	-0.012	-0.023	0.019	0.04	-0.066	-0.015
	Q-Stat	1.3367	3.9428	6.2753	6.3737	6.4124	6.4727	6.5566	6.8372	8.0954	8.1118
	Prob.	0.248	0.139	0.099	0.173	0.268	0.372	0.476	0.554	0.525	0.618
Thursday	AC	-0.015	0.018	-0.036	-0.039	-0.069	0.085	-0.043	0.072	0.085	-0.105
	PAC	-0.015	0.018	-0.035	-0.041	-0.07	0.083	-0.042	0.063	0.089	-0.109
	Q-Stat	0.0555	0.1337	0.4542	0.8385	2.0505	3.8692	4.3355	5.6456	7.4853	10.295
	Prob.	0.814	0.935	0.929	0.933	0.842	0.694	0.74	0.687	0.587	0.415
Friday	AC	0.028	-0.004	0.047	-0.054	-0.1	-0.009	0.031	-0.055	0.01	0.063
	PAC	0.028	-0.005	0.047	-0.056	-0.096	-0.007	0.036	-0.051	0.003	0.05
	Q-Stat	0.1896	0.194	0.7444	1.4678	3.9761	3.9974	4.2426	5.0267	5.051	6.0773
	Prob.	0.663	0.908	0.863	0.832	0.553	0.677	0.751	0.755	0.83	0.809

of negative autocorrelation shows the revision of mean in returns series, it also promotes the meanreversion to become higher inmarkets.

The autocorrelation of daily market return at lag one (first-order autocorrelation) is not zero for all the days of the week. Tuesdays and Fridays are the days with positive autocorrelation at lag one although rest of all days are negatively correlated with one another at the first order autocorrelation. Thus, the null hypothesis of no significant autocorrelationlag is rejected using the autocorrelation coefficient. This indicates that the daily market returns are randomly distributed.

Out of 70 autocorrelation coefficients, 45 (64 percent) are found positive and the rest 35 percent is negative. Although,first order autocorrelation is found to be statistically insignificant, and the second order coefficients from lag 2 are found significantly different from zero indicating the pricechange through a particular day is correlated with the changes of earlier daysexcept the previous day.

The autocorrelation test inferred that the stock market index considered under the study remained inefficient for some lags whereas other lags are efficient for the same period of time. After whole discussion it is worth mentioning thatneither the acceptance nor rejection of the null hypothesis can be entailedas the efficiency or inefficiency respectively, it does not undoubtedly shows that CNX Nifty hold weak form of market efficiency. Because of this conclusion, the research is in the requirement of the further test which will indicate that if it holds weak form of market efficiency or not.

Unit Root Test

A subsequent research methodology named as unit root was developed by Dickey and Fuller (1979), used to examine the stationary of the time series. It is designed to discover the type of the series. There are two types of the series, i.e. difference-stationary (the null hypothesis) or trend-stationary (the alternative hypothesis). A non-stationary series with unit root is said to follow non-random walk. The Dickey-Fuller test is commonly used

Table 4: Unit Root Test

Particulars	*Intercept*		*Intercept and Trend*	
	t- Stats	*Prob.*	*t- Stats*	*Prob.*
Monday	-204.833	0.0001	-203.209	0.0001
Tuesday	-14.1871	0.0000	-14.1589	0.0000
Wednesday	-16.9347	0.0000	-16.9007	0.0000
Thursday	-15.7639	0.0000	-15.7322	0.0000
Friday	-15.1634	0.0000	-15.1344	0.0000

test and it provides evidence on whether the stock prices in a stock market follow a random walk or not. Therefore, it is also a tool to test the weak-form market efficiency. The ADF unit test is computed by using the formula:

$$\Delta Y_t = \alpha + \beta T + \delta Y_{t-1} + \gamma_i \Sigma \Delta Y_{t-1} + \varepsilon_t$$

H_0: There is a presence of unit root (non-stationary)

H_1: There is a non-presence of unit root (stationary)

The maximum lag period of 28 is considered for ADF test. The t statistics at 1%, 5% and 10% are -204.83, -14.18. -16.93, -15.76 and -15.16 respectively. The null hypothesis of a unit root test can be rejected atthe 0.01, 0.05 and 0.10 significance level. The result therefore points towards the evidence of random walk in index on each day of the periods. The ADF unit root test only examines the subsistence of stochastic trend in the series,but does not perceive the be haviour of predictability strength in the market. Therefore, based only on these results, it cannot beconcluded that stock markets indexis weak-form efficient.So there is a requirement to apply atest which can examine the daily effect in stock market returns.

Ordinary least Square Method

In existing studies related to the Indian market index, daily investigation of the week has revealed through the ordinary least square method. This methodology is used to test the daily effect in stock market return. The regression equation employed in the study is by using the following formula:

$$R_t = \alpha_1 + \alpha_2 d_{2t} + \alpha_3 d_{3t} + \alpha_4 d_{4t} + \alpha_5 d_{5t} + \varepsilon_t$$

R_t = Return of Market Index (i.e. CNX Nifty)

α_1 = Constant or Return on Monday

d_{2t}= Tuesday

d_{3t}=Wednesday

d_{4t}=Thursday

d_{5t}= Friday

α_2, α_3, α_4, α_5= Difference between return for Monday and return for Tuesday, Wednesday, Thursday and Friday respectively.

ε_t= Error term

To test the linear combination in the coefficients of regression model WALD test is used. The null hypothesis of wald test is:

H_0: α_1(Monday)= α_2(Tuesday)= α_3(Wednesday)= α_4 (Thursday)= α_5(Friday)

In the OLS model, five observations per week areused in order to remove possible biasness in the data raised from the loss of information due to stock exchange holidays. In case of non-trading day the returns are calculated using the last trading day's closing price. Natural logarithm returns are calculated for knowing the daily return after the first difference.The daily returns are computed as:

$$R_t = \text{In}\,(P_t / P_{t-1})*100$$

This model is used to describe the mean return. The individual value for each dummy variable could reveal the existence of difference during a day of the week with respectto Monday. D_{2t} is a dummy variable whose value will be 1 if day t is a Tuesday, and 0 otherwise; and so on for the rest of the week days. α1, the constant shows the average daily return on Monday. A positive and significant α_2 indicates the higher and significant Tuesday return than the return on Monday. The coefficients for the remaining days will also be calculated in the same way.

Table 5: Ordinary least square model

Dependent Variable: RETNSE				
Method: Least Squares				
Variable	*Coefficient*	*Std. Error*	*t-Statistic*	*Prob.*
C	2.000344	0.000515	3883.564	0.0000
TUE	-0.000192	0.000728	-0.264231	0.7916
WED	0.000329	0.000727	0.452365	0.6511
THRUS	-0.000978	0.000733	-1.334090	0.1824
FRI	-0.000240	0.000731	-0.327986	0.7430
R-squared				0.002782
Adjusted R-squared				-0.000451
S.E. of regression				0.081520
F-statistic				0.860558
Prob.(F-statistic)				0.487025
Durbin-Watson stat				1.884069

The error term (ε_t) absorbed all the stochasticvariation, it is not independently and identically distributed with a constant mean and constant variance.

Thus, we needed to test the t-statistics values considered from the equation for the presence of both heteroscedasticity and autocorrelation. In OLS model, t-test will be used to test out the individual coefficient; null hypothesis will be rejected if the estimated coefficient is different from zero.

The mean return on Tuesday is higher and on Monday is lower as compared to other days. The study is done on the recent daily data, which investigates five types ofanomalies namely Monday, Tuesday, Wednesday, Thursday and Friday. All the days except Monday are statistically insignificant. The value of Durbin Watson Stat is consistent with the results of autocorrelation test. The result demonstrates that no specificday is important as match up to other days; there is insignificant difference between specific day and other days. It was foundthat as all days are equally important for investor in Indian stock markets.Therefore through these analysis we can summarize that Indian stock market is following the weak form of market efficiency.

Research Limitations

This research has been done from Indian perspective and will be applicable only to its regulatoryframework and environment. Therefore, a major limitation is that it will not be applicable to other stock exchange due to the cultural differences and trading background. Another limitation is that this study takes in account the data of market index and individual scrips are not considered in it. This study is basically aiming at testing the efficiency of the CNX Nifty and creating an investment strategy through these findings may lack the accuracy in their results to marketers.

Conclusion

On the basis of above observations it may be concluded that Indian stock market (CNX Nifty) is following weak form of efficiency. NSE is a major equity index and it usually considered as a barometer to Indian economy. The randomness in the walk of the Indian market is verified through the run test and the autocorrelation test. The analysis of the run test shows that most of the days are following the trend of the random walk in their nature. Supporting this, the findings of autocorrelation test are consistent with the run test.ADF test of unit root has also proved the non-presence of the unit root in the series. These are the three essential conditions for the weak form of efficiency. The results for the tests of serialcorrelation conclusively rejectthe presence of random walks in daily returns of market indices. Likewise, the unit roottests conclude that unit roots, as necessary assumption for a random walk, are absent from all of the returnseries. Through OLS method we can conclude that the day-of-the-week effect is absent in the Indian economy and

investors that reap full benefit after making use of the available information in the market.

The results of this research paper are consistent withthe generalization that developing economies are dubiousto be associated with the random walks obligatory forthe assumption of weakform market efficiency. These results present an attention-grabbing avenue for future research, toexamine whether market efficiency has implied overtime in emerging stock markets like India. The results specify that the various tests for random walks, is satisfying the assumptions regarding the presence of random walks.

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