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EMPIRICAL ANALYSIS OF EFFICIENT MARKET HYPOTHESIS OF SELECTED INDIAN SECURITIES

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Abstract
This paper attempts to examine the weak form of Efficient Market Hypothesis w.r.t. capital market in India. This study will help the investors in portfolio selection. Sample data is used for the period of 11 February 2013 to 10 February 2014. Daily data for 8 stocks were collected and the weak form of the market was analyzed with the help of Auto Correlation test and Run test. The result of Run test shows that weak form of market exist for daily price movement of stocks but weak for of efficiency does not hold good for all the stock in Autocorrelation test. This study focused that with the help of strong and adequate supervision by the regulations and authorities, efficiency of market can be improved and weak form may be converted into semi strong and strong form.

Introduction
From the past two decades the stock market has gained its importance. Since they provide a reliable and profitable avenue to investors they significantly impact the growth of the economy. But to maintain its reliability, the stock market should be efficient. Efficient Market Hypothesis is also named as Theory of random walk. This theory propounded that Value of firm is completely reflected by stock prices of current period. But it is very important for the financial managers and investors to know about the reason of change in the prices of securities in the stock market. The efficient market hypothesis recommended that estimation of profits from the prediction of movement of prices is unlikely and too difficult. New information is the main reason of the changes in prices. If new unbiased information affects prices then the market is to be considered as "Efficient Market". So the current prices of the securities are reflected by accessible information.

The informational efficiency of a stock market was confirmed by Professor Eugene Fama (1960) at the University of Chicago Booth School Of Business by his theory of efficient market hypothesis. The theory states that the market is informational efficient, the price of an asset reflects all relevant information that is available about the intrinsic value of the asset. According to EMH, no one in this market can outperform i.e. it is impossible to buy undervalued stocks or sell overvalued stocks. The EMH comes in three forms. The first form, known as the weak form, postulates that future prices cannot be predicted by analyzing the past prices. The second form, known as the semi-strong form, suggests that security prices reflects all publically available information as security prices adjust instantaneously to the new information available in the market. The third form, strong form, is the integration of weak and semi strong form of market. It describes that security prices reflect all information, public and private, and no one can earn excess returns. There are various tests through which the validity of EMH can be checked.

FORMS OF THE EMH
The hypothesis of efficient market envision that at any point of time all available information incorporated by market prices, So values of securities and price of securities influenced by the various types of information regarding securities. Therefore, "full available information" depends upon the 3 forms of Efficient market hypothesis. All these important forms which affect the securities price are as under:-

Efficient market hypothesis-Weak form
According to the efficient market hypothesis weak form information related to past history and records of the securities prices are reflected by the prevailing prices of the securities and random walk is followed by the current prices. As per this market is fully fledged efficient and all information is available in the market. As per the assumption of weak form of hypothesis market rate of return should be self-reliant, future rate are not affected by past rates. The theory stressed that market itself considered all information related to the securities and prices of the securities which is automatically reflected by the prices of the securities and technical analysis is not helpful to predict future upward and downward movement of prices. To earn extra return fundamental analysis and private information can become useful. As per the views of most of the Economist and analysts big proportion of markets are at least to be evaluated as weak form.

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Efficient Market Hypothesis-Semi Strong form

Under semi strong form of efficiency new information available to public about share status and value affects the share prices. Semi strong hypothesis implies that excess profit cannot be attained from fundamentals or technical analysis. To check semi strong form of efficient market persistent changes and adjustment related to upward and downward must be considered for. This form of efficient market hypothesis propounded that prevailing prices totally assimilate by public information. This information contains financial statements, announcements related to profits and dividends, merger opportunities, competitor's positions and strategies, effects from inflation and Unemployment etc.

Efficient Market hypothesis-Strong form

Under strong form of efficiency, public and private information cogitate the current share prices only. Without information nobody can bring in extra profits. Strong form will become impossible when under trading laws; any barrier is imposed on private information to become public information. Exception is available only in the case of ignorance of Regulation and laws on universal grounds. Existence of market is required to test strong form of efficiency where excess return cannot be earned by the investors consistently. The theory behind strong efficiency of market is that market prognosticates in an impartial way. So the stock prices may have assimilated the public and private information and figure out in more effective, informative and objective way.

Literature review

Barnes (1986) studied that there is limited support of weak form of efficient stock market according to Kaula lumpur stock exchange.

Fama ,French (1992) analyzed the portfolios made from 'Value stock'(value stock are those with high cash flows. high earnings and tangible assets related to the current price of shares).and examined that any portfolios which are constructed from value stock in long run can produce more investment returns. Size of the firm and variance of portfolio returns when controlled that stocks can outperform in the market those have low price earnings ratio.

Beechey, Gruen and Vickery (2000) conducted a survey on EMH and concluded that the EMH is the perfect place for the starting of asset pricing formation but according to asset market experience and academic research it does not explain the features of market behavior of asset

Timmermann, Granger (2004) examined that by continuous profit seeking investors can produces efficient market; EMH is not the base of profit making strategy. First user can make short term gain from these methods but after using these methods will not be successful in long run. This approach will be the basis for new methods for forecasting financial information.

Hadi (2006) Explained the types of Efficient market hypothesis and on the basis of empirical research based on weak, semi strong and strong form of efficiency he tested that according to accounting based research efficiency of semi strong market is pre assumed because financial report when released in the market considered as public information treated as empirical evidence from the Jordanian market which conveyed that for releasing profitability, solvency and liquidity mixed signals given by security market.

Sharma, Mahendru (2009) threw lights on the Efficiency hypothesis of the stock markets .In this Study they investigate the validity of EMH related to 11 securities listed (BSE) Indian stock markets and concluded after using Run test and autocorrelation test that BSE is weak form efficient .Revealed that current share price reflecting the effect of past share price.

Hamid, suleman, et.al (2010) tested evidence investing the weak form efficiency in Asia pacific market from region they selected 14 equity markets. For the verification of data skewness, kurtosis and jarque bera test and many other tests such as Run test, Auto correlation test etc. were used and concluded that no market is weak form in efficiency point of view and investors can enjoy the arbitrage benefits because of market in efficiency of these companies.

Joshi, D (2012) highlighted the mixed form of efficient market by analysis BSE six indices. For this purpose run test was applied and as a result Indian market was considered as inefficient. For this study the period of study was 2000-2010.as a result Indian market was considered in efficient in long run and in shrt run the market was considered efficient.

Research methodology

The present study has focused on weak form of EMH for NSE of India. The paper analyzes the daily data of eight securities listed on National Stock Exchange, which includes Wipro, Godrej, Bharti Airtel, Cipla, Hindalco, Tata Motors, Cinimaxin, Religare. The time duration of the study is 11 February 2013 to 10 February 2014.

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Results and discussion

The weak form of efficient market hypothesis is checked by Run Test and Autocorrelation Test.

Run Test:

To detect for the weak form efficiency of the National stock Exchange, the nonparametric Run test is used in this study. The randomness of the data is detected by the help of Z, which is defined as:

$$Z = \frac{\text{Calculated Run-Expected Run}}{\text{Standard Deviation}}$$

The null and alternative hypotheses for weak-form market efficiency test are;
H0: There is no significant relationship between the past prices and the future price of securities.
H1: There is significant relationship between the past prices and the future price of securities.
If calculated Z value is greater than critical value with appropriate significance level, than we can reject Null hypothesis.

Table 1: Z Values of companies under observation

	Wipro	Godrej	Bharti Airtel	Cipla	Hindalco	Tata Motors Ltd	Cinemaxin	Religare
Calculated Run	8	18	23	26	11	26	3	19
n0	116	115	120	134	121	133	144	121
n1	135	135	130	116	129	117	106	131
n	251	250	250	250	250	250	250	252
E ®	125.7809	125.2	125.8	125.352	125.872	125.488	123.112	126.8016
V®	60.5358	60.20576	60.80096	60.35627	60.87258	60.4911	58.15691	61.30253
S.D®	7.780476	7.759237	7.797497	7.76893	7.802088	7.777602	7.626068	7.829593
Z	-15.138	-13.8158	-13.1837	-12.7884	-14.7232	-12.7916	-15.7502	-13.7685
P	4.55E-52	1.02E-43	5.44E-40	9.52E-38	2.29E-49	9.13E-38	3.42E-56	1.97E-43

Source: calculated and complied with Excel

n0= Negative Observations
n1= Positive Observation
E®= Expected Run
V®= Variance
S.D®= Standard Deviation

The above table shows that Cinemax has the maximum negative observations and both Wipro and Godrej has the maximum positive observations. The calculated value of Z of all the securities is less than 1.96. Therefore the null hypothesis is accepted, which shows that there is no significant relationship between past prices and the future prices of securities. This shows that the prices move randomly.

Autocorrelation Test:

Table 2: Results of autocorrelation tests for the observed daily-return data

Autocorrelations								
Lag	Wipro	Godrej	Bharti Airtel	Cipla	Hindalco	Tata Motors Ltd	Cinemaxin	Religare
1	0.98762	0.953389	0.935728	0.947437	0.965429	0.98417	0.994131	0.961737

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2	0.975643	0.908694	0.879265	0.893811	0.934153	0.964745	0.986799	0.929323
3	0.964246	0.856571	0.823287	0.842638	0.900123	0.946731	0.978123	0.909594
4	0.951624	0.804385	0.778877	0.79533	0.87161	0.930983	0.969153	0.879918
5	0.939197	0.753295	0.739326	0.741966	0.851251	0.916611	0.960124	0.848382
6	0.925193	0.697627	0.695698	0.689789	0.830398	0.902985	0.95195	0.818741
7	0.911134	0.650554	0.652358	0.644284	0.815071	0.888008	0.942881	0.793556
8	0.897708	0.606309	0.60372	0.606909	0.789373	0.872836	0.934347	0.774083
9	0.882689	0.56795	0.560239	0.567348	0.764267	0.859655	0.926137	0.748478
10	0.868465	0.526337	0.513186	0.53308	0.733301	0.848281	0.917853	0.718994
11	0.853817	0.495596	0.469111	0.510639	0.706063	0.837284	0.909341	0.690627
12	0.838668	0.472814	0.431394	0.486053	0.682872	0.823954	0.900141	0.66501
13	0.823014	0.447383	0.379454	0.466033	0.656055	0.811671	0.8916	0.6393
14	0.808249	0.423667	0.339552	0.436351	0.636342	0.802486	0.883366	0.612979
15	0.793652	0.401066	0.294801	0.413498	0.611371	0.790291	0.874837	0.585094
16	0.77834	0.377963	0.268007	0.381158	0.590954	0.774488	0.865782	0.553844

Source: Calculated and complied with help of SPSS

a. The underlying process assumed is independence (white noise).
b. Based on the asymptotic chi-square approximation.

This test is applied on the share price of different companies. In autocorrelation test we analyze the value of lag t with lag t+1, lag t+2 and so on. Similarly lag t+1 is auto correlation with t+2, t+3 and so on. According to table (number) the value of Wipro, Hindalco, Cinemaxin, Religare and Tata Motors Ltd lie between the ranges of .9 to .5 which shows these values are correlated with each other. Hence rejects the existence of weak form of market. But the value of Godrej, Bharti Airtel, and Cipla, lies between the ranges of .9 to .3, which shows a large deviation in the values and therefore they are not correlated with each other. This shows that weak form of market exist.

Conclusion

In this research 8 companies listed on BSE were selected to test the weak form of market. Run test and auto correlation test were utilized to determine the efficiency of weak form of market. Run test shows that prices move randomly for all the 8 companies. But Auto correlation test deviates from Run test results for Wipro, Hindalco, Cinemaxin, Religare and Tata Motors Ltd.

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