



A STUDY OF THE WEAK FORM OF MARKET EFFICIENCY IN INDIA WITH SPECIAL REFERENCE TO REALTY SECTOR

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ABSTRACT

The theory of efficient market hypothesis (EMH) implies that all known information is reflected in share prices & the price movements are independent to one another. Thus EMH states that share prices are not influenced by past prices, publicly available information & insider information. It has attracted various studies, but their outcomes are conflicting. Mainly conflicts are due to the development status of the markets i.e. developed markets or emerging market. Out of above mentioned three pieces of information, this paper focuses on the past prices & attempts to verify the weak form of efficient market in Indian stock market with special reference to 10 companies of realty sector. The data is collected on the basis of one year's daily closing price, for the financial year 2015-16, to test the null hypothesis i.e. H_0 : - Price change is Random against alternate hypothesis H_a : - Price change is not Random. The collected data is analyzed with the help of run test at 10% significance level. The conclusion is that for 80% of the sample, null hypothesis has been accepted which means Indian capital markets are efficient in weak form i.e. share prices move independently of each other during the successive days.

Key words: Efficient Market Hypothesis, Price movements, Emerging markets, Run test, & Price change is random.

I. Introduction

The efficient market hypothesis (EMH) or Random Walk theory states that share prices reflects all the relevant information i.e. price are always got adjusted with new information

prior to any reaction of the investor. According to this theory if investor can predict the price of shares, it means markets are not efficient. Thus, stocks always trade at their fair value on stock exchanges, making it impossible for investors to either purchase undervalued stocks or sell stocks for inflated prices. Therefore, it should be impossible to time the market or making expert selection. Tests of the market efficiency is essentially test of whether three types of information i.e. Past Prices, Publicly available information, Inside Information; can be used to make above average returns.

American economist, Eugene Fama, proposed three types of efficiency¹

1. Weak form;

Weak form efficiency claims that all past prices of a stock are reflected in current stock price. Therefore, one cannot beat or predict the market using technical analysis.

2. Semi-strong form;

Semi-strong efficiency implies that the recent share price contains all public information. Thus neither fundamental nor technical analysis can be used to achieve superior returns.

3. Strong efficiency.

Strong form efficiency is the strongest side of market efficiency. It states all information in a market, whether public or private, is used by the market to show stock price. Thus even insider information fails to give an investor the advantage.

This paper attempts to verify the weak form of efficient market hypothesis i.e. present stock prices reflect all known information with respect to historical prices. Thus such data can-not be used to predict future prices.

II. Review of Literature

Allen, Brealey and Myers (2011) defined efficient market as a situation when it is not possible to beat the market and make higher returns. In other words, the shares are priced fairly & reflects the true value of the firm which is equal to discounted (at alternative cost of capital) value of the future cash flows.

Eakins and Mishkin (2012) explained efficient market as a place where all the available information is reflected by prices of the stocks. Thus, efficient market depends upon two factors: (1) All the information is included in stock prices; (2) No investor can earn excess return due to the weight-age of risk.

¹ Eugene Fama, "Efficient capital markets: A review of theory and empirical work", Journal of Finance 25, 1970, page 383

According to Malkiel, in weak form of efficient stock markets, the stock price covers all information related to the past changes in the stock price. This type of information covers data on past prices, trading volume, etc. On the basis of this information, it becomes almost impossible to make additional profit from the stock market. Thus, if the market is weakly efficient, technical analysis will yield no excess return.

Nourrendine Khababa (1998) has examined the behavior of stock price in the Saudi Financial market seeking evidence for weak-form efficiency and found that the market was not weak-form efficient. According to him the inefficiency might be due to delay in operations and high transaction cost, narrowness of trading and illiquidity in the market.

Roux and Gilbertson (1978) and Poshakwale S. (1996) find the evidence of non-randomness stock price behavior and the market inefficiency (not weak-form efficient) on the Johannesburg stock Exchange and on the Indian market.

After review of previous studies a mix approach comes into existence i.e. some markets hold weak form efficiency, but some do not. May be it is due to the phase of development i.e. developed markets or emerging markets. So it is an interesting empirical question whether and to what extent, markets are in weak form of efficiency apart from this is Indian stock market, as a less developed emerging market, weak form efficient or not? This issue is examined empirically as follows:

III. Objectives & Hypothesis

To test whether price changes are independent or not during the short period i.e. one year

Ho: Null Hypothesis - Price change is random.

Ha: Alternate Hypothesis - Price change is not random.

Hypothesis was tested at 10% significance level at which 'Z' value is 1.64

IV. Research Methodology

Coverage of the study

The universe of the present study is the Indian stock market from which, on the basis of judgmental sampling, Nifty Realty Index of National Stock Exchange is taken as subject, and it has ten companies. These companies are DLF Ltd., Delta Corp Ltd., Godrej Properties Ltd, Housing Development & Infrastructure Ltd., Indiabulls Real Estate Ltd., Oberoi Realty Ltd., Phoenix Mills Ltd., Prestige Estates Project Ltd., Sobha Ltd., and Unitech Ltd.

Data Collection

The data for the selected sample is collected from the secondary source i.e. website of National Stock Exchange (www.nseindia.com). A sample for one year's (1st April 2015 to 31st March 2016) daily closing price of all ten companies has been taken here for analysis.

Tools & Techniques

To study that stock prices are from a random process the runs test (Bradley, 1968) is used. A run is defined as a series of increasing values or a series of decreasing values. The number of increasing, or decreasing, values is the length of the run. The runs test (also called Wald–Wolfowitz test after Abraham Wald and Jacob Wolfowitz) is a non-parametric statistical test that checks a randomness hypothesis for a two-valued data sequence. More precisely, it can be used to test the hypothesis that the elements of the sequence are mutually independent. Run Test is calculated as follows:

- “R” stands for Observed no. of runs
- Calculated Runs (μ) = $(2n_1n_2 / n_1+n_2) + 1$
- Standard deviation of Runs (σ^2) = $[(2n_1n_2)(2n_1n_2-n_1-n_2)] / [(n_1+n_2)^2 (n_1+n_1-1)]$
- n_1 = No. of times price Advances
- Lower limit of runs (LWL R) = $\mu - 1.64 X \sigma$
- n_2 = No. of times price Declines
- σ
- n_1+n_2 = Number of observations in each category
- Upper limit of runs (UPL R) = $\mu + 1.64 X \sigma$

If the observed runs fall between the upper limit & lower limit, so the null hypothesis (H₀) is accepted and the alternate hypothesis (H_a) is rejected.

V. Analysis

The run test is an approach to test and detect statistical dependencies (randomness). Run test is preferred to prove the random-walk model because the test ignores the properties of distribution. The null hypothesis of the test is that the observed series is a random series. A run is defined by Siegel, as “A succession of identical symbols which are followed or preceded by different symbols or no symbol at all”.

Table 1
Run Test Analysis

Run Test (Z)	DLF	Delta Corp Ltd.	Godrej Prop. Ltd.	Housing Dev. & Infr. Ltd.	Indiabulls Real Estate Ltd.	Oberoi Realty Ltd.	Phoenix Mills Ltd.	Prestige Estates Proj. Ltd.	Sobha Ltd.	Unitech Ltd.
R	128	128	125	131	123	117	108	121	105	119
n₁	116	114	119	124	115	115	118	107	119	98
n₂	130	132	127	122	131	131	128	139	127	148
μ	123.6	123.3	123.9	124.0	123.5	123.5	123.8	121.9	123.9	118.9
σ	60.9	60.6	61.1	61.2	60.7	60.7	61.0	59.2	61.1	56.3
UPL R	136	136	137	137	136	136	137	135	137	131
LWL R	111	111	111	111	111	111	111	109	111	107

- The observed no. of runs in case of DLF is 128, whereas upper limit is 136 and lower limit is 111, hence the null hypothesis is accepted i.e. price change is random.
- The observed no. of runs in case of Delta Corp Limited is 128, whereas upper limit is 136 and lower limit is 111, hence the null hypothesis is accepted i.e. price change is random.
- The observed no. of runs in case of Godrej Properties Limited 125, whereas upper limit is 137 and lower limit is 111, hence the null hypothesis is accepted i.e. price change is random.
- The observed no. of runs in case of Housing Development & Infra Limited 131, whereas upper limit is 137 and lower limit is 111, hence the null hypothesis is accepted i.e. price change is random.
- The observed no. of runs in case of India Bulls Real Estate 123, whereas upper limit is 136 and lower limit is 111, hence the null hypothesis is accepted i.e. price change is random.
- The observed no. of runs in case of Oberoi Realty Limited 117, whereas upper limit is 136 and lower limit is 111, hence the null hypothesis is accepted i.e. price change is random.
- The observed no. of runs in case of Phoenix Mills Limited 108, whereas upper limit is 137 and lower limit is 111, hence the null hypothesis is rejected i.e. price change is not random.
- The observed no. of runs in case of Prestige Estates Projects Limited 121, whereas upper limit is 135 and lower limit is 109, hence the null hypothesis is accepted i.e. price change is random.

- The observed no. of runs in case of Sobha Limited 105, whereas upper limit is 137 and lower limit is 111, hence the null hypothesis is rejected i.e. price change is not random.
- The observed no. of runs in case of Unitech Limited 119, whereas upper limit is 131 and lower limit is 107, hence the null hypothesis is accepted i.e. price change is random.

VI. Findings of the Study

Out of the sample of 10 companies, share price of 8 companies has moved randomly during the study period. Whereas the price movement of only two companies i.e. Phoenix Mills Limited & Sobha Limited is non random during the study period.

VII. Limitations of the Study

The findings are on the basis of Run test; hence findings are subject to the limitations of Run test i.e. Non Parametric Test.

Findings are applicable in the situation, which prevailed during the financial year 2015-16; hence these should be read in the light of these facts.

VIII. Conclusion

In majority of scrips, null hypothesis has been accepted which supports the findings that the Indian capital market is efficient in weak form i.e. share prices move independently of each other during the period of study.

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