

An Empirical Study on Weak Form Efficiency of Indian Stock Market

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ABSTRACT

Market efficiency simply means the accuracy and quickness with which price reflect market related information. The present study examines the weak form market efficiency of Indian Stock market. In weak form of market, Current price reflect all the information found in the past price. So the future price of Security can not be predicted by analyzing past share price data. The present paper discuss the concept efficient Market Hypothesis and also literature available on the same. By taking 10 securities listed On NSE, run test and auto correlation test are applied to judge the weak form market efficiency of Indian stock market. From the study it is found that the relationship between past stock price of sample companies and their future stock price is very meager. This shows that price change are random and market is efficient in weak form.

Keywords: Efficient market hypothesis, Random walk theory, Weak form, Run test, Auto Correlation Test.

INTRODUCTION:

Indian stock market is an emerging market. A capital market is said to be efficient with respect to an information item if the price of securities fully impound the return implication of that item .In a efficient market when new piece of information is added to the market its impact will instantaneously incorporated in share price. No one can earn excess return based on that newly arrived information. The efficient market theory is based on the ideas of random walk theory, which is used to characterize a price series where all the subsequent price change represent random departures from previous prices. Fama (1970) define efficiency of market in to three form they are weak form, semi strong form and strong form.

In weak efficiency form all past price data are fully reflected in securities price. Hence no investor can earn superior return by studying information on past price. semi strong form is where stock price reflect all available public financial information (that is announcement of listed Companies) no investors can earn abnormal return by using public information.

Strong form is where information (Public, personnel even confidential) contribute to stock price and therefore does not enable investors to achieve a competitive advantage by using such kind of information. The efficient market hypothesis theory says that market could be efficient at three form based on what Information was reflected in price.

In this context the present study make an attempt to analysis the weak form market efficiency of Indian stock market based on theory of efficient market market hypothesis of Fama. Auto correlation test and run tests are used for testing efficiency in weak form.

STATEMENT OF PROBLEM:

Stock market efficiency is a major areas of research in financial economics, Particularly as it relates to Stock markets of developing countries. The small and medium investors can be motivated to save and invest in capital

market only if their Securities in the market are appropriately priced. The information content of event and its dissemination determine the efficiency of capital market. The present study examine how much, how fast and how accurately available information is incorporated in to security prices. The present study also make an attempt to measure the weak form market efficiency of Indian stock market.

OBJECTIVE OF THE STUDY:

1. To test whether the Indian Stock market are weak form efficient.
2. To analysis whether the past price of the share are reflected on future price.

HYPOTHESIS OF THE STUDY:

1. Null hypothesis (H0) : price change is random.
2. Alternative hypothesis (H1) :price charge is not in a random manner.

RESEARCH METHODOLOGY:

Research Design:

The research design for this study is descriptive and it attempt to describe the efficiency of Indian capital market in weak form. 10 sample companies are selected from NSE to check whether exist randomness in share price for the last Financial year.

Source of Data:

Secondary Data:

The major source of information are the official website of National Stock exchange (NSE) (<http://www.nscindia.com>) , various books and Journals.

Tools for Data Analysis:

Run Test and Auto correlation test are used for measuring weak form market efficiency in Indian stock market.

LIMITATIONS OF THE STUDY:

- The findings are based on run test and Auto correlation tests, So the findings are subjected to the limitation of non parametric tests.
- Findings are applicable in the situation which prevail during the study period.

LITERATURE REVIEW:

Rakesh Gupta & Pariksh K Basu (2007) conducted a study to test the weak form efficiency for the two major equity market in India for the period of 1991 to 2006. Random walk character for the BSE and NSE market in India using stock market indexes for the Indian markets. It employee unit root test (augmented) Dickey fuller (ADF) in case of BSE and NSE .The null hypothesis of unit root is rejected as the test statistics is more negative then the critical value suggesting that these market do not show characteristics of random walk and both NSE and BSE do not support weak form efficient market hypothesis.

Gagan Deep Sharma and Mandeep mahendra (2009) “Efficiency hypothesis of stock market:- A case of Indian Securities” The study investigate validity of EMH’S on Indian securities market- initially the paper discuss the concept of EMH. By taking eleven securities listed on Bombay stock exchange, run test and Auto correlation tests are applied to measure the weak from market efficiency. From the study it is observed that the effect of stock price for sample companies on future price is very meager and the investor cannot reap profit by using the share price data as the current share price already reflect the effect of past share price.

Anjala Kalsie (2011) find that Indian stock market- was weak from in efficient. The weak from of efficient market is tested by using Nifty and 6 major NSE sect oral indices, Pharma, IT, MNC, Bank, FMCG and Nifty Junior. The present study use daily index return of selected indices for a ten year period from January2,2001 to December 30,2011. Uni variate time series analysis of indices return is carried out for testing randomness. Run test, Unit root test, ACF, Correlograms and other relevant statistical methods are used for the study.

Ramkumar (2012) Through his paper examined the market efficiency of sectoral indices of BSE, India. The study reveals that the return of 8 indices out of 12 indices such as BSE Auto mobile index, BSE Bankex , BSE

capital goods index, BSE Consumer durable goods index, BSE reality index and BSE PSU sector index follows normal distribution and earned better remuneration at 5% significance level.

Neeraj Gupta, Ashwin Gedem (2014) in their Paper investigate weak form efficiency of Indian stock market by taking sample data from NSE over the period 1st January 2014 to 31st March 2014 by employing run test (Non parametric Test) The study conclude that Indian Stock market is efficient in weak form and stock price are independent of past prices.

Ravikumar gupta(2014) through his study make an attempt to look at the efficiency of indian stock market BSE Sensex was used in the study to represent indian stock market. Daily closing price data were taken for the sample period of ten years from January 2003 to 2012. Unit root test ,run test and Kolmogorov sminove test were used to analysis the data with the help of Eview software .The study conclude that indian stock market is not efficient in weak form. Information on the past are not completely absorbed in the current price .So investors has an opportunity to make estimates of current price on the basis of past information.

DATA ANALYSIS METHOD:

The study seek to test weak form market hypothesis by employing Auto correlation test and run test.

Auto Correlation Test:

The term Auto correlation is defined as correlation between members of series of observation ordered in time or space. In this paper certain number of stocks are selected for a particular period. The change in price of these stocks are observed. Then in another period for the same stock, the changes in stock price are noted, for these changes correlation analysis is conducted. If correlation between these changes is near or equal to zero, it implies that the Price changes are independent of each other.

Sample Design:

Companies performing well in stock market is randomly selected for the Sample. The Price of these companies in two different years at the same time period (6 month) is taken.Then calculate correlation co-efficient. Co-efficient of correlation is calculated by using following formula where

- X = Change in Price of Series 1
- Y = Change in Price of Series 2
- N = Total Number of days.

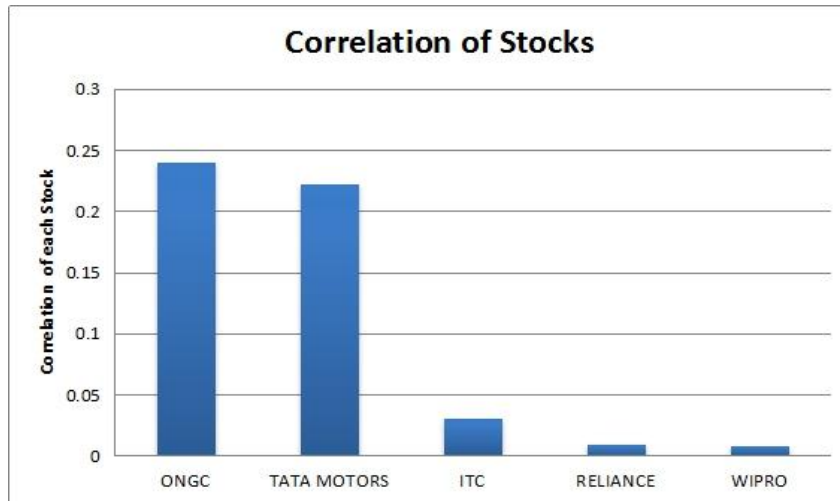
$$r = \frac{N\epsilon xy - \epsilon x \epsilon y}{\sqrt{N\epsilon x^2 - (\epsilon x)^2} \sqrt{N\epsilon y^2 - (\epsilon y)^2}}$$

Table 1: Correlation between Companies

SI.NO	STOCKS	CORRELATION
1.	ONGC	0.2399
2.	Tata Motors	0.2228
3.	ITC	0.0302
4.	Reliance	0.0092
5.	WIPRO	0.0084

Interpretation:

The correlation between the change is near to zero for all the selected stock. It implies that the price change are independent of each other. Form the analysis it is found that the stock market is efficient in weak form.



Run Test:

This test measure randomness in investigating serial dependencies in share price movements and compare the expected number of runs from a random process with observed number of runs. A run is a series of identical sign that preceded or are followed by a different sign or no sign at all. This test measure whether the value of one observation influence the value taken by later observation.

In the present study 3 month data of selected companies are chosen and its run are found to measure the positive and negative price changes. Companies performing well in Indian stock market are chosen for the present study. Then the runs are used to calculate the mean and standard error and at last , T test is done at different levels of significance to understand the efficiency of the mark

H0: There is Randomness in share price

H1: There is no randomness in share price

Mean and standard error of the companies are calculated by using following formula.

$$\text{Mean} = \frac{2n_1n_2}{n_1+n_2} + 1$$

Standard Error:

$$\sigma_r = \frac{z = r - m / \sigma}{\sqrt{\frac{2n_1n_2(2n_1n_2 - n_1 - n_2)}{(n_1+n_2)^2(n_1+n_2-1)}}$$

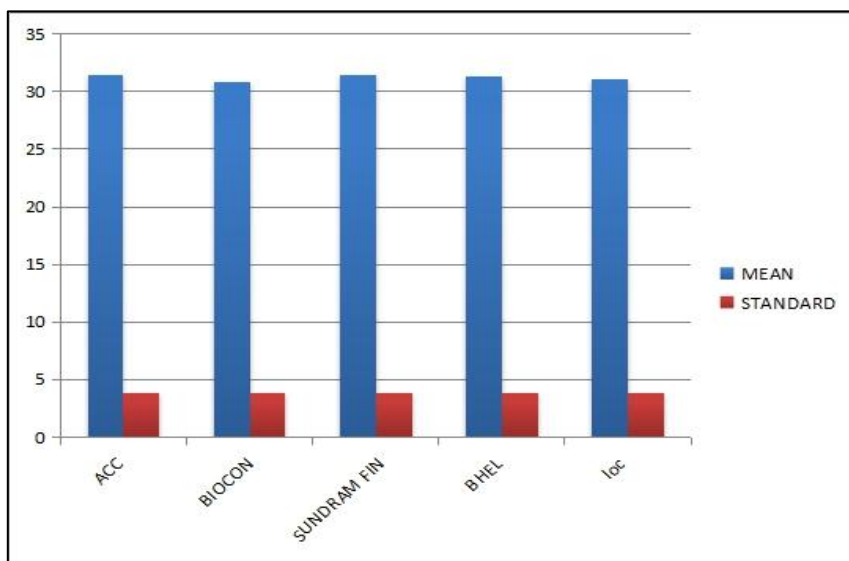
Table No 2: Showing the result of hypothesis testing

Company's Name	Degrees of Freedom	N1	N2	Table Value			Mean	Standard Error	Observed Runs	Hypothesis Testing	Calculated Value
				1%	5%	10%					
ACC	60	32	29	2.660	2.00	1.67%	31.4262	3.8629	29	Ho Accepted	0.629
Biocon	60	28	32	2.660	2.00	1.67%	30.867	3.82267	30	Ho Accepted	0.227
Sundaram finance	60	30	31	2.660	2.00	1.67%	31.49	3.87	31	Ho Accepted	0.127
BHEL	60	33	28	2.660	2.00	1.67%	31.30	3.85	36	Ho Accepted	1.220
IOC	60	34	34	2.660	2.00	1.67%	31.098	3.82	31	Ho Accepted	0.026

Inference:

Since the calculate Value less than table value for all selected Stocks ,we accept null hypothesis and conclude that there is randomness on stock price then market is efficient in weak form.

MEANS & STANDARD ERROR OF STOCK:



FINDINGS OF THE STUDY:

Auto Correlation test in all the cases reveals that the market is not following a set of pattern, there by validating the efficient market hypothesis in weak form.

The run test performed on all the securities shows that the movement of stock price is random, there by conforming the random walk theory and also reveals that the market is efficient in weak form .

The overall findings indicate that technical analysis is only limited scope in earning abnormal return.

CONCLUSION:

The test result shows that Indian stock market is efficient in weak form. All most in all cases the stock price are independent of the past prices. So Null hypothesis is accepted in all cases. It indicate that Indian stock market efficient in weak form. The run test performed on all the stock shows that share price move in a independent manner and also universal level the study support random walk theory.

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