Oligopoly Markets are Not Efficient: Evidence from Indian Cement Industry

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Abstract: **- Capital market Efficiency means that any type of information is reflected in the stock prices instantly. This paper has tried to find out the type of capital market efficiency that Indian stock market exists. Since the market is efficient in three forms: weak, semi strong and strong. The type of efficiency any market exhibits will lead to usefulness of fundamental and technical analysis in investment decisions of that market. Hence investor can accordingly plan its approach of investment analysis.**

This paper has studied the stock market prices of top players of cement industry of India for 1 year to find out the dependency among stock prices and information by conducting exploratory research. This paper would test the type of efficiency of Indian cement industry and its results could be applied for further portfolio management practices.

Keywords: **Market efficiency, oligopoly, fundamental analysis, technical analysis, portfolio management.**

I. INTRODUCTION OF THE STUDY

The oligopoly market can be explained by few seller and they are selling homogenous or differentiated products. In other words, the Oligopoly market structure lies between the pure monopoly and monopolistic competition, where few sellers dominate the market and have control over the price of the product. In this study researcher try to find out that oligopoly market are not efficient. For the study cement industry has been considered.

The efficient market model is actually concerned with the speed with which information is incorporated in security prices. This hypothesis states that the capital market is capable in processing information. An efficient capital market is one in which security prices equal their intrinsic values at all times, and where most securities are correctly priced. **According to Elton and Gruber, "**when someone refers to efficient capital markets, they mean that security prices fully imitate all available information**"**.

The efficient market theory holds the view that in an efficient market, new information is processed and evaluated as it arrives and prices instantaneously adjust to new and correct levels. Therefore, an investor cannot constantly earn excess returns by undertaking fundamental analysis or technical analysis.

The capital market is considered to be efficient in three different forms: the weak form, semi-strong form and the strong form. The weak form deal with the information about the past sequence of security price movements, the semi-strong form deals with the widely available information, while the strong form deals with all information, both public and private(or inside).

Forms of Market Efficiency

The capital market is considered to be efficient in three different forms: the weak form, semi-strong form and the strong form. Thus, the efficient market hypothesis has been sub-divided into three forms, each dealing with a different type of information.

a. *Strong efficiency* - This is the strongest version, which states that *all* information in a market, whether public or private, is reflected in a stock price. Not even insider information could give benefit to the investor
b. *Semi-strong efficiency* - This form of EMH implies that all public information is reflected into a stock's current share price. Neither fundamental nor technical analysis can be used to achieve superior gains.

c. *Weak efficiency* - This type of EMH claims that all past prices of a stock are reflected in today's stock price. Therefore, technical analysis cannot be used to forecast and beat a market.

The different forms of efficient market hypothesis have been tested through several empirical studies. The tests of the weak form hypothesis are essentially tests of whether all information contained in historical prices of securities is fully reflected in current prices. Semi-strong form tests of the efficient market hypothesis are tests of whether publicly available information is fully reflected in current stock prices. Finally, strong form tests of the efficient market hypothesis are tests of whether all information, both public and private, is fully reflected in security prices and whether any type of investor is able to earn excess returns.

II. LITERATURE REVIEW

Large number of researchers have tested the weak form of market efficiency in different frameworks but got contradictory results. Some have supported the existence of market efficiency while others have rejected it.

Rao et al (1988) studied weekend price data over the period 1982-1987 for ten blue chip companies by means of serial correlation analysis, runs tests and filter rules and concluded in favour of random walk hypothesis.

Chaudhuri (1991) had studied daily price quotations of 93 actively traded shares for the period January 1988 to April 1990 to examine the serial independence of share price changes and concluded that results did not support the hypothesis.

Al-Loughaniet al (1997) had tested The validity of the weak form of the efficient markets hypothesis (EMH) for the FTSE 30 share index during stable government economic policy and suggested random walk behaviour .

Olowe (1999) had investigated and concluded on the support of weak form efficiency of the Nigerian stock market by using correlation analysis of monthly stock returns data over the period January 1981–December 1992.

Buguk et al (2003) had tested the market effiiency for the Istanbul stock exchange using its composite, industrial, and financial index weekly closing prices and concluded that all three series followed a random walk, but nonparametic tests delivered some evidence against a random walk.

M.A. Moustafa (2004) , had studied the behavior of daily prices of the 43 stocks included in the Emirates market index covering the period commencing October 2, 2001 through September 1, 2003 in United Arab Emirates(UAE) stock market. And concluded that data did not followed the normal distribution

Islam et al (2005) had studied factors leading to the weak form inefficiency of the Dhaka Stock Market.

Khan et al (2009) had tested the efficiency of Indian capital market by applying run test and concluded that the Indian capital market in inefficient in weak form.

Sharma et al (2009) had investigated and validated the Efficient Market Hypothesis by taking a sample of eleven securities listed on the Bombay Stock Exchange (BSE)through the runs tests and the autocorrelation tests.

Gupta et al (2009) had tested the weak form efficiency in the background of random walk hypothesis for the two major equity markets in India during1991 to 2006 and concluded that the series do not follow random walk model and hence rejected the weak form efficiency hypothesis

Dhawan et al (2012) had investigated the weak form of market efficiency of Asian four selected stock markets by Root Test, Variance Ratio, Auto-Correlation analysis and concluded that the stock markets under the study are weak-form inefficient.

Need of the Research

1. Because of the Indian capital market efficiency has not been proved yet.
2. There are mixed evidences in favor of weak form of market efficiency.
3. The type of capital Market Efficiency suggests whether to use fundamental or technical or none investment strategy.

Empirical Tests of Weak Form Efficiency

The weak form of the Efficient Market Hypothesis (EMH) says that the current prices of stocks already fully reflect all the information that is contained in the historical sequence of prices. The new price movements are completely random. They are produced by new pieces of information and are not related or dependent on past price movements. Therefore, there is no advantage in studying the historical sequence of prices to gain abnormal returns from trading in securities. This implies that technical analysis, which relies on charts of price movements in the past, is not a meaningful analysis for making abnormal trading profits.

The weak form of the Efficient Market Hypothesis is thus a direct negation of technical analysis.

Two approaches have been used to test the weak form of the efficient market hypothesis.

a. K-S test
b. Runs Test

III. RESEARCH METHODOLOGY

Objectives of the Research

This study has tried to test the weak form of market efficiency of the Indian capital market in cement industry from 1st April 2017 to 31st March 2018. The results would be helpful for investors to design their strategy. The presence of weak form of market efficiency repudiates the use of technical analysis to earn supernormal returns.

Scope of the Study

- This study has taken data from 1 April 2017 to 31 March 2018 only.
- This study is based on only capital market of India
- This study would be based only on evidences on weak form of market efficiency.

To test the weak form of efficiency, this study has formulated the null and alternate hypothesis.

Hypothesis of the Study

To test the weak form of market efficiency, following hypothesis have been formulated:

Null Hypothesis

- H_0: The succeeding stock indices changes of ACC, Ambuja cement, PRISM and Ultratech are independent and move randomly.
- H_0: Capital Markets under the study is efficient in Weak-Form.

Alternate Hypothesis

- H_a :The succeeding stock index changes of ACC, Ambuja cement, PRISM and Ultratech are dependent and does not move randomly.

- H_a : Capital market under the study is inefficient in weak form.

IV. DATA COLLECTION AND ANALYSIS

Sample

For studying the objectives sample which consists of the daily closing values of the selected indices i.e. ACC, Ambuja cement, PRISM and Ultratech been taken from 1st April 2017 to 31st March 2018.

Sample Period

We have taken the closing values of selected stock indices under study from the 1st April. 2017 to 31st March. 2018

Sample Size

Following table shows the details of sample size of each selected stock index. The data are synchronized. The sample includes observations of daily closing values of individual index for 1year .The study has considered the selected indices as they are the mostly considered in many researches.

Analysis of Descriptive Statistics

One of the assumptions of the random walk model is that the distribution of the return series should be normal. In order to test the distribution of the series, the descriptive statistics of the log of market returns are calculated and presented in the below:

Results of Descriptive Statistics for the selected Companies

	N	Minimum	Maximum	Mean	Std. Deviation
ACC	153	1460.20	1847.85	1692.9915	99.38844
AMBUJA	153	231.15	288.85	261.0807	16.41667
PRISM	153	99.95	126.65	114.5052	6.61856
ULTRATECH	153	3798.65	4488.30	4128.2650	162.77304
Valid N (listwise)	153				

Statistical Test Used

The data has been analyzed by the way of Non Parametric tests mentioned as:

Runs Test

This study has used the Wald-Wolfowitz Runs Test (non-parametric) for the randomness of the series. Run testing is a strong test for randomness in investigating serial dependence in share price movements and compares the expected number of runs from a random process with the observed number of runs. The test is non-parametric and is independent of the normality and constant variance of data. A run is defined as a series of identical signs that are preceded or are followed by a different sign or no sign at all. That is given a sequence of observations, the runs test examines whether the value of one observation influences the values taken by later observations. If the observations are independent, the sequence is considered as random. Runs test shows the cutting point, the number of runs, the number of cases below the cutting point, the number of cases greater than or equal to the cutting point, and the test statistics Z with its observed significance level. The total number of runs is a measure of chance, since too many or too few runs recommends dependence between observations. Under the hypothesis on interdependence of consecutive price changes, the distribution of the total number of runs is nearly normal

This study has applied runs test to find out the serial independence in return series of selected stock prices to find out the trend in the succeeding price differences. The weak form of efficiency in the market specifies the subsequent price variation should be independent to each other. The expected number of runs (M) and the standard error is given as follows:

$$\text{Expected number of runs (M)} = \frac{\left[N(N+1) - \sum_{i-1}^{3} n_i^2\right]}{N_1}$$

$$\text{Standard error } \sigma_m = \left[\frac{\sum_{i-1}^{3} n_i^2 \{= N(N+1)\} - 2N\sum_{i-1}^{3} n_i^3 - N^3}{N^2(N-1)}\right]^{\frac{1}{2}}$$

Where N is the total number of price changes and n_i the number of price changes of each sign. The significance of the difference between the observed and expected number of runs can be tested by computing standardized variable Z as under:

$$Z = \frac{(R + 0.5 - M)}{\sigma_m}$$

Where

R = Total observed number of runs of all signs

0.5 = Continuity adjustment factor

Results of the Runs Test

Runs Test

a Mean

	ACC	AMBUJA	PRISM	ULTRATECH
Test Value(a)	1704.85	262.85	114.90	4095.85
Cases < Test Value	76	75	75	76
Cases >= Test Value	77	78	78	77
Total Cases	153	153	153	153
Number of Runs	10	10	13	16
Z	-10.950	-10.950	-10.463	-9.977
Asymp. Sig. (2-tailed)	.000	.000	.000	.000

The results of Runs test for the returns on companies under the study are represented in the above table. The p-value of all the companies are less than 0.05. So the null hypothesis is rejected. The succeeding stock index changes are dependent and do not move randomly. So the market is not efficient in weak form.

Kolmogorov-Smirnov Test:

This study has used K-S one sample test to test whether the observations for selected sample have come from normal or uniform distribution.

The non-parametric, Kolmogorov Smirnov Goodness of Fitness Test (KS) test whether the observed distribution fit theoretical normal or uniform distribution. Kolmogorov Smirnov Goodness of Fitness Test (KS) is used to define how well a random sample of data fits a particular distribution (uniform, normal or Poisson). This study has used both normal and uniform parameters to test distribution. The sample's cumulative distribution is compared against the standard cumulative function for each distribution. Ai denotes Cumulative relative frequency and Oi the comparable value of sample frequency. The K-s test is based on the maximum value of the absolute difference between Ai and Oi. The test statistic is:

K= Max(Ai-Oi)

The decision to reject the null hypothesis is based on the value of K. Critical value of K is given by $1.36/n^{(1/18)}$.

Alternatively K can be transformed into a normally distributed z statistic and its associated probability can be determined.

Results of K-S Goodness of fit test (Normal Distribution)

One-Sample Kolmogorov-Smirnov Test

		ACC	AMBUJA	PRISM	ULTRATECH
N		153	153	153	153
Normal Parameters(a,b)	Mean	1692.9915	261.0807	114.5052	4128.2650
	Std. Deviation	99.38844	16.41667	6.61856	162.77304
Most Extreme Differences	Absolute	.106	.120	.095	.086
	Positive	.074	.120	.054	.086
	Negative	-.106	-.105	-.095	-.074
Kolmogorov-Smirnov Z		1.316	1.480	1.171	1.065
Asymp. Sig. (2-tailed)		.063	.025	.129	.207

The Kolmogorov Smirnov Goodness of Fit Test (KS) shows p-value < 0.05 at the 5% level of significance, in case of normal distribution. The results clearly indicate that the frequency distribution of the daily values of the stock indices under the study does not fit normal distribution. So the null hypothesis is rejected. The succeeding stock changes are dependent and do not move randomly. So the market is inefficient in weak form.

V. FINDINGS AND CONCLUSION

The results of Runs test for the returns on stock indices under the study are indicating the p-value of all the stock exchanges are less than 0.05. So the null hypothesis is rejected. The succeeding price changes are dependent and do not move randomly. So the Indian capital market is not efficient in weak form. The Kolmogorov Smirnov Goodness of Fit Test (KS)

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The study provides the evidence of weak form of inefficiency of Indian capital market over the full sample period as well as period wise sample. The overall results from the empirical analysis suggest that the stock market in India is weak-form inefficient.

Since the Indian capital market is inefficient in weak form, it is also inefficient in semi-strong and strong form. Hence it is concluded that Indian Capital market is inefficient. The implication of rejection of capital market efficiency for investors is that they cannot accept a 'fair return for risk' strategy, by holding a well-diversified portfolio while investing.

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