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An analytical study of weak form efficiency on individual stocks

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Abstract
The efficient markets hypothesis (EMH) widely known as the Random Walk Theory, is the plan that current stock prices fully reflect available information about the value of the firm, and there is no way to earn excess profits, (more than the market overall), by using this information. It deals with one of the most fundamental and exciting issues in finance - why prices change in security markets and how those changes take place. It has very important implications for investors as well as for financial managers. Many investors try to identify securities that are undervalued, and are expected to increase in value in the future, and particularly those that will increase more than others. Many investors, including investment managers, believe that they can select securities that will outperform the market. They use a variety of forecasting and valuation techniques to help them in their investment decisions. The main objective of this research paper is to study the weak form efficiency on individual stocks through run test in the Indian stock market.

Keywords: Efficient markets, investors, financial managers, price change, securities

1. Introduction
The efficient market hypothesis (EMH) means that if new information is revealed about a firm, it will be incorporated into the share price rapidly and rationally, with respect to the direction of the share price movement and the size of that movement. In an efficient market, no trader will be presented with an opportunity for making a return on a share or other security that is greater than a fair return for the riskiness associated with that share or any other security. The absence of abnormal profit possibilities arises because current and past information is immediately reflected in current prices. It is only new information, which causes prices to change. In the major stock markets of the world, prices are set by forces of supply and demand. There are hundreds of analysts and thousands of traders; each receives new information on a company through electronic and paper media. The moment an unexpected, positive piece of information leaks out, investors will act and prices will rise rapidly to a level that gives no opportunity to make further profit. The efficient market hypothesis asserts that financial markets are "informationally efficient" or those prices on traded assets, e.g., stocks, bonds, or property, already reflect all known information and therefore are unbiased in the sense that they reflect the collective beliefs of all investors about future prospects. The efficient market hypothesis states that it is not possible to consistently outperform the market by using any information that the market already knows, except through luck.
The efficient markets hypothesis widely known as the Random Walk Theory, is the plan that current stock prices fully reflect available information about the value of the firm, and there is no way to earn excess profits, (more than the market overall), by using this information. It deals with one of the most fundamental and exciting issues in finance - why prices change in security markets and how those changes take place. It has very important implications for investors as well as for financial managers. Many investors try to identify securities that are undervalued, and are expected to increase in value in the future, and particularly those that will increase more than others. Many investors, including investment managers, believe that they can select securities that will outperform the market. They use a variety of forecasting and valuation techniques to help them in their investment decisions.

The efficient markets hypothesis asserts that profiting from predicting price movements is very difficult and unlikely. The main factor behind price changes is the arrival of new information. A market is said to be "efficient" if prices adjust quickly and, on an average, without bias, to new information. As a result, the current prices of securities reflect all available information at any given point of time. Consequently, there is no reason to believe that prices are too high or too low. Security prices adjust before an investor has time to trade on and profit from a new piece of information. In an efficient market, competition among the many intelligent participants leads to a situation where, at any point in time, actual prices of individual securities already reflect the effects of information based both on events that have already occurred and on events which, as of now, the market expects to take place in the future. In other words, in an efficient market at any point in time the actual price of a security will be a good estimate of its intrinsic value.

2. Review of Literature

Alexander (1961) [1] studied on "Price Movements in Speculative Market: Trends or Random Walks" of the New York Stock Exchange with the help of filter rules. He used the price change to know whether an abnormal return could be earned by using filter rule. The study pertained to a period of 1897 to 1959 and based on the closing prices for two indices, The Dow-Jones Industrial Average from Jan. 1897 to Jan. 1929 and Standard and Poor's Industrials from Feb. 1929 to Dec. 1959. The size of the filter was 5 per cent, 6 per cent, 7 per cent, 8 per cent, 10 per cent, 12.5 per cent, 15 per cent, 20 per cent, 25 per cent, 30 per cent, 40 per cent and 50 per cent. He observed various trends in price behaviour and identified that filter rules produced high rates of return in comparison to a buy-and-hold policy. Mishra, Das and Pradhan (2009) [8] attempted to provide some empirical evidence on the efficiency of Indian stock market in the context of recent global financial crisis. The study by employing the unit root tests on the sample of daily stock returns, presented the evidence of weak form market inefficiency in India. The study further examined the mean reversion implication of market inefficiency and suggested the existence of mean reversion illusion in India.

Gupta and Maheshwari (2010) [10] tested the weak form of the efficient market hypothesis for Central and Eastern Europe (CEE) equity markets for the period 1999-2009 with the help of auto correlation analysis, runs test, and variance ratio test. They found that stock markets of the Central and Eastern Europe did not follow a random walk process. They also tested the presence of daily anomalies for the same group of stock markets using a basic model and a more advanced Generalized Autoregressive Conditional Heteroskedasticity in Mean (GARCH-M) model. Results indicated that day-of-the-week effect was not evident in most markets except for some. Bansal Monica (2010) prescribed in the study that some of these markets were not weak form efficient and an informed investor can make abnormal profits by studying the past prices of the assets in these markets.

3. Objectives of the Study

The main objective of this research paper is to study the weak form efficiency on individual stocks through run test in the Indian stock market.

4. Analysis and Interpretation

4.1 Analysis of Weak form Efficiency Based on Individual Stocks

The analysis of individual stocks through methodological inputs of the study under consideration has been done for 15 years, which is further divided into four sub-periods, i.e. first phase (from April 1996 to March 2000), second phase (from April 2000 to March 2003), third phase (from April 2003 to March 2008, fourth phase (from April 2008 to March 2011).

The following section has discussed the findings of runs test, serial correlation test and Q-statistics during different time period.

4.1.1 Findings of Runs Test

The runs test is a non-parametric test and is frequently used to examine the random character of stock return behaviour as this test is free from the distribution assumption. The random character of the stock return behaviour has been examined in many phases because the market has seen many cyclical changes during the sampled period of the study under consideration. A generalization is made on the basis of overall results of runs test obtained through a long term analysis.

Empirical Results of the First Phase

The results reported for the first phase (April 1996-March 2000). A total of 207 cases were reported by 73 sample stocks. During this period, majority of the stocks reported positive mean returns. Out of 73 stocks, more than 43 stocks have reported positive mean returns and 30 stocks have reported negative mean returns. This table gives a comprehensive analysis of runs test at three levels of significance, i.e. 1, 5 and 10 per cent. Out of 73 companies 3 companies have significant z-value at 5 per cent level which is around 4 per cent and at 10 per cent level, there are around 10 per cent companies which have a significant z-value. There were only three companies which were showing non-random pattern in weekly return series when examined at 95 per cent confidence level and the number was nil when examined at 99 per cent level of confidence. Therefore, it can be said that the results portrayed above partially favour the inefficiency existing on the Bombay Stock Exchange when checked at 5 and 10 per cent level and prevails efficiency at 1 per cent level of confidence.

Runs Test and Bear Market Phenomenon

During the bear market phenomenon (from April 2000-March 2003), 59 companies out of 89 have shown positive mean returns and rest 30 companies have negative mean returns. The total cases found during this period were 156. Out of 89 sampled stocks, there is only one company i.e. Hero Honda having significant z-value at 5 per cent, 2 companies at 10 per cent and 2 companies at 1 per cent level. These stocks showed non randomness by having z value significant at various levels. The overall findings of the bear market study showed that the Indian stock market is highly efficient in weak form market.

Runs Test and Bull Market Phenomenon

A total of 263 cases were reported in the bull market phase i.e. (from April 2003-March 2008) of the study under consideration. The results obtained during bull market have

revealed that the mean returns were positive in case of 92 stocks out of 94 sampled stocks. Only two stocks showed negative mean returns. Findings of runs test during bull market phenomenon. Only one stock has reported significant z-value at 1 per cent level of significance indicating an increased level of weak form efficiency in Indian stock market. Further, it is interesting to notice that majority of the z-value were found with positive sign indicating the under expectations of the investors during the bull market. Further when examined through z-value at 5 and 10 per cent level, there were 6 companies showing significant value at 5 per cent and 5 companies at 10 per cent level. To generalize, it can be said that the Indian stock market was highly efficient in weak form in the bull market phenomenon.

Empirical Results of the Fourth Phase

The fourth and last phase of the present study (from April 2008-March 2011) has documented evidences in favour of weak form efficiency when tested the Indian capital market through Runs test. During the fourth sub-period, 99 companies out of 109 have shown positive mean returns. Only 10 companies have shown negative mean returns. The total cases during this sub-period were 153. The table represented that there were 9 companies showing significant value at 5 per cent, 6 companies at 10 per cent. At 1 per cent level of significance, there is strong evidence in favour of stocks following random walk as there is not a single stock having significant value. On the whole, it can be observed that the Indian stock market is efficient in its weak form during this sub-period.

Table 1: Runs Test during Overall Study Period (April 1996 to March 2011)

Name of the Company	Test Value (a)	Cases < Test Value	Cases >= Test Value	Total Cases	Number of Runs	Z	Asymptotic Sig. (2-detailed)
A B B Ltd.	1.4312	498	285	783	333	-2.358**	0.018
A C C Ltd.	0.3975	395	387	782	374	-1.285	0.199
Aban Offshore Ltd.	0.8092	423	359	782	368	-1.540	0.123
Aditya Birla Nuvo Ltd.	0.4112	434	348	782	353	-2.483**	0.013
Ambuja Cements Ltd.	0.3613	379	403	782	368	-1.693*	0.090
Apollo Tyres Ltd.	0.4487	435	347	782	382	-0.366	0.714
Areva T & D India Ltd.	0.0945	418	359	777	377	-0.741	0.459
Ashok Leyland Ltd.	0.4430	434	348	782	382	-0.382	0.703
Asian Paints Ltd.	0.4477	418	364	782	391	0.062	0.950
Bajaj Holdings & Invst. Ltd.	0.2208	390	392	782	386	-0.429	0.668
Bharat Forge Ltd.	0.5362	424	358	782	370	-1.385	0.166
Bharat Heavy Electricals Ltd.	0.6167	395	387	782	397	0.361	0.718
Bharat Petroleum Corpn. Ltd.	0.3956	427	355	782	375	-0.988	0.323
Century Textiles & Inds. Ltd.	0.3631	430	352	782	363	-1.815*	0.070
Chambal Fertilisers & Chemicals Ltd.	0.4123	410	372	782	398	0.497	0.619
Cipla Ltd.	0.5879	405	377	782	419	1.971**	0.049
Colgate-Palmolive (India) Ltd.	0.1082	415	365	780	388	-0.101	0.920
Crompton Greaves Ltd.	0.6451	428	354	782	382	-0.469	0.639
Cummins India Ltd.	0.4365	434	348	782	392	0.343	0.732
Dabur India Ltd.	0.5528	422	360	782	421	2.266**	0.023
Dr. Reddy'S Laboratories Ltd.	0.5576	391	391	782	392	0.000	1.000
Exide Industries Ltd.	0.6964	445	337	782	369	-1.134	0.257
Federal Bank Ltd.	0.5097	421	361	782	380	-0.698	0.485
Glaxosmithkline Consumer Healthcare Ltd.	0.4172	416	366	782	375	-1.107	0.268
Glaxosmithkline Pharmaceuticals Ltd.	0.3856	407	375	782	404	0.907	0.364
Grasim Industries Ltd.	0.3843	413	369	782	364	-1.921*	0.055
H D F C Bank Ltd.	2.7413	552	230	782	350	2.094**	0.036
Hero Honda Motors Ltd.	0.6513	419	363	782	384	-0.431	0.666
Hindalco Industries Ltd.	0.3420	400	382	782	381	-0.773	0.440
Hindustan Petroleum Corpn. Ltd.	0.2795	414	368	782	397	0.456	0.648
Hindustan Unilever Ltd.	0.2737	417	365	782	412	1.562	0.118
Housing Development Finance Corpn. Ltd.	0.5230	406	376	782	422	2.191**	0.028
I D B I Bank Ltd.	0.3592	434	348	782	379	-0.599	0.549
I F C I Ltd.	0.4571	454	328	782	383	0.085	0.933
I T C Ltd.	0.5185	417	365	782	387	-0.235	0.814
Indian Hotels Co. Ltd.	0.1703	414	368	782	393	0.169	0.866
Infosys Ltd.	0.9943	402	380	782	403	0.810	0.418
J S W Steel Ltd.	0.5032	438	340	778	376	-0.571	0.568
Jindal Saw Ltd.	0.6855	441	341	782	384	-0.117	0.907
Kotak Mahindra Bank Ltd.	0.9209	445	337	782	386	0.106	0.915
L I C Housing Finance Ltd.	0.8241	449	333	782	385	0.117	0.907
Mahindra & Mahindra Ltd.	0.5296	400	382	782	386	-0.415	0.678
Oil & Natural Gas Corpn. Ltd.	0.4503	404	378	782	373	-1.330	0.183
Oriental Bank Of Commerce	0.4127	429	353	782	391	0.195	0.846
Piramal Healthcare Ltd.	0.4207	428	354	782	390	0.108	0.914
Ranbaxy Laboratories Ltd.	0.3607	420	362	782	389	-0.061	0.951
Reliance Capital Ltd.	0.5893	422	360	782	363	-1.912*	0.056
Reliance Industries Ltd.	0.5522	387	395	782	387	-0.355	0.723

Reliance Infrastructure Ltd.	0.3968	404	378	782	389	-0.184	0.854
Siemens Ltd.	0.6227	420	362	782	385	-0.349	0.727
State Bank Of India	0.2997	411	371	782	384	-0.501	0.617
Steel Authority Of India Ltd.	1.8760	504	278	782	348	-0.886	0.376
Sun Pharmaceutical Inds. Ltd.	0.7400	427	355	782	424	2.549**	0.011
Tata Chemicals Ltd.	0.6505	458	324	782	347	-2.471**	0.013
Tata Global Beverages Ltd.	0.2949	416	366	782	392	0.115	0.909
Tata Motors Ltd.	0.3638	401	381	782	391	-0.053	0.957
Tata Power Co. Ltd.	0.4425	412	370	782	376	-1.067	0.286
Tata Steel Ltd.	0.4297	413	369	782	367	-1.706*	0.088
Thermax Ltd.	0.4869	418	364	782	379	-0.801	0.423
Titan Industries Ltd.	0.7158	421	361	782	384	-0.410	0.682
Voltas Ltd.	0.6900	426	356	782	365	-1.722*	0.085
Zee Entertainment Enterprises Ltd.	0.7561	415	367	782	381	-0.684	0.494

Source: Data Complied from CMIE – Prowess database.

** Significant at 5 per cent level of significance. * Significant at 10 per cent level of significance. *** Significant at 1 per cent level of significance

5. Empirical Results of the Overall Study Period

During the overall study period (from April 1996-March 2011), the runs test has reported 782 cases as shown in the table-4.5. Out of 62 stocks, 6 stocks reported significant z-value at 10 per cent level and 8 stocks showed significant z-value at 5 per cent level of significance. No stock reported significant value at 1 per cent.

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