Research Paper
Impact Factor - 2.262
Peer Reviewed Journal

IJMDRR
E- ISSN –2395-1885
ISSN -2395-1877

MYTH OR REALITY ABOUT THE EFFICIENCY OF INDIAN STOCK MARKET A STUDY ON BSE.

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INTRODUCTION

There are three vital theories of investment within which the purview of the investment analysts study the behavior of stock prices. The primary one is the Fundamental analysis and second one is the Technical analysis. Fundamental analysis is related to the company's financial statements through ratio analysis, earnings per share and intrinsic value of the share. Technical analysts believe that history repeats itself. The past behavior of the stock prices gave an indication about the future of the stocks. They studied the pattern of the stock prices through charts and drew inferences through patterns which were found on the charts. This method was an indication of the kind of stocks that were to be purchased when the bull or bear market begins to operate. On the basis of the technical analysis, many researchers questioned whether today's stock prices indicate anything about tomorrow's prices. This is the question which is described and analyzed through the Random Walk Theory which is the third vital theory of investment within which the purview of the investment analysts study the behavior of stock prices. This theory discusses the efficiency of the capital market.
Fama (1970) classified EMH in its three forms-

- **Weak- form efficiency**: Prices reflect all information found in the record of past prices and volumes. That is no excess returns can be earned by using investment strategies based on historical share price or other financial data. This form of efficiency market implies that technical analysis will not be able to consistently produce excess returns.

- **Semi – strong form efficiency**: Prices reflect not only all information found in record of past prices but also all other publicly available information like company's financial statements etc. the implication of semi-strong hypothesis is that fundamental analysts cannot make superior gains by undertaking fundamental analysis because stock prices adjust to new pieces of information as soon as they are received. Thus, the semi-strong hypothesis repudiates fundamental analysis.

- **Strong –form efficiency:** Prices reflect all available information, public as well as private or inside information. This implies that no information public or private can be used to earn superior returns consistently. Inside information refers to that information which is available to directors and other senior management positions of the company and that which is not available to general public.

The criteria of this study are to test the validity of the weak-form Efficient Market Hypothesis.

PROBLEM

For many years, economists, statisticians and teachers of finance have been interested in developing and testing the existence of weak form of market efficiency. In Fama survey the vast majority of those studies were unable to reject the efficient markets hypothesis for stocks. On the other hand, there are several anomalous departures from market efficiency in the literature. Although a precise formulation of an empirically refutable efficient market hypothesis must obviously be model specific, historically the majority of such tests have focused on the ability to forecast of common stock returns. Within this framework, which is called random walk of stock prices, few studies have been able to reject the random walk model statistically. It is noticed that a large majority of the studies are in favour of Weak form of stock market efficiency and some studies deny its existence. Under this backdrop, the present study was conceptualised to test the weak-form EMH in the Indian Stock Market. Is the Indian stock market efficient or not?

NEED FOR THE STUDY

There is call for to study whether stock prices in the Indian stock markets move as the random walks theory suggests. In other words, is the Indian stock market mechanism efficient in the manner predetermined in its weak form preposition? The objectives conceptualized in the study under consideration is to empirically test whether the weak form of efficient market hypothesis holds well in Indian stock markets.

OBJECTIVES OF THE STUDY

- To test the efficiency of the Indian Capital Market.
- To test the existence of Weak Form of Efficient Market Hypothesis in Indian Capital Market.

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RESEARCH DESIGN

The scope of the study is confined to Bombay Stock Exchange Sensex and the 30 companies under BSE-SENSEX of Indian Capital Market. The study is limited to test the weak form of Efficient Market Hypothesis in BSE. The sample included total 73 monthly observations for the total sample period 2006 to 2012. To be more precise the monthly closing prices from January 2006 to February 2012 are considered for the study. A period of six years data is considered. The population of the study comprises of all the stock exchanges of the Indian Capital Market.Bombay stock Exchange is perhaps the oldest stock Exchanges in India is considered for the study. The BSE Sensitive Index and 30 companies of the BSE SENSEX is the sample selected for the study. The data utilized in this study have been collected from the archieves of BSE. (websites www.bseindia.com.). It is purely Secondary data. The study employs tests of normality, Kolmogrov-smirnov test, Autocorrelation or Durban Watson (DW) and Runs Test to know whether stock prices of 30 companies shares and BSE INDEX follow random walk or alternatively, they have presence of a serial correlation/auto correlation.

REVIEW OF LITERATURE

There is extensive literature available on random walk theory and market efficiency hypothesis. Bachelier (1900) is the first who theorized the concept of market efficiency. The Seminal works of Samuelson (1965) and Fama (1965, 1970) show their keen interest in this area. Samuelson (1965), Fama (1965) and Jennergren and Korsvold (1974) examined the behaviour of stock returns by applying serial correlation tests and they found markets as efficient. Kim, Nelson & Startz (1991) examined the random walk process of stock prices by using weekly and monthly returns in five Pacific Basin stock markets. They concluded that the mean reversion was only a phenomenon of the pre-World War II period, and not a feature of the postwar period. They found that the variance ratio tests produced positive serial correlation. Ayadi and Pyun (1994) showed that the South Korean market doesn't follow random walk when tested under homoscedastic error term assumption and follows random walk when the test statistic is corrected for heteroscedasticity. Poshakwale.s(1996) study has presented evidence concentrating on the weak form efficiency and on the day of week effect in the Bombay Stock Exchange under the consideration that variance is time dependent. Moving from its traditional functioning to that required by the opening of the capital markets, the BSE has presented different patterns of stock returns and supports the validity of day of the week effect. The frequency distribution of the prices in BSE does not follow a normal or uniform distribution which is also confirmed by the non-parametric K-S Test. The results of runs test and serial correlation coefficients tests indicate nonrandom nature of the series and, therefore, violation of weak form efficiency in the BSE. Grieb and Reyes (1999) employed variance ratio test on weekly stock returns to reexamine the Brazilian and Mexican stock markets. Their findings indicated nonrandom behavior in the Mexican market while the Brazilian market indicated evidence in favor of the random walk. Magnusson and Wydick (2000) tested the random walk hypothesis for a group of African countries and found that there is greater support for the African stock markets than for other emerging stock markets.

To sum up, although, the literature on random walk and market efficiency is vast; There is no consensus among the researchers regarding efficiency of the market. The different tests yield different results. Hence, a thought to verify the presence of efficiency in the stock market is the present study.

HYPOTHESES

For the present study the hypothesis formulated (Ho) examines whether the stock returns follow a random walk (weak - form efficiency) during the study period.

- **Null Hypothesis (Ho):** The Indian stock market returns are random during the study period.
- **Alternate Hypothesis (H1):** The Indian stock market returns are not random during the study period.

ANALYSIS AND INTERPRETATION

The empirical results are classified in accordance with the different statistical techniques used. The findings of individual statistical techniques are discussed in each subsection below.

DESCRIPTIVE STATISTICS

Poshokwale, S.1996, described about this clearly. One of the basic assumptions of random walk model is that the distribution of the return series should be normal. In order to test the distribution of the return series, the descriptive statistics of market returns are calculated and presented in the table 1

IJMDRR
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Table 1: Descriptive statistics of market and 30 companies stock returns.

	Descriptive Statistics					
		N	Mean	Std. Deviation	Minimum	Maximum
BSE-Sensex	RETURN	73	1.155399	8.2973991	-23.8901	28.2551
STERLITEIND	RETURN	73	.304541	21.9480179	-84.9024	62.7454
TATA POWER	RETURN	73	.662094	15.7894531	-90.4438	41.6745
COAL INDIA	RETURN	15	.402767	6.2045700	-11.2548	9.5073
BHARTI ARTL	RETURN	73	.631522	10.8934566	-48.8156	19.7347
TATASTL	RETURN	73	1.744385	17.7179737	-50.6344	70.6784
TCS	RETURN	73	.428788	11.7998417	-46.0721	35.0783
JINDAL STEEL	RETURN	73	2.948542	24.8136378	-84.9153	129.3002
MNM	RETURN	73	1.179220	12.3451864	-45.8778	38.8175
HINDALCO	RETURN	73	.977864	15.3052223	-38.3828	57.2888
SUNPHARMA	RETURN	73	1.020364	12.1858757	-78.7050	17.6872
ITC	RETURN	73	.941683	9.6243145	-47.3198	31.2943
INFY	Return	73	.616830	10.2375202	-46.2592	22.6270
MARUTI	RETURN	73	1.305820	10.9722729	-20.4794	32.6435
GAIL	RETURN	73	.978129	10.6869079	-47.6827	26.5142
HUL	RETURN	73	1.261897	8.1422435	-18.8401	24.2043
HERO MOTOCO	Return	73	1.566098	8.4701632	-17.9044	23.2541
NTPC	RETURN	73	1.004882	8.4923176	-20.8558	23.7529
CIPLA	Returns	73	.329732	11.1067750	-60.6013	25.0623
WIPRO	RETURN	73	.416104	11.4057037	-42.4329	34.6781
BAJAJAUT	RETURN	45	3.955779	16.5428288	-46.0834	60.7439
TATA MOTORS	RETURN	73	.944715	18.2775480	-78.9538	44.7879
ICICI BANK	RETURN	73	1.514248	14.1648909	-29.4101	55.0392
HDFC BANK	Return	73	1.086641	13.6050511	-80.5243	31.0393
ONGC	Return	73	-.471547	14.0444196	-77.0158	35.8637
RIL	Return	73	.964423	12.0578031	-44.9683	28.3140
SBI	Return	73	2.042271	12.8860289	-24.2998	46.2863
BHEL	Return	73	-.616881	14.7545671	-80.5852	31.6725
DLF	RETURN	55	.214362	20.7712142	-37.5000	74.6644
HDFC	Return	73	.610969	13.7208101	-79.0306	27.8973
LNT	RETURN	73	1.030365	16.9938608	-67.0283	59.8090

NON- PARAMETRIC TESTS

The study uses two different non-parametric tests; one kolmogrov Smirnov Goodness of fit test to examine if the distribution is normal and the other (runs test) is to prove if the daily return series follows random walk model.

KOLMOGROV SMIRNOV GOODNESS OF FIT TEST

Kolmogrov Smirnov Goodness of fit test (K-S test) is a non-parametric test and is used to determine if the distribution is normal or not.

IJMDRR
E- ISSN –2395-1885
ISSN -2395-1877

Table 2: Kolmogrov Smirnov Goodness of Fit Test

Monthly Market Return

Company		Absolute	Positive	Negative	K-S Z	Asymp. Sig.(2-tailed test)
BSE-SENSEX	RETURNS	.068	.067	-.068	.584	.885
STERLITE IND	RETURNS	.123	.123	-.120	1.047	.223
TATAPOWER	RETURN	.149	.073	-.149	1.271	.079
COAL INDIA	RETURN	.161	.161	-.140	.623	.832
BHARTI ARTL	RETURN	.109	.064	-.109	.933	.349
TATA STL	RETURN	.074	.067	-.074	.634	.816
TCS	RETURN	.152	.084	-.152	1.296	.069
JINDAL STEEL	RETURN	.188	.145	-.188	1.608	.011
MNM	RETURN	.125	.105	-.125	1.067	.205
HINDALCO	RETURN	.068	.068	-.061	.580	.890
SUN PHARMA	RETURN	.150	.100	-.150	1.281	.075
ITC	RETURN	.135	.076	-.135	1.152	.141
INFY	RETURN	.068	.057	-.068	.577	.893
MARUTI	RETURN	.057	.057	-.029	.488	.971
GAIL	RETURN	.111	.111	-.101	.952	.325
HUL	RETURN	.057	.057	-.047	.489	.971
HEROMOTOCO	RETURN	.051	.051	-.041	.437	.991
NTPC	RETURN	.082	.082	-.071	.705	.704
CIPLA	RETURN	.101	.083	-.101	.866	.441
WIPRO	RETURN	.104	.069	-.104	.891	.406
BAJAJ AUT	RETURN	.149	.115	-.149	.998	.272
TATAMOTORS	RETURN	.118	.070	-.118	1.009	.260
ICICI BANK	RETURN	.121	.121	-.072	1.035	.234
HDFC BANK	RETURN	.139	.099	-.139	1.190	.118
ONGC	RETURN	.170	.129	-.170	1.453	.029
RIL	RETURN	.067	.042	-.067	.574	.897
SBI	RETURN	.076	.076	-.066	.652	.788
BHEL	RETURN	.135	.135	-.132	1.157	.137
DLF	RETURN	.096	.096	-.074	.711	.693
HDFC	RETURN	.168	.093	-.168	1.434	.033
LNT	RETURN	.158	.158	-.129	1.349	.053

Kolmogorov – smirnov test is designed to test normality by comparing data to normal distribution with same mean and standard deviation of the sample. If the test is not significant, then the data are normal, so any value above 0.05 indicates normality. If the test is significant, then the data are not normal, that is any value less than 0.05 is not normal. In the above table no. 2 (K – S test), it is observed that out of 30 companies that are selected to test the normality, except JINDAAL STEEL, ONGC and HDFC rest all companies including SENSEX which is the bench mark in this sample, the probability values are greater than 0.05. This indicates that the data (returns) is normal.

RUN TEST

The run test is another approach to test and detect statistical dependencies (randomness). The null hypothesis of the test is that the observed series is a random series.The number of runs is computed as a sequence of the price changes of the same sign (such as, ++, _ _, 0 0). When the expected number of run is significantly different from the observed number of runs, the test rejects the null hypothesis that the monthly returns are random. The run test converts the total number of runs into a Z statistic. For large samples the Z statistics gives the probability of difference between the actual and expected number of runs. If the Z value is greater than or equal to +_ 1.96, reject the null hypothesis at 5% level of significance (Sharma and Kennedy, 1977). If the Z value is lesser than + -1.96, accept null hypothesis at 5% significance level. That is the observed series is a random series.

As can be seen from the table -3, the Z statistics of monthly market return is lesser than _+ 1.96, which means that the observed number series is a random series.

IJMDRR
E- ISSN –2395-1885
ISSN -2395-1877

Table 3: Runs test values.

Particulars	Variable	Number of Runs	Z	Asymp sig (2 – tailed test)
SENSEX	Monthly Returns	43	1.298	.194
STERLITE IND	Monthly Returns	34	-.824	.410
TATAPOWER	Monthly Returns	41	.827	.408
COAL INDIA	Monthly Returns	7	-.521	.603
BHARTI ARTL	Monthly Returns	40	.591	.554
TATA STL	Monthly Returns	43	1.298	.194
TCS	Monthly Returns	35	-.588	.557
JINDAL STEEL	Monthly Returns	32	-1.295	.195
MNM	Monthly Returns	25	-2.946	.003
HINDALCO	Monthly Returns	36	-.352	.725
SUN PHARMA	Monthly Returns	42	1.063	.288
ITC	Monthly Returns	43	1.298	.194
INFY	Monthly Returns	44	1.534	.125
MARUTI	Monthly Returns	35	-.588	.557
GAIL	Monthly Returns	41	.827	.408
HUL	Monthly Returns	41	.827	.408
HERO MOTOCO	Monthly Returns	41	.827	.408
NTPC	Monthly Returns	45	1.770	.077
CIPLA	Monthly Returns	42	1.063	.288
WIPRO	Monthly Returns	34	-.824	.410
BAJAJ AUT	Monthly Returns	24	.003	.997
TATA MOTORS	Monthly Returns	35	-.588	.557
ICICI BANK	Monthly Returns	35	-.588	.557
HDFC BANK	Monthly Returns	40	.591	.554
ONGC	Monthly Returns	42	1.063	.288
RIL	Monthly Returns	37	-.116	.907
SBI	Monthly Returns	32	-1.295	.195
BHEL	Monthly Returns	37	-.116	.907
DLF	Monthly Returns	27	-.406	.685
HDFC	Monthly Returns	42	1.063	.288
LNT	Monthly Returns	35	-.588	.557

It is noticeable that out of 30 companies, only one company that is MNM's calculated value of run test of randomness lies outside the preceding confidence level (+_1.96), for all remaining companies and also the market (SENSEX) calculated value of run test of randomness lies within the preceding confidence level (+_1.96). Therefore, this means we can accept the null hypothesis that the return series on the BSE follows random walk.

In addition to this, the output probability value (p = Asymp sig (2 – tailed test)) is used for decision making of whether to accept or reject null hypothesis. If the probability value is >- than the predetermined significance value (here it is 5% or 0.05) then accept null hypothesis. If the probability value is < than predetermined significance value then reject null hypothesis. On observing the results of probability values from table-3, it can be seen that except MNM company, the rest of the companies along with BSE-SENSEX, probability values are greater than significance level ($p > 0.05$). Therefore it can be concluded that null hypothesis is acceptable.

Overall, the results of run test analysis on the Bombay Stock Exchange of India indicate that the monthly share return of Bombay Stock Exchange is random.

IJMDRR
E- ISSN –2395-1885
ISSN -2395-1877

CONCLUSION

The empirical analysis of the study uses monthly market return of the Bombay Stock Exchange for the period from January 2006 to February 2012. The data of monthly price indices are collected from the Bombay stock exchange site for the period of 2006 - 2012. The study uses the general methodology followed by Poshokwale, 1996 in emerging market. In this study, the stock returns are measured on monthly percentage change in the share price index in order to avoid the influences of extreme index values. The study employs tests of normality, Kolmogrov-smirnov test and Runs Test to know whether stock prices of 30 companies' shares and BSE INDEX follow random walk. Based on Runs test carried out on the sample drawn from BSE it is concluded that the stock market returns follow random walk and they support the weak form of market efficiency. Hence, the empirical study supports the weak-form EMH of Bombay Stock Exchange (BSE) of India based on Runs test and Kolmogorov - Smirnov test.

The results obtained for BSE are considered to be applicable to Indian stock markets in general. It means that the Indian stock markets are weak form efficient and abnormal returns cannot be generated based on past price trends / information.

REFERENCES

1. Ayadi, O.P. and Pyun, C.S., (1994), "An application of variance ratio tests to theKorean Securities market", Journal of Banking and finance, 18, pp. 643-658.
2. Bachelier, L.,(1900). "Theory of Speculation", A Thesis submitted to the Faculty of theAcademy of Paris on March 29, 1900
3. Fama, E. F. (1970). "Efficient capital markets: A review of theory and empirical work."Journal of Finance. 25, pp .383-417.
4. Fama, E.F. (1965), "The Behaviour of Stock Market Prices," Journal of Business, 28.1 (January), pp .34-105.
5. Grieb, T. and Reyes, M.R., (1999), "Random walk tests for Latin American equity indexes and individual firms", The Journal of Financial Research, XXII (4), pp. 371-383.
6. Jennergren, L. P. & Korsvold, P. E., (1974). "Price formation of the Norwegian andSwedish stock markets: Some random walk tests". The Swedish Journal of Economics,76, pp. 171-185.
7. Kim, M.J., Nelson, R.C. and Startz, R.,(1991), "Mean reversion in stock prices? A reappraisal of the empirical evidence", The Review of Economic Studies, 58, pp. 515-528.
8. Magnusson M A and Wydick B (2002) "How Efficient are Africa's Emerging Stock Markets," Journal of Development Studies 38, pp. 141-156.
9. Poshakwale, S. (1996) , "Evidence on Weak Form Efficiency and Day of the Week Effect in the Indian Stock Market", FINANCE INDIA, Vol.10, No. 3, September , pp. 605-616.
10. Samuelson, P. (1965). "Proof that properly anticipated prices fluctuate randomly", Industrial Management Review, 1, pp. 41-49.