"Efficiency of Indian Stock Market: A Study from National Stock Exchange"

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Abstract: **The efficient market theory states that the share price fluctuations are random and do not follow any regular pattern. Mean while technical analysts see meaningful patterns in their charts. Hence the question arises that whether investors can predict future share prices and gives an opportunity for earnings ? Many studies of the market analysts have proved the weak form of the EMH. The type of information used in weak form of Efficient Market Hypothesis is the historical prices. Everyone has access to the past prices; even though, some people can get those more conveniently than others.**

Informational efficiency is the measure of swiftness with which the market reacts to new information in the form of economic reports, company analyses, political statements and notification of the Industrial policy. The Semi strong form of the efficient market hypothesis states that the security price adjusts rapidly to all publicly available information like earnings of corporate, dividend, bonus, stock splits so on. The study analyses whether current security prices reflect all the historical information, whether future prices can be predicting by analyzing past prices and whether all public information is reflected in the security prices?

The study on Market efficiency is conducted for NSE 50 stocks and Nifty for the period of 3 years. From the study it is understood that Indian Stock Markets are efficient in Both Weak & Semi-strong form.

I. INTRODUCTION

The Indian equity markets performed remarkably well in last few years, supported by improved conditions in the global financial markets. During this period, there was a rise in the inflows of foreign capital and increased trading activity in equity markets. With increased movement of investments across international boundaries owing to the integration of world economies, the understanding of efficiency of the emerging markets is also gaining greater importance. Hypothesis of Market Efficiency is an important concept for the investors who wish to hold diversified portfolios.

The expectations of the investors regarding the future cash flows are translated or reflected on the share prices. The accuracy and the quickness in which the market translates the expectation into prices are termed as market efficiency. By efficient market we mean a market in which share prices follow an independent path, this happens because of the presence of several macro and micro factors contributing towards the efficiency. In an efficient market each price of a share is independent of the previous price.

The type of information used in weak form of Efficient Market Hypothesis is the historical prices. Everyone has access to the past prices, even though some people can get those more conveniently than others. Many studies of the market analysts have proved the weak form of the EMH. The Semi strong form of the efficient market hypothesis states that the security price adjusts rapidly to all publicly available information like earnings of corporate, dividend, bonus, stock splits so on. The abnormal returns are calculated using residual analysis.

This study is based on the daily closing price of NIFTY 50 index and 50 stocks obtained from NSE for the period of 3 years that is from 1st April 2013 to 31st March 2016. In order to test weak form of market efficiency Auto correlation test and run test has been conducted. The Run test is conducted to test the weak form of efficient market hypothesis. The Residual return on event study is conducted to examine the Semi strong form of efficient market hypothesis and the security returns are regressed against the returns on market index.

II. LITERATURE REVIEW

According to Fama (1970) the concept of efficient market is concerned with the adjustment of security prices to three relevant information's. First, weak form tests, in which the information is of historical prices, then semi-strong form tests, in which the prices adjust to other information that is publicly available, finally, strong form tests were all information is reflected. E. Dockery and M. G. Kavussanos (1995) they tested unit root tests using panel data to investigate the efficiency of the Athens stock market for a total 73 companies out of possible 150 companies listed on Athens stock exchange from February 1988 to October 1994 and the it is noticed that there was no evidence of random walk and the null hypothesis was rejected. Rakesh Gupta and Parikshit Basu (2007) conducted a test for weak form of efficiency on NSE and BSE from 1991 to 2006. The evidence suggests that the series do not follow random walk model and there is an evidence of autocorrelation in both markets rejecting the weak form efficiency hypothesis. Richard Osayuwu (2010)

conducted a study on weak form of efficient market hypothesis in Nigerian Capital Market from 2001 to 2010 by using serial correlation technique of data analysis to test for independence of successive price movement and the distributive pattern while runs test was used to test for randomness of share price movement. He found that the successive price changes of stocks traded on the floor of the Nigerian Capital Market are independent and random. It is concluded that the Nigerian Capital Market is efficient in the weak form. Saqib Nisar and Muhammad Hanif (2011) employed runs test, serial correlation, unit root and variance ratio test to examine the weak form of efficient market hypothesis on the four major stock exchanges of South Asia including, India, Pakistan, Bangladesh and Sri Lanka. Historical index values on a monthly, weekly and daily basis for a period of 14 Years (1997-2011) were used for analysis. It is concluded that none of the four major stock markets of south-Asia follows random walk and hence all these markets are not the weak form of efficient market. Renuka Sharma (2012) conducted a study on Information Efficiency of Indian Stock Market by using the data of earnings announcement and annual dividend announcement for 133 companies. As a result, study considered a total of 1417 events composing of 229 quarterly earnings announcements made in the month of April in each year and 1188 annual cash dividend announcement. Study was conducted in three phases First phase July 1991 to March 2000, Second Phase, April 2000 to March 2003, Third Phase April 2003 to December 2007. She concluded that stock prices immediately get adjusted to the information regarding the earnings announcements and no investors can attain abnormal returns near the earnings announcement, which shows the market is efficient in semi-strong form. Venkata Rajasekhar Ryaly, R. S. R. K. Kiran Kumar and Bhargava Urlankula (2013) conducted a study of the behaviour of the daily returns to find the weak form efficient market in five Asian countries using the stock indices of India (SENSEX) South Korea (Kospi), Japan (Nikkiei), Hong Kong (Hang Seng), and Singapore (Strait Times) for the period of July 1997 to November 2013. Run test, autocorrelation test, and unit root test were employed to find weak form of efficiency. They found that the market were weak form of efficient market in all five countries. In run test, with the exception of India and Japan all other countries satisfied the condition of randomness.

III. OBJECTIVE OF THE STUDY

To examine whether Indian Stock Market is efficient in weak form & semi-strong form.

IV. NEED FOR THE STUDY

Hypothesis of Market Efficiency is an important concept for the investors who wish to hold diversified portfolios. With increased movement of investments across international boundaries owing to the integration of world economies, the understanding of efficiency of the emerging markets is also gaining greater importance. It is understood that the share price fluctuation are random and do not follow any regular pattern. Hence there is need to understand whether the Indian stock markets are efficient. It is also important to understand whether investors are benefited by analyzing the historical price to predict the future price for greater return and how fast the dissemination of information like the earnings, bonus issue, dividend, rights issue, merger and acquisitions etc are reflected immediately on the share price and whether there is a scope for the abnormal return is to be studied.

V. SCOPE FOR THE STUDY

The study on Market efficiency is conducted for NSE 50 stocks and Nifty for the period of 3 years. The Auto correlation test, Run test and Residual test are conducted to know whether there is any significant relation is there between stock price returns at 3 periods, the stock prices follow a random path and possibility of any abnormal returns at three periods respectively. An effort is made to understand whether the Indian markets are efficient in Weak and Semi-strong form.

VI. DATA SOURCE AND METHODOLOGY

The research is conducted for Nifty 50 index & Nifty 50 stocks. It is based on the daily closing price of the trading sessions for the period of 3 years that is from 1st April 2013 to 31st March 2016.

The sample is prominent because,

- NIFTY represents about 65% of the free float market capitalization of the stocks listed on NSE as on March 31st 2016.
- Total traded value of all NIFTY stocks is approximately is 46% of the traded value of all the stocks listed on NSE.

In order to test weak form of market efficiency Auto correlation test and run test are conducted. Auto Correlation test is conducted to know whether there is any significant relation between price changes in different periods. In run test, we test randomness of order. At the given level of significance, whether the number of runs observed from the test falls within the limit is checked.

The Residual return on event study is conducted to examine the Semi strong form of market efficiency. Events study is conducted to know the abnormal returns. Here the security returns are regressed against the returns on market index.

Analysis of Correlation Test:

Table 1: 'r' values for the Nifty 50 for the period

2013-14 to 2014-15 & 2014-15 to 2015-16

INDEX	r Value 2013-14 to 2014-15	r Value 2014-15 to 2015-16
NIFTY 50	0.0234	0.0224

Table 2: 'r' values for the Nifty 50 stocks for the period 2013-14 to 2014-15 & 2014-15 to 2015-16

Sl No.	Stocks of NIFTY 50	r Values 2013-14 to 2014-15	r Values 2014-15 to 2015-16
1	Adaniports	-0.0054	-0.0085
2	Asianpaint	0.0117	0.0133
3	Ambujacem	-0.1149	0.0881
4	Aurophar ma	0.0863	0.1348
5	Axis Bank	-0.013	0.1336
6	Bajaj Auto	-0.0214	0.0035
7	Bankbaroda	0.0087	0.074
8	Bhartiartl	0.0622	0.078
9	Bhel	0.0561	-0.0434
10	Boschltd	-0.0997	-0.026
11	Bpcl	-0.0083	0.0394
12	Cipla	0.145	-0.0001
13	Coalindia	-0.0381	0.075
14	Drreddy	0.0924	-0.0901
15	Eichermot	-0.2069	-0.0712
16	Gail	0.0944	0.0594
17	Grasim	-0.1022	-0.0334
18	Hcltech	0.0925	-0.0151
19	Hdfc	-0.0221	-0.0907
20	Hdfcbank	-0.0224	0.0268
21	Heromotoco	0.0154	0.0643
22	Hindalco	0.0232	-0.0225
23	Hindunilvr	0.0536	-0.0969
24	Icicibank	-0.1368	-0.0684
25	Idea	-0.0948	0.0095
26	Indusindbk	-0.0756	0.0291
27	Infratel	0.1118	-0.0023
28	Infy	0.0804	-0.0189
29	Itc	0.0674	-0.1241
30	Kotakbank	-0.0984	0.0753
31	Lt	-0.0306	0.066
32	Lupin	-0.0334	0.1013
33	M&M	-0.0647	0.0299
34	Maruti	0.0461	-0.0356
35	Ntpc	0.0574	0.1128
36	Ongc	-0.0548	-0.0045
37	Powergrid	0.0234	-0.0851
38	Relanice	-0.013	-0.0075
39	Sbin	0.0046	-0.0279
40	Sunpharma	0.0532	0.0213
41	Tatamotors	0.0393	0.066
42	Tatamtrdvr	-0.0047	0.0506
43	Tatapower	-0.1108	0.0406
44	Tatasteel	-0.0749	0.0323
45	Tcs	-0.0164	-0.0122
46	Techm	0.1419	0.0423
47	Ultracemco	-0.1195	0.0772
48	Wipro	0.0726	0.1127
49	Yesbank	-0.0301	0.1413
50	Zeel	0.0748	0.0103

This study is conducted to examine the daily return of NIFTY and 50 Stocks in two phases, reveals that the correlations were insignificant for Nifty 50 stocks and market in both the phases. From this evidence we can say that there is an independent movement of stock prices.

Analysis of Run Test:

Table 3: Z values for the Nifty 50 stocks for the period April 2013 to March 2016 (Three periods)

Sl No.	Stocks of NSE	Z Values April 2013 – March 2014	Z Values April 2014 – March 2015	Z Values April 2015 – March 2016
1	Adaniports	0.1895	0.6996	-1.18715
2	Asianpaint	0.0629	2.6565	-0.01773
3	Ambuja	-0.3168	-0.0807	2.378807
4	Aurophar ma	1.0532	0.883	1.3524
5	Axisbank	0.6959	0.5346	-0.0334
6	Bajaj Auto	0.3065	-0.1716	2.8568
7	Bankbaroda	1.4095	0.5936	0.0414
8	Bhartiartl	1.3185	0.479	1.5764
9	Bhel	-1.1349	0.7371	2.0908
10	Boschltd	-0.626	-0.8528	0.9801
11	Bpcl	0.5387	1.7406	0.9571
12	Cipla	2.1078	-0.1716	2.892
13	Coalindia	0.4602	1.2604	0.8392
14	Drreddy	-0.1959	-0.5379	1.5498
15	Eichermot	-0.7695	-0.7166	-0.8379
16	Gail	1.8246	0.936	0.6092
17	Grasim	0.8305	1.3217	2.3674
18	Hcltech	1.5353	1.7811	2.2392
19	Hdfc	-0.2014	-0.5832	0.7122
20	Hdfcbank	2.7146	1.978	2.7941
21	Heromotoco	1.0939	2.4788	0.298
22	Hindalco	0.2068	0.4278	1.0706
23	Hindunilvr	0.8125	0.8095	1.8325
24	Icicibank	0.1895	-1.2442	0.04141
25	Idea	1.2475	-0.9994	1.0643
26	Indusindbk	1.2207	0.8662	1.4937
27	Infratel	-0.702	1.228	1.0706
28	Infy	-0.4869	0.4051	0.8082
29	Itc	1.4304	1.529	0.8103
30	Kotakbank	0.9672	1.483	2.0953
31	Lt	-0.9498	-1.2442	1.355
32	Lupin	2.0776	0.8622	1.3975
33	M&M	2.7079	2.1158	0.9948
34	Maruti	0.4505	1.529	0.5725
35	Ntpc	1.7023	2.1158	2.0886
36	Ongc	2.0776	2.6565	0.5521
37	Powergrid	2.6281	0.0887	1.0958
38	Relanice	1.2823	-0.0035	1.1003
39	Sbin	-0.0637	0.0658	0.8206
40	Sunpharma	1.5012	1.9773	0.5826
41	Tatamotors	1.7551	0.9571	1.5829
42	Tatamtrdvr	-0.3094	1.2706	2.347
43	Tatapower	1.1961	1.4721	1.4549
44	Tatasteel	0.18	0.5564	0.4543
45	Tcs	1.0279	0.9423	1.0769
46	Techm	1.4637	0.1475	2.7051
47	Ultracemco	0.6284	1.206	2.0908
48	Wipro	1.1756	0.4523	1.7264
49	Yesbank	-0.8071	0.0658	0.9425
50	Zeel	0.3335	2.0999	1.3225

At a 5% level of significance, the calculated values of Z for almost all stocks lies between – 1.96 and + 1.96, hence it can be said that runs have occurred by chance. It can be concluded that the prices are random or independent of each other. Here exceptions are CIPLA, HDFCBANK, M&M, ONGC and NTPC. Their prices are affected by some other factors like announcement of results and earnings. These stocks have still gap for the investors to earn greater return.

Table 4: Z values for the Nifty 50 for the period April 2013 to March 2016 (Three periods)

Periods	**Z Values**
1st April 2013 to 31st March 2014	-1.1941
1st April 2014 to 31st March 2015	-2.3372
1st April 2015 to 31st March 2016	0.0517

Nifty represents the market and the Z values of Nifty shows insignificant return in the first period and third period but in second period the market return shows that some factors were affecting. However the overall period provides a strong evidence of weak form of efficiency. Future prices cannot be predicted by the past performance of the stock prices.

Analysis of Residual Test:

Table 5: Average Abnormal Returns for Nifty 50 stocks for the event Result Announcement for the period 1st April 2013 to 31st March 2016 (Three periods)

Sl No.	**Stocks of NSE**	**Average Abnormal Returns 1st April 2013 to 31st March 2014**	**Average Abnormal Returns 1st April 2013 to 31st March 2014**	**Average Abnormal Returns 1st April 2013 to 31st March 2014**
1	Adaniports	-0.0003	0.0054	-0.0003
2	Asianpaint	0.0023	0.0000	0.0023
3	Ambujacem	0.0009	-0.0011	0.0009
4	Aurophарma	-0.0038	0.0022	-0.0038
5	Axisbank	-0.0002	0.0021	-0.0002
6	Bajaj-Auto	0.0015	0.0051	0.0015
7	Bankbaroda	0.005	-0.0007	0.005
8	Bhartiartl	0.0001	0.0007	0.0001
9	Bhel	-0.0111	0.0016	-0.0111
10	Boschltd	-0.0008	-0.0009	-0.0008
11	Bpcl	-0.0028	0.004	-0.0028
12	Cipla	-0.0125	-0.0025	-0.0125
13	Coalindia	-0.0061	0.0028	-0.0061
14	Drreddy	0.0022	-0.0001	0.0022
15	Eichermot	0.0066	0.0076	0.0066
16	Gail	-0.0006	0.0029	-0.0006
17	Grasim	-0.0005	-0.0007	-0.0005
18	Hcltech	0.001	-0.0012	0.001
19	Hdfc	0.0019	-0.0005	0.0019
20	Hdfcbank	-0.0008	-0.0007	-0.0008
21	Herpmotoco	0.0034	0.0026	0.0034
22	Hindalco	0.001	-0.0039	0.001
23	Hindunilvr	0	-0.0017	0
24	Icicibank	-0.0048	0.0005	-0.0048
25	Idea	-0.0079	-0.0021	-0.0079
26	Indusindbk	0.0008	-0.0008	0.0008
27	Infratel	-0.0035	0.0042	-0.0035
28	Infy	0.0034	-0.0029	0.0034
29	Itc	-0.0002	-0.0017	-0.0002
30	Kotakbank	0.0018	0.0009	0.0018
31	Lt	0.0009	0.0022	0.0009
32	Lupin	0.0021	0.0013	0.0021
33	M&M	0.0014	0.0032	0.0014
34	Maruti	-0.0042	0.0013	-0.0042
35	Ntpc	-0.0007	-0.0014	-0.0007
36	Ongc	-0.0029	-0.001	-0.0029
37	Powergrid	0.0023	0.0002	0.0023
38	Relaince	0.0018	0.0026	0.0018
39	Sbin	0.0009	-0.0008	0.0009
40	Sunpharma	0.0028	-0.0033	0.0028
41	Tatamotors	-0.0015	-0.0039	-0.0015
42	Tatamtrdvr	*	*	*
43	Tatapower	-0.0006	-0.0012	-0.0006
44	Tatasteel	0.0054	-0.0053	0.0054
45	Tcs	0.0007	-0.0002	0.0007
46	Techm	-0.0051	-0.0021	-0.0051
47	Ultracemco	0.0028	0.0023	0.0028
48	Wipro	0	-0.0046	0
49	Yesbank	0.0044	0.0017	0.0044
50	Zeel	0.002	0.002	0.002

*The data for the scrip TATAMTRDVR was insufficient.

The average abnormal returns are calculated for all the values and the average of abnormal returns is estimated. Here the average of residual returns is very close to zero. Hence it can be inferred that the announcement of result in this period is incorporated immediately in the stock prices. This shows informational efficiency in the market and shows the market is efficient in semi-strong form.

Table 6: Average abnormal return for the event of bonus for the period 1st April 2015 to 31st March 2016

Sl No	**Stocks of NSE**	**Average Abnormal Returns**
1	Aurophарma	0.0022
2	Hcltech	0.0002

Here the average of residual return for Aurophарma and HCLTECH is very close to zero. Announcement of bonus in this period is incorporated immediately in the stock prices. This shows informational efficiency and understood that the market is efficient in semi-strong form.

Table 7: Average abnormal return for the event of split for the period 1st April 2014 to 31st March 2015

Sl No	**Stocks of NSE**	**Average Abnormal Returns**
1	Axisbank	0.004

The average of residual returns for Axisbank is very close to zero. Announcement of stock split in this period is incorporated immediately in the stock prices. It is understood that market is efficient in semi-strong form. There is no gap for the investor to gain excess or abnormal profits.

Table 8: Average Abnormal Returns and T Statistics for the periods 1st April 2014 to 31st March 2016 (Three periods)

Stocks of NSE	1st April 2013-31st March 2014	1st April 2014-31st March 2015	1st April 2015 -31st March 2016
Adaniports	-0.0003	0.0054	-0.0003
Asianpaint	0.0023	0.0000	-0.0041
Ambujacem	0.0009	-0.0011	0.0005
Auropharma	-0.0038	0.0022	0.0063
Axisbank	-0.0002	0.0021	0.0042
Bajaj-Auto	0.0015	0.0051	-0.0013
Bankbaroda	0.005	-0.0007	0.0008
Bhartiartl	0.0001	0.0007	-0.0004
Bhel	-0.0111	0.0016	0.0002
Boschltd	-0.0008	-0.0009	-0.0003
Bpcl	-0.0028	0.004	-0.0019
Cipla	-0.0125	-0.0025	0.0033
Coalindia	-0.0061	0.0028	0.0015
Drreddy	0.0022	-0.0001	-0.0001
Eichermot	0.0066	0.0076	0.0037
Gail	-0.0006	0.0029	-0.001
Grasim	-0.0005	-0.0007	-0.0022
Hcltech	0.001	-0.0012	-0.0009
Hdfc	0.0019	-0.0005	-0.0029
Hdfcbank	-0.0008	-0.0007	-0.0009
Herpmotoco	0.0034	0.0026	-0.0005
Hindalco	0.001	-0.0039	0.0038
Hindunilvr	0	-0.0017	-0.0032
Icicibank	-0.0048	0.0005	0.001
Idea	-0.0079	-0.0021	0
Indusindbk	0.0008	-0.0008	-0.0008
Infratel	-0.0035	0.0042	0.0059
Infy	0.0034	-0.0029	-0.0027
Itc	-0.0002	-0.0017	-0.0015
Kotakbank	0.0018	0.0009	0.0025
Lt	0.0009	0.0022	0.0014
Lupin	0.0021	0.0013	-0.0001
M&M	0.0014	0.0032	0.0006
Maruti	-0.0042	0.0013	0.0004
Ntpc	-0.0007	-0.0014	0.0068
Ongc	-0.0029	-0.001	-0.0002
Powergrid	0.0023	0.0002	0.0025
Relaince	0.0018	0.0026	0.0029
Sbin	0.0009	-0.0008	0.0011
Sunpharma	0.0028	-0.0033	0.0024
Tatamotors	-0.0015	-0.0039	-0.003
Tatamtrdvr	*	*	*
Tatapower	-0.0006	-0.0012	0.0027
Tatasteel	0.0054	-0.0053	0.0054
Tcs	0.0007	-0.0002	-0.0001
Techm	-0.0051	-0.0021	0.0017
Ultracemco	0.0028	0.0023	-0.0008
Wipro	0	-0.0046	0.0267
Yesbank	0.0044	0.0017	0.0047
Zeel	0.002	0.002	-0.0006
Total	**-0.0115**	**0.0141**	**0.0632**
Average	**-0.0002**	**0.0003**	**0.0013**
T Statistics		**0.0168**	**0.035553**

T statistics value for the period of 1st April 2014 to 31st April 2015 and 1st April 2015 to 31st March 2016 lies within the range ±1.96 at 5% level of significance. This shows the event has no bearing on return.

VII. CONCLUSION

The Z values of runs test for individual Nifty stocks and Nifty 50 for three periods reveals that the values are insignificant and lies within the range; successive price changes are independent and moved in random fashion. 'r' values of NIFTY and 50 Stocks in two phases are close to zero, which shows insignificant correlation. From both the test it proves that markets are efficient in the weak form.

The average abnormal returns around the announcement of event for the Nifty 50 stocks in all the three periods were very close to zero and the values of T statistics are insignificant, which show that event has no bearing on returns. Hence it can be concluded that markets are efficient in semi strong form.

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