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DIVIDEND ANNOUNCEMENT: A Test of Semi Strong Form of Efficiency of Selected Stocks at the Indian Stock Exchange

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ABSTRACT

Dividend announcement has always played a crucial role in determining the price volatility of the stock. Whenever there is sudden release of news pertaining to a particular stock, its price fluctuates drastically. Various kinds of news like oil prices change, budget announcement, parliament bill declaration, dividend announcement, etc. has always impacted the share market. Semi strong form of EMH is a theory which is used to undertake all these different kinds of news factors to evaluate the condition of the stock in the market. It is basically used to test the effectiveness of the fundamental analysis on a stock market. The present project uses the dividend announcement effect over the stocks of various different companies. The data of the companies are taken from the National Stock Exchange and is carried out under various statistical tools to evaluate the performance of the stock before and after dividend announcement.

Keywords: *dividend announcement, semi-strong, stock, fundamental analysis, effectiveness, etc.*

1 INTRODUCTION

The share price movement is analyzed broadly with two approaches namely: Fundamental analysis and technical analysis. Fundamental approach analyses the share price based on economic, industry and company statistics. The Technical analyst mainly studies the stock price movements of the stock prices. An “Efficient Market” is defined as a market where there are large number of rational profit makers actively competing with each trying to predict future market values of individual securities, and where important current information is almost freely available to all the participants.EMH is one of the central ideas of modern finance. Market efficiency means that the market price of a security reflects all available information. In other words, as per EMH, an efficient market responds quickly to new information, i.e., market price of security changes rapidly, completely and accurately in accordance with new information. (According to Adam Smith, "invisible hand" of the market place works quickly). “The market efficiency will produce prices that are appropriate in terms of current knowledge, and investors will be less likely to make unwise investments.” The key to market efficiency is the high level of competition among participants in the market. This implies that the new information cannot be used to create a trading strategy to beat the market i.e. the investor cannot make abnormal profits13 in the share market (except by chance). According to the EMH, stocks always trade at their fair market value on stock exchanges, making it impossible for investors to purchase undervalued stocks or sell stocks for inflated prices.

Many studies have found empirical regularities that are contrary to the efficient market hypothesis. For example, the monthly, weekly and daily returns on stocks tend to exhibit discernable patterns, such as seasonal affects, month of the year affect, day of the week affect, hourly affect, seasonal effects and day of the week affect. Further, the wide spread use of “technical analysis” among stock traders and their ability to predict to some extent the direction of movements in the prices of individual stocks over medium term testifies to the existence of patterns and seasonal trends. The existence of these systematic affects may imply informational inefficiency of the stock markets as markets take long time to adjust to new information. But there is another possible explanation too. That is that the markets are informational efficient and adjust quickly and fully to any new piece of information but the information arrives in a systematic pattern, hence the observed systematic pattern in stock returns. A direct test of this possibility is to look for any association between pattern of information arrival and pattern of market activity variables. For this we will need some measure of information as well as measures for market activity. We also would have to decide whether to perform this analysis at firm level or at aggregate market level.

One fundamental issue in all such studies is the definition that what constitutes information and its measurement. Researcher bias is bound to come into play in it. In order to minimize this bias, we resorted to a broad measure of information that includes financial, macroeconomic, political, and other types of information.

Based on different information sets, there are three forms of market efficiency: -

1.1 Weak Form Efficiency:

Under weak form of efficiency, the current prices reflect the information contained in all past prices, suggesting that charts and technical analysis that use past prices alone would not be useful in finding undervalued stock. The weak form of the efficient markets hypothesis asserts that the current price fully incorporates information contained in the past history of prices only. That is, nobody can detect mispriced securities and “beat” the market by analyzing pastprices.

A market is weakly efficient if its prices fully reflected all historical information, i.e. market responds only to information derived from past. The current share price

reflects past price, volume and rate of return information. In this type of market, the prices follow random pattern i.e., today's price is independent of yesterday's price; tomorrow's price will be independent of today's price etc. The weak form of EMH says that one cannot predict future stock prices on the basis of past stock prices.

Implication: technical analysis is of no use.

1.2 Semi-strong Form Efficiency:

Under semi strong form of efficiency, public information includes not only past prices, but also data reported in a companies' financial statements, earnings and dividend announcements, announced merger plans, the financial situation of company's competitors, expectations regarding macroeconomic factors (such as inflation, unemploymentetc.)

Semi Strong form efficiency implies that share prices adjust to publicly available new information very rapidly and in an unbiased fashion, such that no excess returns can be earned by trading on that information and neither fundamental analysis nor technical analysis techniques will be available to reliably produce excess returns.

To test for semi strong form efficiency, the adjustment to previously unknown news must be of a reasonable size and must be instantaneous. To test for this, consistent upward or downward adjustments after the initial changes must be looked for. If there are any such adjustments it would suggest that investors had interpreted the information in an unbiased fashion and hence in an inefficient manner.

The assertion behind semi strong market efficiency is still that one should not be able to profit using something that "everybody else knows"(the information is public). Nevertheless, this assumption is far stronger than that of the weak form of efficiency. Semi Strong efficiency of market requires the existence of market analysis who are not only financial economists able to comprehend implications of vast financial information, but also macro economists, expert's adept at understanding processes in product and input markets. In effect, the semi strong form of market hypothesis maintains that as soon as information becomes publicly available, it is absorbed that and reflected in stock prices. Furthermore, even while the correct adjustment is taking place, the analyst cannot obtain consistent superior returns.

A market has semi-strong efficiency if its prices at all times reflect all public information. It means it is not possible to abnormal profit by reading newspapers, looking at the company's annual accounts and so on as the prices move on generation of public information such as announcement of dividend, quarterly results, fresh public offer, new project, merger etc.

Implication: even fundamental analysis is of no use.

1.3 Strong Form Efficiency:

The strong form of market efficiency hypothesis states that the current price fully incorporates all existing information, both public and private (sometimes called inside information). The main difference between the semi strong and strong efficiency hypothesis is that in latter case, nobody should be able to systematically generate profits even if trading on information not publicly known at the time. The rationale for strong-form market efficiency is that the market anticipates, in an unbiased manner, future developments and therefore the stock price may have incorporated the information and evaluated in a much more objective and informative way than the insiders.

Market has strong efficiency if its prices fully reflect all information, both public and private. Abnormal profit can be made only on the basis of Luck/chance; skills have no role to play. In this case even insider information is of no use..
Points to be noted: -

1.4 The semi-strong efficiency EMH form hypothesis tells us that a security's price movements are a reflection of publicly-available material information.

1.5 It suggests that fundamental and technical analysis are of no use in predicting a stock's future price movement.

1.6 Material non-public Information (MNPI) can be used for trading.

2 LITERATUREREVIEW

The ICH (Information Content of Dividends Hypothesis) is one the most referred to hypotheses in economics literature in so far as the impact of dividend announcement on stock prices is concerned. The hypothesis was developed by Modigliani and Miller (1958). They postulated that under the assumptions of perfect capital markets, rational behavior and zero taxes, the value of the firm does not depend on the firm's announcement of a dividend. Most recent and important study in this line of research is that of Mitchell and Mulhern (1994) that focused on market level aggregate variables of daily market returns and trading volume on one hand and on the other hand a broad-based information variable of number of daily publicly announced news items. Another study with slightly different emphasis is that of Berry and Howe (1994) who looked for association in pattern of hourly public information arrival and aggregate measures of intraday market activity. An early seminal study was that of Rozeff and Kinney (1976) who conjectured a relationship between information flow and stock market activity stating that abnormal stock returns in the month of January may be due to above-average flow of information generated by firms in that month. Other later studies include Penman (1987) who looked at distribution of corporate earnings news and aggregate stock returns, and Atkin and Basu (1991). Even the event study analysis in context of financial markets pioneered by Fama (1965) can also be counted towards this line of research. Durand (1959) questioned whether this conclusion was consistent with the then existing evidence, which consisted mostly of strong positive cross-sectional correlations of price with dividends. However, in their reply to Durand, Modigliani and Miller explained that a firm's market value depends on its expected future value. Thus, if the value which is determined by a firm's market performance consists of permanent and transitory components and if dividends depend on the former, dividend announcement would serve as a surrogate for expected future value, and such a surrogate relationship might explain the results of the cross-sectional studies.

Vandana, Gupta (200,tested the semi-strong efficiency of the Indian Stock market over the period 1995 to 2000 by employing event study. The study involved a sample of 145 bonus issues, in order to examine the announcement effects of bonus issues on equity share prices in India. The study concluded that the Indian Stock market was semi-strong form efficient. Mishra, A.K (2005), examined the reaction of the stock price to the information content of bonus issues over the period 1998 to 2004. For the purpose of the study samples of 46 stocks listed on the NSE and BSE of India were analyzed by employing event study using 180-day event window. It was found that stocks show abnormal return before eight or nine days of announcement, thereby supporting the evidence that Indian Stock market is efficient in its semi-strong form. Hadi (2006),threw light on the types of Efficient Market Hypothesis. He undertook detailed research that tested weak, semi-strong and strong forms of market efficiency. It is observed that accounting-based research generally assumes that market is efficient in semi- strong form. The reason behind is that the financial reports are considered public information once they have been released in the market. He provided empirical evidence from the Jordanian market, which suggested that the security market reacted with mixed signals on releasing profitability, liquidity and solvency information. Iqbal and Mallikarjunappa, T. (2007) tested market reaction to quarterly earnings announcement of 149 companies listed on the Bombay Stock Exchange for September 2001 by employing both parametric and nonparametric tests. It is observed that during event window, runs test are not significant at 5% level, which signifies that abnormal returns occur randomly. On the other hand, t-test rejects the existence of abnormal returns on daily basis, which provides an opportunity to beat the market and earn abnormal returns. The study concludes that Indian stock market is not efficient in semi-strong form. Yalama, Abdullah and Selik, Sibel (2008) investigated semi-strong form efficiency in Istanbul Stock Exchange Market (ISE-100), Foreign Exchange Market (FEM) and Inter-bank Money Market (IMM) in respect to changes in Currency and Circulation (CIC).

Leuthold, Raymond M. and Hartmann, Peter A(1979), conducted a semi-strong form test of the efficiency of the Live- Hog futures market by employing econometric forecasting model. The study concluded that the live-hog futures market has not performed efficiently consistently. Also, the presence of objectionable inaccuracies has been observed, thereby supporting the view that live-hog futures market is inefficient.Ormos, Mihaley (2002),empirically tested the efficiency of Hungarian Capital Market in its semi-strong and strong form. The study focused to examine whether the Hungarian Capital Market was efficient in the semi-strong form. The investigation was based on the capital market data over the period 1991 to 2000, which was analyzed by employing event study. The study concluded that strong form of efficiency of capital market does not completely hold true, thereby supporting that Hungarian Capital Market is semi-strong form efficient.

3 OBJECTIVES OF STUDY

3.1 To indicate whether prices of stocks consider past information and the information publicly available as required by the semi strong form of Market Efficiency Theory.

3.2 To find out whether the semi strong form of efficient market holds true or not.

4 RESEARCH METHODOLOGY

4.1 Period of study is from 31st December 2021 to 30th December 2022

4.2 The stock prices were taken from the NSE (National Stock Exchange)

4.3 Twentytop companies of NIFTY 50 index fund are selected with respect to their dividend announcement date from different sectors.

4.4 Companies name along with their dividend amount, type, & date

S.no	Company Name	Dividend for the year 2022 (INR)	Dividend declaration date	Symbol	Sector	Dividend Type
1.	Adani Enterprises Ltd.	1	04-05-2022	ADANIENT	Metals & Mining	Final
2.	Adani Ports and Special Economic Zone Ltd.	5	25-05-2022	ADANIPORTS	Services	Final
3.	Apollo Hospitals Enterprise Ltd.	11.75	25-05-2022	APOLLOHOSP	Healthcare	Final
4.	Asian Paints Ltd.	4.4	20-10-2022	ASIANPAINT	Consumer Durables	Final
5.	Axis Bank Ltd.	1	28-04-2022	AXISBANK	Financial Services	Final
6.	Bajaj Auto Ltd.	140	27-04-2022	BAJAJ-AUTO	Automobile and Auto Components	Final
7.	Bajaj Finance Ltd.	20	26-04-2022	BAJFINANCE	Financial Services	Final

8.	Bajaj Finserv Ltd.	4	28-04-2022	BAJAJFINSV	Financial Services	Final
9.	Bharat Petroleum Corporation Ltd.	6	25-05-2022	BPCL	Oil Gas & Consumable Fuels	Final
10.	Bharti Airtel Ltd.	0.75	17-05-2022	BHARTIARTL	Telecommunication	Final
11.	Britannia Industries Ltd.	56.5	02-05-2022	BRITANNIA	Fast Moving Consumer Goods	Final
12.	Cipla Ltd.	5	27-07-2022	CIPLA	Healthcare	Final
13.	Coal India Ltd.	3	25-05-2022	COALINDIA	Oil Gas & Consumable Fuels	Final
14.	Divi's Laboratories Ltd.	30	23-05-2022	DIVISLAB	Healthcare	Final
15.	Dr. Reddy's Laboratories Ltd.	30	19-05-2022	DRREDDY	Healthcare	Final
16.	Eicher Motors Ltd.	21	13-05-2022	EICHERMOT	Automobile and Auto Components	Final
17.	Grasim Industries Ltd.	5	24-05-2022	GRASIM	Construction Materials	Final
18.	HDFC Bank Ltd.	30	02-05-2022	HDFCBANK	Financial Services	Final
19.	HDFC Life Insurance Company Ltd.	1.7	31-05-2022	HDFCLIFE	Financial Services	Final
20.	Nestle India	65	17-02-2022	NESTLEIND	Consumer Food	Final

The sources of data for the research paper are mainly secondary which is collected from the websites, documents, which are in printed form like annual reports etc.

5 RESEARCH PLAN

5.1 Hypothesis testing:

While studying the efficient market hypothesis, hypothesis testing has been taken into account.
Thus, in context of this research we have,
H0: Prices reflects all the publicly available information. H1: Prices do not reflect the publicly available information.

5.2 Data Analysis methods:

5.2.1 Determination of actual monthly return.

The return for any given month equals the last trading price for the last business day of the month, divided by the last trading price for the previous month, minus one. Assume, for instance, that we wish to calculate the return for April 2012 and the last business day in April was April 29, while the last trading day of the prior month was March 31. Divide the closing price of April 29 by the closing price of March 31 and subtract 1 from the result multiply by 100. We can formulate the equation as

Actual monthly return = *(last trading price for the last business day of the month / last trading price for the previous month)*$-1 * 100$

The study seeks to test the efficient market hypothesis, by employing Event Test. By the term 'event' here we mean, generation of some public information, for example, dividend announcement, merger announcement, fire, winning some law suit (it was not expected) etc.Under this test we measure the impact of the event on the share prices. Event study enables us to assess the impact of a particular event on share prices. For this purpose, we calculate abnormal return. Abnormal return is the difference between the expected return (calculated on the basis of characteristic line) return and actual return.If the total of abnormal return of difference periods tends to zero, the market is semi-strongefficient, otherwise it is not.
To evaluate the abnormal return by using event test we need carry out the following calculations:

5.2.2 Determination of characteristic line for each company.

The equation of the characteristic line can be written as

$$y = \alpha + \beta x$$

…
Where α and β are constants. The slope of characteristic line β is the security's beta. At present, beta is taken as the measure of the sensitivity of the security's price Y with respect to market changes.
The characteristic line for the company is calculated by the estimation of the Beta and Alpha for the individual companies. They can be evaluated as shown:

Beta is calculated by using formula:

$$\beta = \frac{\Sigma XY - nX\,(\text{mean})\,Y(\,\text{mean})}{\Sigma X2 - n\,(X\,\text{mean})\,\hat{}\,2}$$

here,

XY=product of individual stocks returns with market index return
X(mean)=average of the market index return
Y(mean)=average of the companies' stocks returns
n=total number of working days

Alpha is calculated by using formula:

$\alpha = Ymean - \beta Xmean$
here,
X(mean)= average of the market return
Y(mean)= average of the companies' stocks returns
β =*systematic risk*

5.2.3 Determination of expected monthly return for each company.

This is evaluated by using the above obtained characteristic line, here the equation changes to:

Rs=α+βRm Here,
Rs= expected monthly return for the company
Rm=value of market monthly return

5.2.4 Evaluating the abnormal monthly return.

After the expected return of the company is obtained, then the abnormal return is calculated as:

Abnormal return=∑ (Actual Return –Expected Return)

Note: By abnormal return we mean: excess return relative to risk

6 DATA EVALUATIONS AND FINDINGS

6.1 Adani Enterprises Ltd.

The characteristic line for this company is: **Rs= 0.316+1.70Rm**

DATE	ACTUAL MONTLY RETURN	MARKET RETURN	EXPECTED RETURN	ABNORMAL RETURN
31-Jan-22	0.321740911	-0.08182528	0.176897024	0.144843887
28-Feb-22	-4.110907024	-3.148527813	-5.036497282	0.925590258
31-Mar-22	22.51816717	3.994605184	7.106828813	15.41133836
29-Apr-22	15.74637052	-2.073891696	-3.209615883	18.9559864
31-May-22	-7.051886792	-3.028788105	-4.832939779	-2.218947014
30-Jun-22	1.07725312	-4.849694445	-7.928480557	9.005733677
29-Jul-22	17.26687663	8.732434531	15.1611387	2.105737927
30-Aug-22	24.33247704	3.502979616	6.271065347	18.06141169
30-Sep-22	8.18319846	-3.744235415	-6.049200206	14.23239867
31-Oct-22	-3.133907256	5.369317933	9.443840486	-12.57774774
30-Nov-22	17.04132997	4.142470104	7.358199177	9.683130793
30-Dec-22	-1.51994691	-3.481382957	-5.602351027	4.082404117
			SUM	**77.81**

Since the sum of the abnormal return is not close to zero, therefore, we conclude that market is not efficient in semi strong form (H1 selected). Thus, the market is inefficient in semi strong form.

6.2 Adani Ports

The characteristic line for this company is**: Rs= 0.054+0.33Rm**

Date	ACTUAL MONTHLY RETURN	MARKET RETURN	EXPECTED RETURN	ABNORMAL RETURN
31-Jan-22	-1.917020403	-0.08182528	0.026997658	-1.944018061
28-Feb-22	-1.22853553	-3.148527813	-0.985014178	-0.243521352
31-Mar-22	9.427561837	3.994605184	1.372219711	8.055342126
29-Apr-22	10.61741152	-2.073891696	-0.63038426	11.24779578
31-May-22	-13.60929472	-3.028788105	-0.945500075	-12.66379465
30-Jun-22	-9.164019734	-4.849694445	-1.546399167	-7.617620567
29-Jul-22	13.63737817	8.732434531	2.935703395	10.70167477
30-Aug-22	10.27235826	3.502979616	1.209983273	9.062374987

30-Sep-22	-2.552989372	-3.744235415	-1.181597687	-1.371391685
31-Oct-22	0.35337842	5.369317933	1.825874918	-1.472496498
30-Nov-22	6.975897031	4.142470104	1.421015134	5.554881897
30-Dec-22	-7.139614075	-3.481382957	-1.094856376	-6.044757699
			SUM	**13.26**

Since the sum of the abnormal return is not close to zero, therefore, we conclude that market is not efficient in semi strong form (H1 selected). Thus, the market is inefficient in semi strong form.

6.3 Apollo Hospitals Enterprise Ltd.

The characteristic line for this company is: **Rs = -0.018-0.11Rm**

Date	ACTUAL MONTHLY RETURN	MARKET RETURN	EXPECTED RETURN	ABNORMAL RETURN
31-Dec-21				
31-Jan-22	-11.09127538	-0.08182528	-0.008999219	-11.08227616
28-Feb-22	7.750120587	-3.148527813	0.328338059	7.421782528
31-Mar-22	-5.969434497	3.994605184	-0.45740657	-5.512027927
29-Apr-22	-1.367330219	-2.073891696	0.210128087	-1.577458306
31-May-22	-10.6648557	-3.028788105	0.315166692	-10.98002239
30-Jun-22	-7.433468198	-4.849694445	0.515466389	-7.948934587
29-Jul-22	14.3559115	8.732434531	-0.978567798	15.3344793
30-Aug-22	2.625643947	3.502979616	-0.403327758	3.028971705
30-Sep-22	1.399523468	-3.744235415	0.393865896	1.005657572
31-Oct-22	3.059269061	5.369317933	-0.608624973	3.667894034
30-Nov-22	4.62423907	4.142470104	-0.473671711	5.097910781
30-Dec-22	-5.264048747	-3.481382957	0.364952125	-5.629000872
			SUM	**-7.17**

Since the sum of the abnormal return is less than zero, therefore, we conclude that market is efficient in semi strong form (H0 selected). Thus, the market is efficient in semi strong form.

6.4 Asian Paints Ltd

The characteristic line for this company is: **Rs= -0.018-0.10Rm**

Date	ACTUAL MONTHLY RETURN	MARKET RETURN	EXPECTED RETURN	ABNORMAL RETURN
31-Dec-21				
31-Jan-22	-6.819491864	-0.08182528	-0.009817472	-6.809674392
28-Feb-22	0.710603537	-3.148527813	0.296852781	0.413750756
31-Mar-22	-2.983006001	3.994605184	-0.417460518	-2.565545483
29-Apr-22	5.105602364	-2.073891696	0.18938917	4.916213194
31-May-22	-11.66285679	-3.028788105	0.284878811	-11.9477356
30-Jun-22	-5.750703757	-4.849694445	0.466969445	-6.217673202
29-Jul-22	23.69211932	8.732434531	-0.891243453	24.58336277
30-Aug-22	1.73528309	3.502979616	-0.368297962	2.103581052
30-Sep-22	-1.449168534	-3.744235415	0.356423542	-1.805592076
31-Oct-22	-7.023291298	5.369317933	-0.554931793	-6.468359505
30-Nov-22	2.17041542	4.142470104	-0.43224701	2.60266243
30-Dec-22	-2.747901674	-3.481382957	0.330138296	-3.07803997
			SUM	**-4.27**

Since the sum of the abnormal return is less than zero, therefore, we conclude that market is efficient in semi strong form (H0 selected). Thus, the market is efficient in semi strong form.

6.5 Axis Bank Ltd.

The characteristic line for this company is: **Rs= 0.120+0.69Rm**

Date	ACTUAL MONTHLY RETURN	MARKETRETURN	EXPECTED RETURN	ABNORMAL RETURN
31-Dec-21				
31-Jan-22	13.92675558	-0.08182528	0.063540557	13.86321502
28-Feb-22	-3.964814695	-3.148527813	-2.052484191	-1.912330504
31-Mar-22	2.525592672	3.994605184	2.876277577	-0.350684905
29-Apr-22	-4.276423832	-2.073891696	-1.31098527	-2.965438562
31-May-22	-5.956629152	-3.028788105	-1.969863792	-3.98676536
30-Jun-22	-7.063631057	-4.849694445	-3.226289167	-3.83734189
29-Jul-22	13.81124372	8.732434531	6.145379826	7.665863894
30-Aug-22	3.690927906	3.502979616	2.537055935	1.153871971
30-Sep-22	-2.435129741	-3.744235415	-2.463522436	0.028392695
31-Oct-22	23.56792144	5.369317933	3.824829374	19.74309207
30-Nov-22	-0.524282561	4.142470104	2.978304372	-3.502586933
30-Dec-22	3.606102635	-3.481382957	-2.28215424	5.888256875
			SUM	**31.78**

Since the sum of the abnormal return is not close to zero, therefore, we conclude that market is not efficient in semi strong form (H1 selected). Thus, the market is inefficient in semi strong form.

6.6 Bajaj Auto Ltd.

The characteristic line for this company is**: Rs= 0.044+0.26Rm**

Date	ACTUAL MONTHLY RETURNRETURN	MARKET RETURN	EXPECTED RETURN	ABNORMAL RETURN
31-Dec-21				
31-Jan-22	9.706855428	-0.08182528	0.022725427	9.684130001
28-Feb-22	-0.962226306	-3.148527813	-0.774617231	-0.187609075
31-Mar-22	3.474159786	3.994605184	1.082597348	2.391562438
29-Apr-22	2.095537914	-2.073891696	-0.495211841	2.590749755
31-May-22	3.607673848	-3.028788105	-0.743484907	4.351158755
30-Jun-22	-4.07598147	-4.849694445	-1.216920556	-2.859060914
29-Jul-22	5.607564884	8.732434531	2.314432978	3.293131906
30-Aug-22	4.353101968	3.502979616	0.9547747	3.398327268
30-Sep-22	-13.63819969	-3.744235415	-0.929501208	-12.70869848
31-Oct-22	4.084756573	5.369317933	1.440022663	2.64473391
30-Nov-22	2.147418876	4.142470104	1.121042227	1.026376649
30-Dec-22	-3.589996534	-3.481382957	-0.861159569	-2.728836965
			SUM	**10.89**

Since the sum of the abnormal return is not close to zero, therefore, we conclude that market is not efficient in semi strong form (H1 selected). Thus, the market is inefficient in semi strong form.

6.7 Bajaj Finserv Ltd

The characteristic line for this company is:**Rs= -0.334-1.81Rm**

Date	ACTUAL MONTHLY RETURN	MARKETRETURN	EXPECTED RETURN	ABNORMAL RETURN
31-Dec-21				
31-Jan-22	-4.368165693	-0.08182528	-0.185896243	-4.18226945
28-Feb-22	2.058695119	-3.148527813	5.364835342	-3.306140223
31-Mar-22	6.54424186	3.994605184	-7.564235383	14.10847724
29-Apr-22	-12.59814366	-2.073891696	3.41974397	-16.01788763

31-May-22	-13.25954068	-3.028788105	5.14810647	-18.40764715
30-Jun-22	-15.48051647	-4.849694445	8.443946945	-23.92446342
29-Jul-22	37.65042194	8.732434531	-16.1397065	53.79012844
30-Aug-22	12.72329142	3.502979616	-6.674393105	19.39768452
30-Sep-22	-90.10532273	-3.744235415	6.443066101	-96.54838883
31-Oct-22	0.5451783	5.369317933	-10.05246546	10.59764376
30-Nov-22	-3.614814815	4.142470104	-7.831870888	4.217056073
30-Dec-22	-4.835536428	-3.481382957	5.967303152	-10.80283958
			SUM	**-71.07**

Since the sum of the abnormal return is less than zero, therefore, we conclude that market is efficient in semi strong form (H0 selected). Thus, the market is efficient in semi strong form.

6.8 Bajaj Finance Ltd.

The characteristic line for this company is**: Rs= -0.001-0.013Rm**

Date	ACTUAL MONTHLY RETURN	MARKETRETURN	EXPECTED RETURN	ABNORMAL RETURN
31-Dec-21				
31-Jan-22	0.328923796	-0.08182528	6.37E-05	0.328860067
28-Feb-22	0.029284668	-3.148527813	0.039930862	-0.010646194
31-Mar-22	3.679505305	3.994605184	-0.052929867	3.732435172
29-Apr-22	-8.101295463	-2.073891696	0.025960592	-8.127256055
31-May-22	-8.837944783	-3.028788105	0.038374245	-8.876319028
30-Jun-22	-11.20738555	-4.849694445	0.062046028	-11.26943158
29-Jul-22	33.48949171	8.732434531	-0.114521649	33.60401336
30-Aug-22	1.347602336	3.502979616	-0.046538735	1.394141071
30-Sep-22	0.403763901	-3.744235415	0.04767506	0.356088841
31-Oct-22	-2.612548138	5.369317933	-0.070801133	-2.541747005
30-Nov-22	-5.923069386	4.142470104	-0.054852111	-5.868217275
30-Dec-22	-2.168592238	-3.481382957	0.044257978	-2.212850216
			SUM	**0.5**

Since the sum of the abnormal return is close to zero, therefore, we conclude that market is efficient in semi strong form (H0 selected). Thus, the market is efficient in semi strong form.

6.9 Bharat Petroleum Corporation Ltd.

The characteristic line for this company is**:Rs= -0.04-0.23Rm**

Date	ACTUAL MONTHLY RETURN	MARKET RETURN	EXPECTED RETURN	ABNORMAL RETURN
31-Dec-21				
31-Jan-22	3.009469451	-0.08182528	-0.021180186	3.030649637
28-Feb-22	-11.90026445	-3.148527813	0.684161397	-12.58442585
31-Mar-22	2.730131504	3.994605184	-0.958759192	3.688890696
29-Apr-22	0.904410742	-2.073891696	0.43699509	0.467415652
31-May-22	-10.03861004	-3.028788105	0.656621264	-10.6952313
30-Jun-22	-5.456774985	-4.849694445	1.075429722	-6.532204707
29-Jul-22	7.101167315	8.732434531	-2.048459942	9.149627257
30-Aug-22	-0.499545867	3.502979616	-0.845685312	0.346139445
30-Sep-22	-7.256960292	-3.744235415	0.821174145	-8.078134437
31-Oct-22	-0.377296588	5.369317933	-1.274943125	0.897646537
30-Nov-22	12.34974477	4.142470104	-0.992768124	13.34251289
30-Dec-22	-3.121793932	-3.481382957	0.76071808	-3.882512012
			SUM	**-10.84**

Since the sum of the abnormal return is less than zero, therefore, we conclude that market is efficient in semi strong form (H0 selected). Thus, the market is efficient in semi strong form.

6.10 Bharti Airtel Ltd.

The characteristic line for this company is**: Rs= 0.062+0.37Rm**

Date	ACTUAL MONTHLY RETURN	MARKETRETURN	EXPECTED RETURN	ABNORMAL RETURN
31-Dec-21				
31-Jan-22	6.653992395	-0.08182528	0.031724646	6.622267749
28-Feb-22	-5.868641163	-3.148527813	-1.102955291	-4.765685872
31-Mar-22	9.970866715	3.994605184	1.540003918	8.430862797
29-Apr-22	-2.112722697	-2.073891696	-0.705339928	-1.407382769
31-May-22	-5.250338295	-3.028788105	-1.058651599	-4.191686696
30-Jun-22	-2.177949157	-4.849694445	-1.732386945	-0.445562212
29-Jul-22	-1.021972407	8.732434531	3.293000776	-4.314973183
30-Aug-22	7.176045431	3.502979616	1.358102458	5.817942973
30-Sep-22	10.08808148	-3.744235415	-1.323367104	11.41144858
31-Oct-22	4.013001625	5.369317933	2.048647635	1.96435399
30-Nov-22	2.013221154	4.142470104	1.594713938	0.418507216
30-Dec-22	-5.025036819	-3.481382957	-1.226111694	-3.798925125
			SUM	**15.74**

Since the sum of the abnormal return is not close to zero, therefore, we conclude that market is inefficient in semi strong form (H1 selected). Thus, the market is inefficient in semi strong form.

6.11 Britannia Industries Ltd.

The characteristic line for this company is:**Rs=0.072+0.39Rm**

Date	ACTUAL MONTHLY RETURN	MARKET RETURN	EXPECTED RETURN	ABNORMAL RETURN
31-Dec-21				
31-Jan-22	-1.960621187	-0.08182528	0.040088141	-2.000709328
28-Feb-22	-3.050660481	-3.148527813	-1.155925847	-1.894734634
31-Mar-22	-6.449401158	3.994605184	1.629896022	-8.07929718
29-Apr-22	2.272018463	-2.073891696	-0.736817761	3.008836224
31-May-22	11.23885035	-3.028788105	-1.109227361	12.34807771
30-Jun-22	-4.972860354	-4.849694445	-1.819380834	-3.15347952
29-Jul-22	12.52019386	8.732434531	3.477649467	9.042544393
30-Aug-22	-3.913701159	3.502979616	1.43816205	-5.351863209
30-Sep-22	2.542859049	-3.744235415	-1.388251812	3.931110861
31-Oct-22	-1.990606419	5.369317933	2.166033994	-4.156640413
30-Nov-22	15.81686158	4.142470104	1.687563341	14.12929824
30-Dec-22	-1.257364234	-3.481382957	-1.285739353	0.028375119
			SUM	**17.85**

Since the sum of the abnormal return is not close to zero, therefore, we conclude that market is inefficient in semi strong form (H1 selected). Thus, the market is inefficient in semi strong form.

6.12 Cipla Ltd.

The characteristic line for this company is**: Rs=0.054+0.30Rm**

Date	ACTUAL MONTHLY RETURN	MARKETRETURN	EXPECTED RETURN	ABNORMAL RETURN
31-Dec-21				
31-Jan-22	0.095328885	-0.08182528	0.029452416	0.065876469
28-Feb-22	-2.111111111	-3.148527813	-0.890558344	-1.220552767
31-Mar-22	10.05351062	3.994605184	1.252381555	8.801129065
29-Apr-22	-3.619665046	-2.073891696	-0.568167509	-3.051497537

31-May-22	1.197513249	-3.028788105	-0.854636432	2.052149681
30-Jun-22	-7.62878292	-4.849694445	-1.400908334	-6.227874587
29-Jul-22	6.56345399	8.732434531	2.673730359	3.889723631
30-Aug-22	6.24616329	3.502979616	1.104893885	5.141269405
30-Sep-22	7.366748519	-3.744235415	-1.069270625	8.436019144
31-Oct-22	4.704246827	5.369317933	1.66479538	3.039451447
30-Nov-22	-2.377077266	4.142470104	1.296741031	-3.673818297
30-Dec-22	-5.589435353	-3.481382957	-0.990414887	-4.599020466
			SUM	**12.65**

Since the sum of the abnormal return is not close to zero, therefore, we conclude that market is inefficient in semi strong form (H1 selected). Thus, the market is inefficient in semi strong form.

6.13 Coal India Ltd.

The characteristic line for this company is**: Rs=0.171+0.95Rm**

Date	ACTUAL MONTHLY RETURN	MARKET RETURN	EXPECTED RETURN	ABNORMAL RETURN
31-Dec-21				
31-Jan-22	9.414584047	-0.08182528	0.093265984	9.321318063
28-Feb-22	6.101376721	-3.148527813	-2.820101422	8.921478143
31-Mar-22	7.962253023	3.994605184	3.965874925	3.996378098
29-Apr-22	-0.109259765	-2.073891696	-1.799197111	1.689937346
31-May-22	5.49630845	-3.028788105	-2.7063487	8.20265715
30-Jun-22	-3.78434422	-4.849694445	-4.436209723	0.651865503
29-Jul-22	13.8200431	8.732434531	8.466812804	5.353230296
30-Aug-22	11.14792899	3.502979616	3.498830635	7.649098355
30-Sep-22	-9.603918228	-3.744235415	-3.386023644	-6.217894584
31-Oct-22	15.87750294	5.369317933	5.271852036	10.6056509
30-Nov-22	-7.603171376	4.142470104	4.106346599	-11.70951797
30-Dec-22	-0.96809681	-3.481382957	**-3.136313809**	**2.168216999**
			SUM	**40.63**

Since the sum of the abnormal return is not close to zero, therefore, we conclude that market is inefficient in semi strong form (H1 selected). Thus, the market is inefficient in semi strong form.

6.14 Divi's Laboratories Ltd.

The characteristic line for this company is**: Rs=-0.099-0.52Rm**

Date	ACTUAL MONTHLY RETURN	MARKET RETURN	EXPECTED RETURN	ABNORMAL RETURN
31-Dec-21				
31-Jan-22	-13.72536446	-0.08182528	-0.056450854	-13.66891361
28-Feb-22	5.67131637	-3.148527813	1.538234463	4.133081907
31-Mar-22	3.213364596	3.994605184	-2.176194696	5.389559292
29-Apr-22	2.347769789	-2.073891696	0.979423682	1.368346107
31-May-22	-20.28898655	-3.028788105	1.475969815	-21.76495636
30-Jun-22	1.088742238	-4.849694445	2.422841111	-1.334098873
29-Jul-22	5.543466285	8.732434531	-4.639865956	10.18333224
30-Aug-22	-5.344955828	3.502979616	-1.9205494	-3.424406428
30-Sep-22	2.160276824	-3.744235415	1.848002416	0.312274408
31-Oct-22	-2.599049984	5.369317933	-2.891045325	0.291995341
30-Nov-22	-5.658233811	4.142470104	-2.253084454	-3.405149357
30-Dec-22	0.249654889	-3.481382957	1.711319138	-1.461664249
			SUM	**-23.38**

Since the sum of the abnormal return is less than zero, therefore, we conclude that market is efficient in semi strong form (H0 selected). Thus, the market is efficient in semi strong form.

6.15 Dr. Reddy's Laboratories Ltd.

The characteristic line for this company is**: Rs=-0.036-0.22Rm**

Date	ACTUAL MONTHLY RETURN	MARKET RETURN	EXPECTED RETURN	ABNORMAL RETURN
31-Dec-21				
31-Jan-22	-12.31302221	-0.08182528	-0.017998438	-12.29502377
28-Feb-22	-5.563818909	-3.148527813	0.656676119	-6.220495028
31-Mar-22	5.710734853	3.994605184	-0.91481314	6.625547993
29-Apr-22	-3.806353234	-2.073891696	0.420256173	-4.226609407
31-May-22	5.752731761	-3.028788105	0.630333383	5.122398378
30-Jun-22	0.552675844	-4.849694445	1.030932778	-0.478256934
29-Jul-22	-6.906322545	8.732434531	-1.957135597	-4.949186948
30-Aug-22	3.782072439	3.502979616	-0.806655516	4.588727955
30-Sep-22	2.135428322	-3.744235415	0.787731791	1.347696531
31-Oct-22	2.260303988	5.369317933	-1.217249945	3.477553933
30-Nov-22	1.205539391	4.142470104	-0.947343423	2.152882814
30-Dec-22	-5.56255084	-3.481382957	0.729904251	-6.292455091
			SUM	**-11.14**

Since the sum of the abnormal return is less than zero, therefore, we conclude that market is efficient in semi strong form (H0 selected). Thus, the market is efficient in semi strong form.

6.16 Eicher Motors Ltd.

The characteristic line for this company is**: Rs= 0.090+0.50Rm**

Date	ACTUAL MONTHLY RETURN	MARKETRETURN	EXPECTED RETURN	ABNORMAL RETURN
31-Dec-21				
31-Jan-22	2.067981018	-0.08182528	0.04908736	2.018893658
28-Feb-22	-2.105462105	-3.148527813	-1.484263907	-0.621198199
31-Mar-22	-5.122017144	3.994605184	2.087302592	-7.209319736
29-Apr-22	7.048816719	-2.073891696	-0.946945848	7.995762567
31-May-22	5.717870245	-3.028788105	-1.424394053	7.142264298
30-Jun-22	0.489076688	-4.849694445	-2.334847223	2.823923911
29-Jul-22	10.70374148	8.732434531	4.456217266	6.247524215
30-Aug-22	8.576185165	3.502979616	1.841489808	6.734695357
30-Sep-22	9.314477112	-3.744235415	-1.782117708	11.09659482
31-Oct-22	4.87117333	5.369317933	2.774658967	2.096514364
30-Nov-22	-9.504083938	4.142470104	2.161235052	-11.66531899
30-Dec-22	-7.36834553	-3.481382957	-1.650691479	-5.717654052
			SUM	**20.94**

Since the sum of the abnormal return is not close to zero, therefore, we conclude that market is inefficient in semi strong form (H1 selected). Thus, the market is inefficient in semi strong form.

6.17 Grasim Industries Ltd.

The characteristic line for this company is**Rs= 0.036+0.19Rm**

Date	ACTUAL MONTHLY RETURN	MARKET RETURN	EXPECTED RETURN	ABNORMAL RETURN
31-Dec-21				
31-Jan-22	6.487902604	-0.08182528	0.020453197	6.467449407
28-Feb-22	-7.467438495	-3.148527813	-0.562220284	-6.905218211
31-Mar-22	4.097591492	3.994605184	0.794974985	3.302616507
29-Apr-22	1.700721154	-2.073891696	-0.358039422	2.058760576
31-May-22	-15.58234356	-3.028788105	-0.53946974	-15.04287382

30-Jun-22	-7.549349013	-4.849694445	-0.885441945	-6.663907068
29-Jul-22	19.09899678	8.732434531	1.695162561	17.40383422
30-Aug-22	6.716465353	3.502979616	0.701566127	6.014899226
30-Sep-22	-0.226372383	-3.744235415	-0.675404729	0.449032346
31-Oct-22	2.797265427	5.369317933	1.056170407	1.74109502
30-Nov-22	2.210024975	4.142470104	0.82306932	1.386955655
30-Dec-22	-2.059951698	-3.481382957	-0.625462762	-1.434488936
			SUM	**8.77**

Since the sum of the abnormal return is not close to zero, therefore, we conclude that market is inefficient in semi strong form (H1 selected). Thus, the market is inefficient in semi strong form.

6.18 HDFC Bank Ltd.

The characteristic line for this company is**Rs= 0.045+0.24Rm**

Date	ACTUAL MONTHLY RETURN	MARKETRETURN	EXPECTED RETURN	ABNORMAL RETURN
31-Dec-21				
31-Jan-22	0.425848317	-0.08182528	0.025361933	0.400486384
28-Feb-22	-4.001480783	-3.148527813	-0.710646675	-3.290834108
31-Mar-22	3.09202454	3.994605184	1.003705244	2.088319296
29-Apr-22	-5.831944775	-2.073891696	-0.452734007	-5.379210768
31-May-22	0.314170157	-3.028788105	-0.681909145	0.996079302
30-Jun-22	-2.948270276	-4.849694445	-1.118926667	-1.829343609
29-Jul-22	6.394658754	8.732434531	2.140784287	4.253874467
30-Aug-22	3.618742156	3.502979616	0.885715108	2.733027048
30-Sep-22	-4.357041922	-3.744235415	-0.8536165	-3.503425422
31-Oct-22	5.301298062	5.369317933	1.333636304	3.967661758
30-Nov-22	7.466426138	4.142470104	1.039192825	6.427233313
30-Dec-22	1.224781622	-3.481382957	-0.79053191	2.015313532
			SUM	**8.87**

Since the sum of the abnormal return is not close to zero, therefore, we conclude that market is inefficient in semi strong form (H1 selected). Thus, the market is inefficient in semi strong form.

6.19 HDFC Life Insurance Company Ltd.

The characteristic line for this company is**Rs= -0.0264-0.18Rm**

Date	ACTUAL MONTHLY RETURN	MARKETRETURN	EXPECTED RETURN	ABNORMAL RETURN
31-Dec-21				
31-Jan-22	-4.172119159	-0.08182528	-0.01127145	-4.160847709
28-Feb-22	-15.94505583	-3.148527813	0.540735006	-16.48579084
31-Mar-22	2.866972477	3.994605184	-0.745028933	3.61200141
29-Apr-22	8.212560386	-2.073891696	0.347300505	7.865259881
31-May-22	2.84168956	-3.028788105	0.519181859	2.322507701
30-Jun-22	-8.172635445	-4.849694445	0.846945	-9.019580445
29-Jul-22	1	8.732434531	-1.597838216	2.597838216
30-Aug-22	3.546354635	3.502979616	-0.656536331	4.202890966
30-Sep-22	-7.779902643	-3.744235415	0.647962375	-8.427865018
31-Oct-22	1.885191818	5.369317933	-0.992477228	2.877669046
30-Nov-22	9.279304283	4.142470104	-0.771644619	10.0509489
30-Dec-22	-4.122925838	-3.481382957	0.600648932	-4.72357477
			SUM	**-9.2**

Since the sum of the abnormal return is less than zero, therefore, we conclude that market is efficient in semi strong form (H0 selected). Thus, the market is efficient in semi strong form.

6.20 Nestle India

The characteristic line for this company is**: Rs= 0.0046+0.02Rm**

Date	ACTUAL MONTHLY RETURN	MARKETRETURN	EXPCTED RETURN	ABNORMAL RETURN
31-Dec-21				
31-Jan-22	-6.00917501	-0.08182528	0.002363494	-6.011538504
28-Feb-22	-4.764180104	-3.148527813	-0.058970556	-4.705209548
31-Mar-22	-1.466057038	3.994605184	0.083892104	-1.549949142
29-Apr-22	5.464441574	-2.073891696	-0.037477834	5.501919408
31-May-22	-3.484940236	-3.028788105	-0.056575762	-3.428364474
30-Jun-22	-1.252013679	-4.849694445	-0.092993889	-1.15901979
29-Jul-22	10.81339439	8.732434531	0.178648691	10.6347457
30-Aug-22	2.927563781	3.502979616	0.074059592	2.853504189
30-Sep-22	-3.919782594	-3.744235415	-0.070884708	-3.848897886
31-Oct-22	6.365174878	5.369317933	0.111386359	6.253788519
30-Nov-22	-0.881728984	4.142470104	0.086849402	-0.968578386
30-Dec-22	-2.862932493	-3.481382957	-0.065627659	-2.797304834
			SUM	**0.77**

Since the sum of the abnormal return is close to zero, therefore, we conclude that market is efficient in semi strong form (H0 selected). Thus, the market is efficient in semi strong form.

7 INFERENCES

Company Name	Characteristic line	Market efficiency	Hypothesis selected
Adani Enterprises Ltd.	Y= 0.316+1.70X	inefficient	H1
Adani Ports	Y= 0.054+0.33X	inefficient	H1
Apollo Hospitals Enterprise Ltd.	Y= -0.018-0.11X	efficient	H0
Asian Paints Ltd.	Y= -0.018-0.10X	efficient	H0
Axis Bank Ltd.	Y= 0.120+0.69X	inefficient	H1
Bajaj Auto Ltd.	Y= 0.044+0.26X	inefficient	H1
Bajaj Finserv Ltd.	Y= -0.334-1.81X	efficient	H0
Bajaj Finance Ltd.	Y= -0.001-0.013X	efficient	H0
Bharti Airtel Ltd.	Y= 0.062+0.37X	inefficient	H1
Bharat Petroleum Corporation Ltd.	Y= -0.04-0.23X	efficient	H0
Britannia Industries Ltd.	Y=0.072+0.39X	inefficient	H1
Cipla Ltd.	Y=0.054+0.30X	inefficient	H1
Coal India Ltd.	Y=0.171+0.95X	inefficient	H1
Divi's Laboratories Ltd.	Y=-0.099-0.52X	efficient	H0
Dr. Reddy's Laboratories Ltd.	Y=-0.036-0.22X	efficient	H0
Eicher Motors Ltd.	Y= 0.090+0.50	inefficient	H1
Grasim Industries Ltd.	Y= 0.0362+0.19X	inefficient	H1
HDFC Bank Ltd.	Y= 0.045+0.24X	inefficient	H1
HDFC Life Insurance Company Ltd.	Y= -0.0264-0.18	efficient	H0
Nestle India	Y= 0.0046+0.02X	efficient	H0

8 LIMITATIONS

8.1 The value of the beta change over a period of time. Therefore, the return of the stock calculated using the characteristic line may not be same always.

8.2 The period of study is small therefore more scope of changes in characteristic line is always there.

9 CONCLUSION

9.1 In the above study majority of the cases (here eleven out of twenty companies) of the stocks are found to be not been able to adjust to publicly available new information very rapidly and in an unbiased fashion. Mostly the alternative hypothesis is being accepted. The market is inefficient in semi strong form of efficient market hypothesis. Therefore, we conclude that during the whole period taken in the above calculations, the application of fundamental analysis is of use.

9.2 The companies having Beta & Alpha greater than or equal to zero are found to be more inefficient while conducting semi strong form of efficient market hypothesis, only exception is Nestle India which is having Beta & Alpha in desirable range and still efficient.

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