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Efficient Market Hypotheses Testing - With Reference to Dividend, Bonus Share and Split Share

Abstract

EMH is one of the well-known methods for measuring the future value of stock prices. According to this hypothesis, the market is efficient if its prices are formed on the basis of all disposable information. One stock market is efficient only if all relevant information about company is incorporated in stock price of this company. Business cycle theoreticians assumed that multiple regression model can be used for forecasting business cycle movement. Scientist, Maurice Kendall had tested a computer model for predicting shares prices in 1953. Results were not satisfactory. Random movement of share process, their unpredictability goes in favour of EMH as this example shows that only new information can affect share price. According to EMH if there is a possibility to predict the future price of shares, that is the first sign of an inefficient market. Key Words: EMH, Split Shares, Bonus Shares, Dividend

Literature Review:

American economist, Eugene Fama, proposed three types of efficiency:

- Weak form;
- Semi-strong form;
- Strong efficiency.

Weak form efficiency claims that all past prices of a stock are reflected in today's stock price. Therefore, technical analysis cannot be used to predict and beat a market.

Semi-strong efficiency implies that all public information is calculated into a stock's current share price. It means that neither fundamental nor technical analysis can be used to achieve superior gains.

Strong form efficiency is the strongest version of market efficiency. It states all information in a market, whether public or private, is accounted for in a stock price. Not even insider information could give an investor the advantage.

Random walk theory claims that stock market can be analyzed as random walk according to next three facts:

- Efficient markets respond very fast to new information;
- If the share price is a reflection of all available information, it is impossible to use that information for market predictions;
- It is impossible to predict market movement other than randomly.

There are a large number of direct and indirect tests as evidence for or against the EMH. Scientist Simon Keane in his work from 1983. Provides some basic explanations of what makes markets inefficient. His very popular idea is called "Gambler's Fallacy". This can be explained as the belief that what "goes up must come down". This phenomenon exhibits itself amongst investors whose stocks price has risen for a period of time and so is deemed to be "due for a fall". Generally speaking, by knowing the relationship of the current price to recent price movements, one can better estimate the likely direction of future price movements, i.e. historical data such as price movement can be used to

predict future prices. This provides credibility to the argument that the market is predictable and inefficient. Therefore, the issue is to see whether the stock market is predictable or not by detecting serial dependence of stock returns.

Two very popular tests of market efficiency will be presented in this paper - Augmented Dickey-Fuller (ADF) test, Run test and Autocorrelation Function (ACF) test. Research will test if some well-known anomalies on the capital market of Montenegro do exist in order to show if critics of EMH are justifiable. Some of the main anomalies that have been identified are as follows: "January effect", "Monday effect", "Holiday effect" and "Turn-of-the-month effect".

RESEARCH METHODOLOGY

Research Objective

- To evaluate efficient market hypotheses by the three vital parameters of the market. i.e. Dividend policy, bonus shares and split of share.
- To study the impact of dividend policy, bonus share issue and split of share over the stock prices of different firms from different sectors.
- To give findings and suggestions for this study.

Research Design & Methodology

Secondary data have been taken from company's websites. Data have been analysed by the help of t-test. Three different firms have been taken from different sectors for the study. The time period for the study is of one week.

Analysis and Interpretation of Canara Bank

STOCK PRICES OF CANARA BANK:

Date	Open Price	High Price	Low Price	Close Price
10-May-12	405	423.1	390.2	418.8
09-May-12	422.5	422.5	403.35	406.75
08-May-12	437	437.85	421.6	425.05
07-May-12	426	434.8	418.2	432.85
04-May-12	429	433	421	426
03-May-12	435	435	427.2	429.4
02-May-12	440	442.45	431.55	435.35

The above table shows the Open, High, Low and Close Stock Price of the Canara Bank from 2nd May, 2012 to 10th May, 2012. These stock prices are of 7 days as the stock market deals from Monday to Friday 9:00 a.m. to 5:00 p.m. These prices are before declaration of dividend.

DECLARATION OF DIVIDEND:

Announcement Date	Effective Date	Dividend Type	Dividend (%)	Remarks
10/05/2012	14/06/2012	Final	110	-

On 10th May, 2012 Canara Bank has declared the dividend of 110%. It has come into effect from 14th June, 2012.

STOCK PRICES AFTER DECLARATION OF DIVIDEND:

Date	Open Price	High Price	Low Price	Close Price
21-May-12	399.8	403.5	391	392.55
18-May-12	398.05	400	390	397.9

17-May-12	400.5	403.75	395.3	398.05
16-May-12	398.95	402.8	391.65	394.6
15-May-12	405.95	411.15	401.1	404.5
14-May-12	420.9	424	403.05	408.95
11-May-12	417	427.05	412.8	419

The above table shows the Open, High, low and Close Stock Prices of Canara Bank from 11th may, 2012 to 21st May, 2012, i.e. 7 days. These prices are after declaration of dividend.

t - TEST FOR OPEN PRICE:

BEFORE DECLARATION OF DIVIDEND	AFTER DECLARATION OF DIVIDEND
405	399.8
422.5	398.05
437	400.5
426	398.95
429	405.95
435	420.9
440	417

t-Test: Paired Two Sample for Means:

	Variable 1	*Variable 2*
Mean	427.78571	405.87857
Variance	139.65476	87.41738
Observations	7.00000	7.00000
Pearson Correlation	0.58375	
Hypothesized Mean Difference	0.00000	
df	6.00000	
t Stat	5.85271	
P(T<=t) one-tail	0.00055	
t Critical one-tail	1.94318	
P(T<=t) two-tail	0.00110	
t Critical two-tail	2.44691	

The above table shows t-test of Open Stock Price of Canara Bank. Here, the calculated value of t-test is 0.00110 which is lower than table value which is 2.44691. Hence the null hypothesis is accepted and Alternative hypothesis is rejected. So the difference is insignificant.

t - TEST FOR HIGH PRICE:

BEFORE DECLARATION OF DIVIDEND	AFTER DECLARATION OF DIVIDEND
423.1	403.5
422.5	400
437.85	403.75
434.8	402.8
433	411.15
435	424
442.45	427.05

t-Test: Paired Two Sample for Means:

	Variable 1	*Variable 2*
Mean	432.67143	410.32143
Variance	54.59488	120.07571
Observations	7.00000	7.00000
Pearson Correlation	0.65035	

Hypothesized Mean Difference	0.00000
df	6.00000
t Stat	7.10035
P(T<=t) one-tail	0.00020
t Critical one-tail	1.94318
P(T<=t) two-tail	0.00039
t Critical two-tail	2.44691

The above table shows t-test of High Stock Price of Canara Bank. Here, the calculated value of t-test is 0.00039 which is lower than table/critical value which is 2.44691. Hence the null hypothesis is accepted and Alternative hypothesis is rejected. So the difference is insignificant.

t -TEST FOR LOW PRICE:

BEFORE DECLARATION OF DIVIDEND	AFTER DECLARATION OF DIVIDEND
390.2	391
403.35	390
421.6	395.3
418.2	391.65
421	401.1
427.2	403.05
431.55	412.8

t-Test: Paired Two Sample for Means:

	Variable 1	*Variable 2*
Mean	416.15714	397.84286
Variance	208.98869	69.09869
Observations	7.00000	7.00000
Pearson Correlation	0.76986	
Hypothesized Mean Difference	0.00000	
df	6.00000	
t Stat	5.02294	
P(T<=t) one-tail	0.00120	
t Critical one-tail	1.94318	
P(T<=t) two-tail	0.00240	
t Critical two-tail	2.44691	

The above table shows t-test of Low Stock Price of Canara Bank. Here, the calculated value of t-test is 0.00240 which is lower than table/critical value which is 2.44691. Hence the null hypothesis is accepted and Alternative hypothesis is rejected. So the difference is insignificant.

t- TEST FOR CLOSE PRICE:

BEFORE DECLARATION OF DIVIDEND	AFTER DECLARATION OF DIVIDEND
418.8	392.55
406.75	397.9
425.05	398.05
432.85	394.6
426	404.5
429.4	408.95
435.35	419

t-Test: Paired Two Sample for Means:

	Variable 1	*Variable 2*
Mean	424.88571	402.22143
Variance	93.41976	86.61405
Observations	7.00000	7.00000
Pearson Correlation	0.52682	
Hypothesized Mean Difference	0.00000	
df	6.00000	
t Stat	6.49426	
P(T<=t) one-tail	0.00032	
t Critical one-tail	1.94318	
P(T<=t) two-tail	0.00063	
t Critical two-tail	2.44691	

The above table shows t-test of Close Stock Price of Canara Bank. Here, the calculated value of t-test is 0.00063 which is lower than table/critical value which is 2.44691. Hence the null hypothesis is accepted and Alternative hypothesis is rejected. So the difference is insignificant.

Analysis and Interpretation of RIL

STOCK PRICES OF RELIANCE INDUSTRIS LTD.

Date	Open Price	High Price	Low Price	Close Price
07-Oct-09	2100	2155	2083.1	2099
06-Oct-09	2139.7	2155	2102.9	2132.45
05-Oct-09	2069.7	2172	2069.7	2137.1
01-Oct-09	2189.7	2205	2155	2170.45
30-Sep-09	2170.15	2210.9	2161.1	2201.2
29-Sep-09	2150	2177	2141	2166
25-Sep-09	2084.95	2146	2075.85	2129.8

The above table shows the Open, High, Low and Close Stock Price of the Reliance Industries Ltd. from 25th September, 2009 to 7th October, 2009. These stock prices are of 7 days as the stock market deals from Monday to Friday 9:00 a.m. to 5:00 p.m. These prices are before declaration of bonus shares.

DECLARATION OF BONUS SHARE:

Announcement Date	Bonus Ratio	Record Date	Ex-Bonus Date
07/10/2009	1:01	27/11/2009	26/11/2009

On 7th October, 2009 Reliance Industries Ltd. has declared the bonus shares in the ratio of 1:1.

STOCK PRICES AFTER DECLARATION OF BONUS SHARE:

Date	Open Price	High Price	Low Price	Close Price
17-Oct-09	2304	2304	2212	2224.75
16-Oct-09	2185.05	2222	2150.15	2216.6
15-Oct-09	2199	2222	2165	2171.4
14-Oct-09	2180.05	2195	2153.1	2178.2
12-Oct-09	2115.05	2185.05	2112	2167.1
09-Oct-09	2118	2132.45	2090	2100.05
08-Oct-09	2150	2209	2100	2119.2

The above table shows the Open, High, low and Close Stock Prices of Reliance industries Ltd. from

8th October, 2009 to 17th October, 2009, i.e. 7 days. These prices are after declaration of bonus shares.

t- TEST FOR OPEN PRICE:

BEFORE DECLARATION OF BONUS SHARE	AFTER DECLARATION OF BONUS SHARE
2100	2304
2139.7	2185.05
2069.7	2199
2189.7	2180.05
2170.15	2115.05
2150	2118
2084.95	2150

t-Test: Paired Two Sample for Means:

	Variable 1	*Variable 2*
Mean	2129.1714	2178.7357
Variance	2038.4982	4118.9698
Observations	7.0000	7.0000
Pearson Correlation	-0.4209	
Hypothesized Mean Difference	0.0000	
df	6.0000	
t Stat	-1.4143	
P(T<=t) one-tail	0.1035	
t Critical one-tail	1.9432	
P(T<=t) two-tail	0.2070	
t Critical two-tail	2.4469	

Above table shows t-test of the Open Stock Price of Reliance industries Ltd. Here, calculated value is 0.2070, which is lower than table value, which is 2.4469. Hence the null hypothesis is accepted and Alternative hypothesis is rejected. So the difference is insignificant.

t- TEST FOR HIGH PRICE:

BEFORE DECLARATION OF BONUS SHARE	AFTER DECLARATION OF BONUS SHARE
2155	2304
2155	2222
2172	2222
2205	2195
2210.9	2185.05
2177	2132.45
2146	2209

t-Test: Paired Two Sample for Means:

BEFORE DECLARATION OF BONUS SHARE	AFTER DECLARATION OF BONUS SHARE
2083.1	2212
2102.9	2150.15
2069.7	2165
2155	2153.1
2161.1	2112
2141	2090
2075.85	2100

t-Test: Paired Two Sample for Means:

	Variable 1	*Variable 2*
Mean	2112.6643	2140.3214
Variance	1518.6423	1827.8182
Observations	7.0000	7.0000
Pearson Correlation	-0.4049	
Hypothesized Mean Difference	0.0000	
df	6.0000	
t Stat	-1.0678	
P(T<=t) one-tail	0.1633	
t Critical one-tail	1.9432	
P(T<=t) two-tail	0.3267	
t Critical two-tail	2.4469	

Above table shows t-test of the Low Stock Price of Reliance industries Ltd. Here, calculated value is 0.3267, which is lower than table value, which is 2.4469. Hence the null hypothesis is accepted and Alternative hypothesis is rejected. So the difference is insignificant.

t- TEST FOR CLOSE PRICE:

BEFORE DECLARATION OF BONUS SHARE	AFTER DECLARATION OF BONUS SHARE
2099	2224.75
2132.45	2216.6
2137.1	2171.4
2170.45	2178.2
2201.2	2167.1
2166	2100.05
2129.8	2119.2

t-Test: Paired Two Sample for Means:

	Variable 1	*Variable 2*
Mean	2148.0000	2168.1857
Variance	1125.1825	2116.2223
Observations	7.0000	7.0000
Pearson Correlation	-0.4026	
Hypothesized Mean Difference	0.0000	
df	6.0000	
t Stat	-0.7976	
P(T<=t) one-tail	0.2278	
t Critical one-tail	1.9432	
P(T<=t) two-tail	0.4555	
t Critical two-tail	2.4469	

Above table shows t-test of the Close Stock Price of Reliance industries Ltd. Here, calculated value is 0.4555, which is lower than table value, which is 2.4469. Hence the null hypothesis is accepted and Alternative hypothesis is rejected. So the difference is insignificant.

Analysis and Interpretation of Jindal Stainless

STOCK PRICES OF JINDAL STAINLESS:

Date	Open Price	High Price	Low Price	Close Price
23-Jan-04	465	485	458.25	483.8
22-Jan-04	450	477.4	427	449
21-Jan-04	490	499.85	445	448.25
20-Jan-04	516	523.5	476.5	488.55

19-Jan-04	511	513.75	489.9	508.25
16-Jan-04	525	526.5	496	504.15
15-Jan-04	569.85	569.85	526	530.2

The above table shows the Open, High, Low and Close Stock Price of the Jindal stainless. from 15th January, 2004 to 23rd January, 2004. These stock prices are of 7 days as the stock market deals from Monday to Friday 9:00 a.m. to 5:00 p.m. These prices are before declaration of split shares.

DECLARATION OF SPLIT SHARE:

Announcement Date	Old FV	New FV	Ex-Split Date
23/01/2004	10	2	01/03/2004

On 23rd January, 2004 Jindal Stainless has declared the split shares with the new face value of Rs. 2 for old face value with Rs. 10.

STOCK PRICES AFTER DECLARATION OF SPLIT SHARE:

Date	Open Price	High Price	Low Price	Close Price
05-Feb-04	425	433	405	412.35
04-Feb-04	415	428.5	405	424.7
03-Feb-04	434.1	445	398	405.7
30-Jan-04	465.05	466	426	434.1
29-Jan-04	473	477	453.05	465.55
28-Jan-04	489.95	494	467.4	472.2
27-Jan-04	500	550	486	489.05

The above table shows the Open, High, low and Close Stock Prices of Jindal Stainless from 27th January, 2004 to 5th February, 2004, i.e. 7 days. These prices are after declaration of split shares.

t -TEST FOR OPEN PRICE:

BEFORE DECLARATION OF SPLIT SHARE	AFTER DECLARATION OF SPLIT SHARE
465	425
450	415
490	434.1
516	465.05
511	473
525	489.95
569.85	500

t-Test: Paired Two Sample for Means:

	Variable 1	*Variable 2*
Mean	503.8357	457.4429
Variance	1600.5056	1094.4237
Observations	7.0000	7.0000
Pearson Correlation	0.9532	
Hypothesized Mean Difference	0.0000	
df	6.0000	
t Stat	9.3630	
P(T<=t) one-tail	0.0000	
t Critical one-tail	1.9432	
P(T<=t) two-tail	0.0001	
t Critical two-tail	2.4469	

Above table shows t-test of the Open Stock Price of Jindal Stainless. Here, calculated value is 0.0001, which is lower than table value, which is 2.4469. Hence the null hypothesis is accepted and Alternative hypothesis is rejected. So the difference is insignificant.

t- TEST FOR HIGH PRICE:

BEFORE DECLARATION OF SPLIT SHARE	AFTER DECLARATION OF SPLIT SHARE
485	433
477.4	428.5
499.85	445
523.5	466
513.75	477
526.5	494
569.85	550

t-Test: Paired Two Sample for Means:

	Variable 1	*Variable 2*
Mean	513.6929	470.5000
Variance	957.6512	1792.5833
Observations	7.0000	7.0000
Pearson Correlation	0.9763	
Hypothesized Mean Difference	0.0000	
df	6.0000	
t Stat	8.2492	
P(T<=t) one-tail	0.0001	
t Critical one-tail	1.9432	
P(T<=t) two-tail	0.0002	
t Critical two-tail	2.4469	

Above table shows t-test of the High Stock Price of Jindal Stainless. Here, calculated value is 0.0002, which is lower than table value, which is 2.4469. Hence the null hypothesis is accepted and Alternative hypothesis is rejected. So the difference is insignificant.

t- TEST FOR LOW PRICE:

BEFORE DECLARATION OF SPLIT SHARE	AFTER DECLARATION OF SPLIT SHARE
458.25	405
427	405
445	398
476.5	426
489.9	453.05
496	467.4
526	486

t-Test: Paired Two Sample for Means:

	Variable 1	*Variable 2*
Mean	474.0929	434.3500
Variance	1124.1770	1203.9342
Observations	7.0000	7.0000
Pearson Correlation	0.9434	
Hypothesized Mean Difference	0.0000	
df	6.0000	
t Stat	9.1163	
P(T<=t) one-tail	0.0000	

t Critical one-tail	1.9432
P(T<=t) two-tail	0.0001
t Critical two-tail	2.4469

Above table shows t-test of the Low Stock Price of Jindal Stainless. Here, calculated value is 0.0001, which is higher than table value, which is 2.4469. Hence the null hypothesis is accepted and Alternative hypothesis is rejected. So the difference is insignificant.

t - TEST FOR CLOSE PRICE:

BEFORE DECLARATION OF SPLIT SHARE	AFTER DECLARATION OF SPLIT SHARE
483.8	412.35
449	424.7
448.25	405.7
488.55	434.1
508.25	465.55
504.15	472.2
530.2	489.05

t-Test: Paired Two Sample for Means:

	Variable 1	*Variable 2*
Mean	487.4571	443.3786
Variance	928.1112	1037.5924
Observations	7.0000	7.0000
Pearson Correlation	0.8820	
Hypothesized Mean Difference	0.0000	
df	6.0000	
t Stat	7.6133	
P(T<=t) one-tail	0.0001	
t Critical one-tail	1.9432	
P(T<=t) two-tail	0.0003	
t Critical two-tail	2.4469	

Above table shows t-test of the Low Stock Price of Jindal Stainless. Here, calculated value is 0.0003, which is higher than table value, which is 2.4469. Hence the null hypothesis is accepted and Alternative hypothesis is rejected. So the difference is insignificant.

Limitations

- The data which have been taken for research is a secondary data.
- There are only three companies from different sectors have been taken for the study.
- Time period for study is of one week.

Findings

1. *CANARA BANK:*

- We can see from t-test that the Open, high, Low and Close stock price of Canara bank decreases after declaration of dividend.
- It means that if the rate of dividend is not in favour of share holders, the demand of stock of respective firms decreases and therefore the firm has to reduce its stock price.
- Thus, here the difference is insignificant, H0 is accepted.

2. *RELIANCE INDUSTRIES Ltd.*

- The open price of RIL increases for first three days of a week after declaration of bonus shares and minor decrease is found in last four days of a week.
- The high price of RIL increases for first three days of a week after declaration of bonus shares, minor decrease is found in next three days and again it increases at the last day of week.
- The low price of RIL increases after declaration of bonus shares accept 5th and 6th day of a week.
- There is an increase in stock price for first four days of a week in RIL and then the prices are decrease in last three days of a week.

Overall there is an increase is found in the stock prices after declaration of bonus shares. Thus the difference is insignificant, H0 is accepted.

3. *JINDAL STAINLESS:*

- We can see from t-test that the Open, high, Low and Close stock price of JINDAL Stainless are continuously decrease after Splitting of shares.
- Thus, here the difference is insignificant, H0 is accepted.

Suggestions and Recommendations:

- Dividend rate should be in favour of the share holders so that even the minor decrease cannot be found in stock price.
- The time period of payment of dividend must be considered as a vital point.
- The dividend policy also plays an important role in the fluctuation in stock prices.
- The ratio of payment of bonus share is one of the key players in determining the stock price. So that RIL should consider this ratio.
- Jindal stainless should split their shares into such a way that the new face value of shares and the number of shares can maintain the balance of old face value of shares.

Conclusion

- IT and Banking sector, last year's dividend and PAT have a significant effect on the current year's dividend.
- There is a great impact of dividend policy, declaration of bonus shares and split of shares on the stock prices of the companies.
- Therefore a company should decide their best Efficient Market Hypotheses.
- Finally to make more efficient it is expected that the authority of the market would introduce sophisticated means of investment and tools in the near future and above all the campaigns to sensitize people about the importance of the stock market and how to invest in the stock market and what are the benefits.

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