International Journal of Psychosocial Rehabilitation, Vol. 24, Issue 01, 2020
ISSN: 1475-7192

EFFICIENT MARKET HYPOTHESIS TEST WITH SPECIAL REFERNCE TO THE INDIAN TELECOM INDUSTRY

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Abstract:

This empirical study is based on the statistical comparison of the Indian Telecom players with refers its share price movements on the Indian Stock Market i.e. BSE (Bombay Stock Exchange). Various statistical tools have been applied to measure their performance such as mean, median. Standard deviation, standard error, variance, RMS, quartiles, skewness, kurtosis, regression and one way Annova. The data under study has been taken for one month i.e. January 2020 (30 days in which only 23 days were working). So we have 23 data set for all players. The examples include airtel, Vodafone, reliance jio and MTNL.

Keywords: *Stock market, FMCG, ANNOVA, REGRESSION, STANDARD DEVIATION*

I. Introduction:

Telecom means those companies which deal in calling and data usage services for daily usage basis. The examples include airtel, Vodafone, reliance jio, BSNL, MTNL etc. In this study we have taken the famous players of this sector. This study is based on the share prices of the companies in BSE market on daily basis from 01-01-2020 to 31-01-2020 in which seven days were non-working.

This sector has annual growth of 10% which is why it attracts so much of importance. The growing awareness and easier access with the changing lifestyles of both urban and rural consumers is bringing the change.

The motive behind this comparative scenario is that it shall compare the four companies and the way their share prices are behaving will be identifying for a reason. Their movement will be supported by a reason through some statistical tools.

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II. Methodology:

The data is secondary which has been taken from the official stock exchange website. Various statistical tools has been applied to measure their performance such as mean, median. Standard deviation, standard error, variance, RMS, quartiles, skewness, kurtosis, regression and one way Annova. The data under study has been taken for one month i.e. January 2020 (30 days in which only 23 days were working). So we have 23 data set for all players.

Hypothesis:

- H0: Price change is random and independent.
- H1: Price change is not random and independent.

Statistics:

SHARE PRICES DATA (CLOSING PRICE) – January 2020 (1 MONTH)

DATE	AIRTEL	VODAFONE	RELIANCE	MTNL
31/01/20	496.7	5.31	0.77	11.12
30/01/20	489.55	5.18	0.79	11.12
29/01/20	490.05	5.26	0.79	11.2
28/01/20	490.9	5.37	0.82	11.21
27/01/20	514.3	5.81	0.83	11.47
24/01/20	524.05	6.05	0.85	11.73
23/01/20	523.6	5.91	0.84	11.18
22/01/20	514.35	5.63	0.83	11.54
21/01/20	511.35	5.92	0.85	11.87
20/01/20	509.25	4.86	0.89	12.06
17/01/20	500	4.51	0.93	12.69
16/01/20	474.05	6.03	0.89	12.09

15/01/20	467.75	6	0.85	11.52
14/01/20	469.45	6.1	0.81	10.98
13/01/20	468.85	6.17	0.83	10.67
10/01/20	457.2	6.07	0.86	10.42
09/01/20	459.85	6.26	0.89	10.77
08/01/20	458.95	6.51	0.85	10.83
07/01/20	445.35	5.97	0.86	10.5
06/01/20	449.5	6.02	0.84	10
03/01/20	455	6.12	0.85	9.9
02/01/20	455	6.11	0.89	9.43
01/01/20	453.3	6.11	0.87	9.45

Statistical analysis using SPSS

	AIRTEL	**VODAFONE**	**RELIANCE**	**MTNL**
Minimum:	445.35	4.51	0.77	9.43
Maximum:	524.05	6.51	0.93	12.69
Range:	78.7	2	0.16	3.26
Count:	23	23	23	23
Sum:	11078.35	133.28	19.48	253.75
Mean:	481.6673913	5.794782609	0.846956522	11.0326087
Median:	474.05	6	0.85	11.12
Mode:	455	6.11	0.85	11.12

Standard Deviation:	25.97720858	0.48833548	0.037347847	0.831653432
Variance:	674.8153656	0.238471542	0.001394862	0.691647431
Mid Range:	484.7	5.51	0.85	11.06
Quartiles:				
Q1 -->	Q1 --> 457.2	Q1 --> 5.37	Q1 --> 0.825	Q1 --> 10.46
Q2 -->	Q2 --> 474.05	Q2 --> 6	Q2 --> 0.85	Q2 --> 11.12
Q3 -->	Q3 --> 504.625	Q3 --> 6.105	Q3 --> 0.86	Q3 --> 11.52
Interquartile Range (IQR):	47.425	0.735	0.035	1.06
Sum of Squares:	14845.93804	5.246373913	0.030686957	15.21624348
Mean Absolute Deviation:	23.1094518	0.386389414	0.02778828	0.641398866
Root Mean Square (RMS):	482.3369687	5.814431072	0.847743809	11.06255081
Std Error of Mean:	5.416622426	0.101824987	0.007787564	0.173411728
Skewness:	0.23938033	-1.090428535	-0.001890208	-0.236943113
Kurtosis:	1.551098106	3.347523602	2.812728061	2.536724624
Coefficient of Variation:	0.05393184	0.084271579	0.044096534	0.075381395
Relative Standard Deviation:	5.39%	8.43%	4.41%	7.54%

One-Way ANOVA results- SPSS

Summary of Data						
	Treatments					
	1	2	3	4	5	Total
N	23	23	23	23		92
∑X	11078.35	133.28	19.48	253.75		11484.86
Mean	481.6674	5.7948	0.847	11.0326		124.835
$\sum X^2$	5350925.8825	777.575	16.5294	2814.7407		5354534.7276
Std.Dev.	25.9772	0.4883	0.0373	0.8317		207.5714

Result Details				
Source	*SS*	*df*	*MS*	
Between-treatments	3905950.8047	3	1301983.6016	*F* = 7706.93075
Within-treatments	14866.4313	88	168.9367	
Total	3920817.2361	91		

The *p*-value is < .00001. The result is significant at $p < .05$.The *f*-ratio value is 7706.93075. Conclusion- Result significant.

III. Interpretation:

The above statistical tools clearly defines and compares the performance of all the four players based on their individual stock price performance for January 2020.

Standard deviation is highest in Airtel and lowest in BSNL, jio and Vodafone which means airtel stock did not behaved in an expected manner whereas others stayed in the league of expectations.

Standard error of mean is lowest in BSNL, jio and Vodafone and highest in Airtel which means BSNL, jio and Vodafone stock error is lowest whereas Airtel went out of the league of correctness.

Skewness is negative for BSNL, jio and Vodafone whereas its positive for Airtel which means that the left tail of distribution is longer which further means the mean and median are less than mode and for Airtel which means that the right tail of distribution is longer which further means the mean and median are more than mode. It is a measure of symmetry. This value is often compared to kurtosis in SPSS.If kurtosis >3 it has heavier tails than normal distribution. For Vodafone the kurtosis >3 and rest of three companies has k <3.

Coefficient of variation (CV) is the ratio of standard deviation to the mean. Higher the value, higher the dispersion around mean of the data and vice-versa. In our data the lowest is for Reliance.

One way Annova results (Analysis of Variance) : The *p*-value is < .00001. The result is significant at $p < .05$.The *f*-ratio value is 7706.93075. this result tells weather or not accept the hypothesis i.e. weather the result is significant or not. If the p value < 0.05 it means the result is significant (Null hypothesis will be accepted) and vice-versa. The F- value is for F- distribution regression models and the p- value is for probability of the result observed. This method is used where number of variables are more than two (preferably 4-5). The Df (degrees of freedom) = n-1 = 4-1=3 in our study.

IV. Conclusion:

The result is significant. H0 accepted. H1 rejected.

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