International Journal of Management and Economics
www.managementjournals.net
Online ISSN: 2664-7079; Print ISSN: 2664-7060
Received: 02-05-2019; Accepted: 03-06-2019; Published: 10-06-2019
Volume 1; Issue 3; 2019; Page No. 05-08

Share price reaction to stock split: A study on companies listed in S&P 500

Omkar Pawar[1], Pratik Jaju[2], Nisha Prasad[3], Prithika Kharwar[4], Nischay Abad[5]
[1-5] Student, Masters in Finance, NMIMS University, Mumbai, India

Abstract
The US Economy, one among the most developed economies in the world, has witnessed new heights in the US equity markets due to the recent earnings of the US companies, which has lured the investors both domestic and foreign to show keen interest in making investments in the US equities. Investors react to any corporate actions explicitly, which play a vital role in the fluctuations of share prices. Various studies so far have proved that the behavior of the investing community towards stock splits differ according to the interpretations given about the present and future prosperity of the stocks in the respective nations. An attempt has been made in this study, to analyze the behavior of the share prices in the US equity market towards the announcements of stock splits, taking into account the price movements of the S&P 500 stocks that have announced stock splits and to find out the impact of the price behavior by comparing the stock performance with the performance of the market index.

Keywords: paired t-test, stock split, S&P 500

1. Introduction
Stock split is a financial illusion because it does not affect any cash inflow or outflow, and it does not add value to the firm and stock holders. It merely distributes additional shares to existing shareholders in proportion to their existing investment. Hence, stock split has no real economic significance. Investors most often prefer to buy shares of those companies which have announced stock split previously. It is evident by the volume of transactions that have taken place on those shares during the respective trading period. It is very clear from the theoretical point of view that the issue of stock split will only increase the number of outstanding equity shares, but will have no effect on the shareholder's proportional ownership holding of shares. As there is no change in the proportional ownership of shareholders, one cannot expect any significant price reactions on the announcement of stock split. Grinblatt M S, Mansulis R W and Titman S (1984) [2] conducted a study and deduced that most of the corporate houses are using stock split and bonus issue announcement, as a measure to attract the attention of market participants when they feel that their share prices are undervalued and traded on discount. Hence an attempt is made by the researcher to assess the real impact of stock split announcements on the price behavior of those firms that announced stock split. US equity market is the top most equity market of the world and it has two major trading platforms, viz. NASDAQ and New York Stock Exchange (NYSE) and one of the benchmark indices is S&P 500. For this study, the researcher has taken the stock composition of S&P 500. The Index of S&P comprise of top performing 500 companies of the United States. Out of these 500 companies only 25 companies have announced the stock split between 2009 to 2019 and those issues alone were taken for studying the impact of stock split announcement on the stock price movements.

2. Literature Review
Lakonishok. J., and Vermaelen T., (1986) [3] observed positive abnormal return for stock split and stock dividends. They considered each of the five trading days prior to the split-day, the split-day itself and two trading days subsequent to it and found that the largest positive abnormal return is experienced on the split-day itself. Lijeblom E. (1989) in a study to examine the informational impact of stock dividend and stock split for stocks listed on the Stockholm Stock Exchange, found that there are significantly high price reactions for the stock dividend and stock split announcements. A study titled "The Effect of Canadian Stock Splits, Stock Dividends and Reverse Splits on the Value of the Firm", by Masse I, Hanrahn J. R, and Kushner J. (1997) [5] to find the impact of stock dividend announcements on the value of the firms listed on the Toronto Stock Exchange revealed that there are significant and positive abnormal returns around the stock dividend announcement date. Papaioannou G.J., Travlos N. G., and Tsangarakis N.V., (2000) [7] carried out a study to analyze price reaction to stock dividend announcement by firms listed on the Athens Stock Exchange. They found no statistically significant abnormal returns on and around the announcement date. It may be described by the fact that the bonus issues are compulsory requirement imposed upon the firms to satisfy the regulatory requirements.
Michelle L.B and Shiguang. M (2001) [6] studied the behavior of stock prices of firms from China's Equity market in response to the announcement of bonus issue and found that the high ratio bonus issue attracts positive return and the bonus announcement with low ratio are rewarded with almost negative pay out. A study by Balachandiran, B., Faff, R., and Jong. L., (2005) [1] to understand the share price reaction to announcement of bonus share issues of Australian Market found that the price reaction to

bonus share announcements from the day of announcement to the trading day next to the bonus announcement day is statistically significant and the positive of average 2.73% for uncontaminated events and 2.11% for contaminated events. Pathirawasam. C, (2009) [8] undertook a research work to investigate the stock price reaction to stock dividends announcement by employing event study methodology and found that the amount of positive abnormal returns on the announcement day in Colombo Stock Exchange is much larger comparing to any other international discoveries. He also discovered that the announcement day (t = 0) abnormal return increases with the size of the stock dividend and vice versa.

3. Need for the study

From the literature above it is clear that the announcement of stock split has an impact on the price behavior of equities. It has been proved by a few studies conducted in various equity markets like Sri Lanka, China, Australia, Canada and so on. It is observed that the proportion of the stock split plays a key role in the price behavior of the equity shares. If the stock split is of large size, then the market reacts positively contrarily, if the split is smaller in size, the market shows its displeasure and delivers a negative return. But it is interesting to note that this theory does not apply to equity market of Athens. A research at Greece found that there is no impact on stock split announcement in the price behavior of shares irrespective of the proportion of stock split. The present study is intended to explore whether the US equity market is behaving in the same manner similar to the global equity markets or it differs from the reactions of the major global equity markets. The study attempts to know the nature and extent of the impact of the price behavior towards the announcement of stock split not only by studying the price behavior of the script but also to compare the performance of the scripts announcing stock splits during the study period, with the performance of the S&P 500 Index.

4. Objective of the study

The objectives of the study are to find out the impact of stock split on the price behavior of S&P 500 index stocks and to assess the nature and extent of script performance based on the proportion of the stock split in relation to the market performance.

5. Hypothesis of the study

H_0 (Null hypothesis): There is either no impact or a negative impact on the price behavior of the shares due to stock split.

H_1 (Alternative hypothesis): There is positive impact on the price behavior of the shares due to stock split.

6. Design and data sample

For the purpose of finding the impact of stock split on share price behavior, the stocks in the composition of S&P 500 alone have been selected. The study is based on secondary data and the information regarding the date of the stock split were collected from www.stocksplithistory.com. The information on the daily price movements of selected stocks and S&P 500 Index movements were collected from finance.yahoo.com. For the purpose of analyzing the data to know the impact of stock split, the daily closing price data for the selected stocks for the period from 30 days before and after the stock split i.e. (- 30 days to +30 days) were taken and the paired t- test method has been employed for analytical purpose.

7. Research Methodology

A. Analytical method 1

To test the hypothesis, Paired t - test is used in this study. It is a parametric test method which considers both direction and magnitude of the difference between any paired values. The procedure of the paired t - test is as follows:

- List the pairs of observations as average price before and after stock split and calculate difference between them(D_1)
- Calculate mean and the standard deviation of all values of D_1
- Apply formula for paired t – test to compute t_{cal} (t calculated)

The formulas used are as follows

- Mean $(D_m) = \sum D_1/n$
- Standard deviation $(S_d) = \sqrt{\sum [(D_1)^2 - n * (D_m)^2]/ (n-1)}$
- Paired t – test statistics $(t_{cal}) = D_m * \sqrt{n} / S_d$

Where,

n = sample size

N-1 = Degrees of freedom

A.1. Decision rule

Find the table value of t_{tab} for 5% level of significance (α=5) and accept the Null hypothesis if the calculated value of t_{cal} is less than table value of t_{tab}, otherwise reject the null hypothesis.

B. Analytical method 2

For the purpose of comparing the performance of script with the performance of S&P 500 Index, a simple mathematical model has been constructed for this research study and employed to find the actual return of the selected scripts and the S&P 500 Index.

- $A_{id} = C_{id\ -1} + (C_{id} – C_{id\ -1}) / C_{id\ -1}$

Where,

A_{id} = Actual return of the security *i* in period *d*.

$C_{id\ -1}$ = Price of security *i* on day prior to day *d*

C_{id} = Price of the security *i* on the day *d.*

After calculating the daily actual returns for the period of 60 trading days i.e., 30 trading days before and after the stock (-30 to +30), the average of daily actual returns is calculated by applying the following simple arithmetic mean formula and is similarly calculated for S&P 500 Index by taking the period corresponding to the period taken for selected scripts $X = \sum A_{id} / N$; Where X is average of actual daily returns of security *i* or S&P 500 Index, N = Number of observations. After finding the average of actual daily returns for both selected securities and the S&P 500 Index, the growth ratio has been calculated by adopting the following formula:

Growth ratio = (Average actual performance of the script) / (Average actual performance of the Index)

B.1. Decision rule

If the value of the growth ratio is greater than 1, it may be interpreted that the performance of the script is better than the performance of the S&P 500 Index and vice versa.

8. Analysis and Interpretation

A. Impact of Stock Split

As per the analytical method 1 mentioned in research Methodology, the Table 1 & 2 show the results of the paired t - test for all the selected S&P 500 Index stocks which have announced stock splits from 2009 to 2019. Out of 500 companies only 25 companies announced stock split in the selected period. In the selected sample, few firms have announced stock splits more than once and for the study purpose only the recent stock splits made by the firms have been considered for analysis. It is found that 56% of the total sample i.e., 14 stocks out of 25 have shown negative impact during the event. i.e., the calculated D_1 value of these stocks are negative whereas rest 44% stock have shown a positive impact but the since the D_m calculated is negative the value for t_{cal} is also negative. When t_{cal} was compared with t_{tab} it was found that $t_{tab} > t_{cal}$ at 5% level of significance. Hence the Null hypothesis is accepted indicating that the stock Splits have a negative impact on the price behavior.

B. Comparison of script and Index

The Table 3 has been constructed to find the performance of the script with respect to the performance of the index. The average of the actual daily returns of the security is calculated and compared with the average of actual daily returns of the S&P 500 Index. The stocks have been arranged in the table based on the proportion of the stock split for easy reference. As observed from the table unlike other markets of the world the proportion of the stock split has no significant impact on the stock prices but at the same time it was also observed that the firms that show a positive response to the stock split perform better than the index in the given period whereas the firms that show a negative response to stock split perform less than the index (growth ratio < 1)

Table 1: Calculations of paired t – test to find D_1 and $(D_1)^2$

Company	Avg. Stock Price Before split	Avg. Stock Price After split	D_1	$(D_1)^2$
Hilton worldwide holdings inc	54.02231983	57.65099987	3.628680033	13.167319
Motorola solutions Inc.	34.24671263	38.74766693	4.5009543	20.25859
American international group	31.34666697	15.94666673	-15.40000023	237.16001
Duke energy	67.8649998	67.125666	-0.7393338	0.5466145
Celgene	79.0408341	87.1300006	8.0891665	65.434615
CME	53.6039333	52.8616668	-0.7422665	0.5509596
General Electric	9.272435933	10.04	0.767564067	0.5891546
Gilead Sciences	37.93049987	41.94966703	4.019167167	16.153705
Danaher	75.1508716	81.04500013	5.894128533	34.740751
Starbucks	47.25616663	49.5533331	2.297166467	5.2769738
Nike	64.70333333	60.64766677	-4.055666567	16.448431
Union Pacific	96.67783333	100.6449994	3.967166067	15.738407
Honeywell international	110.2120587	105.3741529	-4.837905867	23.405333
salesforce.com	43.48349993	42.9749998	-0.508500133	0.2585724
Netflix	94.19238053	114.5366659	20.3442854	413.88995
Abbott laboratories	31.1043146	33.41099987	2.306685267	5.3207969
Citigroup	45.0133334	40.08799997	-4.925333433	24.258909
Coca-Cola	39.28883363	38.33099953	-0.9578341	0.9174462
Comcast	37.02333287	37.4373333	0.414000433	0.1713964
Verizon Communications	26.4268985	28.1039999	1.6771014	2.8126691
MasterCard	81.2315003	77.0123337	-4.2191666	17.801367
Visa	67.45225013	66.1536669	-1.298583233	1.6863184
Alphabet	593.8735392	539.3406677	-54.53287153	2973.8341
Berkshire Hathaway Inc. New	66.1259994	76.1113335	9.9853341	99.706897
Apple Inc.	86.75947673	93.2633334	6.503856667	42.300152

Table 2: Results of paired t – test for D_m, S_D, t_{tab} and t_{cal}

D_m	$(D_m)^2$	$n * (D_m)^2$	S_d	t_{cal}	t_{tab}
-0.7128882	0.5082096	12.70524	12.941735	-0.2754222	1.711

Table 3: Results for Growth ratio

Company	Stock split ratio	Avg. daily returns of script	Avg. daily returns of Index	Growth Ratio
Hilton worldwide holdings Inc.	1 for 3	1.002821493	1.001201405	1.001618144
Motorola solutions Inc.	1 for 4	1.002924204	1.001757265	1.001164892
American international group	1 for 20	0.999945738	1.001755242	0.998193666
Duke energy	1 for 3	1.000999796	1.001393591	0.999606753
Celgene	2 for 1	1.002261967	1.000120797	1.002140911
CME	5 for 1	1.000543984	1.001159967	0.999384731
General Electric	1 for 1	1.002098302	1.001840854	1.000256975
Gilead Sciences	2 for 1	1.003165382	1.001461912	1.001700983
Danaher	1 for 1	1.001527324	1.001215218	1.000311727
Starbucks	2 for 1	1.001545305	1.000106105	1.001439047
Nike	2 for 1	0.997406853	0.998138687	0.999266802

Union Pacific	2 for 1	1.001102589	1.000834218	1.000268147
Honeywell international	1 for 1	0.999791881	0.999850956	0.999940916
salesforce.com	4 for 1	0.99876385	1.001220505	0.99754634
Netflix	7 for 1	1.002786385	0.998002092	1.004793871
Abbott laboratories	10 for 5	1.002175627	1.001964374	1.000210839
Citigroup	1 for 10	0.997623189	0.999623537	0.997998899
Coca-Cola	2 for 1	0.999971495	1.001561281	0.998412693
Comcast	2 for 1	1.001166265	1.000655765	1.000510166
Verizon Communications	10 for 9	1.002009813	0.999569593	1.002441271
MasterCard	10 for 1	1.000791629	1.000838623	0.999953046
Visa	4 for 1	1.000351831	1.000308754	1.000043063
Alphabet	2 for 1	0.997972692	1.000401621	0.997572045
Berkshire Hathaway Inc. New	50 for 1	0.988147741	1.000297405	0.987853948
Apple Inc.	7 for 1	1.002501321	1.000834218	1.001665713

9. Conclusion

The results of the study prove that the stock splits by the companies listed on S&P 500 from 2009 to 2019 have a significant negative impact on the price movements of the shares and the market is not reacting according to the proportion of the stock split. It is observed from the study that the scripts in the S&P 500 Index showing positive response to the stock split outperform the index whereas one with negative response under perform as compared to the index. Hence it can be concluded that the US Equity market is not behaving like the Greece Equity market which has no impact of corporate actions on the stock price but at the same time it is also not behaving identical to the major Global Equity Markets like the Stockholm Stock Exchange or the Toronto Stock Exchange in relation to the issue of stock split since the stock prices for firms of US Equity market show a negative trend after a stock split announcement.

10. References

1. Balachandiran B, Faff R, Jong L. “Announcement of Bonus Share Options: Signaling of the Quality of Firms”, Global Finance Journal. 2005; 16:180-190.
2. Grinblatt MS, Masulis RW, Titman S. “The Valuation Effect of Stock Splits and Stock Dividends”, Journal of Financial Economics. 1984; 13(4):461-490.
3. Lakonishok J, Vermaelen T. “Tax Induced Trading Around Ex- Dividend Days”, Journal of Financial Economics. 1986; 16(3):287-319.
4. Lijleblom E. “The Informational Impact of Announcements of Stock Dividends and Stock Splits”, Journal of Business Finance and Accounting. 1989; 16(5):681-698.
5. Masse I, Hanrahn JR, Kushner J. “The Effect of Canadian Stock Splits, Stock Dividends and Reverse Splits on the Value of the Firm,” QJBE. 1997; 36(4):51-62.
6. Michelle LB, Shiguang M. “Market Efficiency or Not? The Behavior of China’s Stock Prices in Response to the Announcement of Bonus Issues”, Centre for International Economics Discussion Paper, 2001, 120.
7. Papaiannou GJ, Travlos NG, Tsangarakis NV. “Valuation Effects of Greek Stock Dividend Distributions”, European Financial Management. 2000; 6(4):515-531.
8. Pathirawasam C. “The Information Content of Stock Dividend Announcements: Evidence from Sri Lanka”, Central European Review of Economic. 2000; 12(3):103-114.
9. https://www.stocksplithistory.com/spx/
10. https://finance.yahoo.com/
11. https://www.slickcharts.com/sp500