Market Reaction to Stock Splits Announcement--An Analysis of Abnormal Returns

Prabhamar Rane

Abstract: The purpose "of the paper is to analyze and interpret the effect of stock splits announcement on the stock price in the Indian context. The sample size of the paper includes 86 initial stock splits events of listed companies announced during the period from 1998 to 2013. For the study, the daily actual returns for the company and for the NSE Nifty Index are calculated to employ regression model to estimate the expected returns to ascertain the abnormal returns for 91 days window period. A large sample t – test has been conducted to test whether abnormal returns from the stock splits announcement are statistically significant. The study finds that the market reacts to the stock splits announcement negatively" in the Indian context.

Keywords: Stock splits, Abnormal returns, Expected returns, Company and Index.

I. INTRODUCTION

The main purpose of stock splits is to make the stock cheaper and affordable to the new investors. When the new investors enter the market and buy the shares, the stock price of the company generally goes upward. If the stock price of the company goes upward and out performs the market, the actual returns from the stock will be more than the expected returns. The "differences between the actual returns and the expected returns results into abnormal returns. The study, therefore, in this paper, calculates and analyzes the abnormal returns from the announcement of stock splits both before and after the announcement in order to assess and ascertain whether stock splits announcement signals the abnormal returns.

II. METHODOLOGY

The objective "of the paper is to analyze and interpret the impact of announcement of stock splits on the market price in the Indian context. The sample size of the paper consists of 86 initial stock splits of the listed companies announced during the period from 1998 to 2013. The study ignores the subsequent stock splits as the performance of the subsequent stock splits may be based on the performance of the initial stock splits and not due to the basic fundamental factors. For the purpose of the study, the daily actual returns for the company and for the NSE Nifty Index are calculated to estimate the expected returns to compute the abnormal returns from the company for 91 days i.e., - 45 days to + 45 days, window period. The study employed market model to estimate the expected returns from the company. A large sample t – test has been conducted to test whether abnormal returns from the stock splits announcement are statistically significant.

III. HYPOTHESES

The following hypotheses have been developed to test the objective of the paper; H0: Abnormal returns from the stock splits announcement are equal to zero. (ARs from SS = 0)

H1: Abnormal returns from the stock splits announcement are not equal zero. (ARs from SS ≠ 0)

Classification of the Window Period

The window period of – 45 days to +45 days i.e. 91 days has been classified into i) Pre announcement Period (~ 1 to ~45 days), ii) Post announcement Period (+ 1 to + 45 days), iii) Pre vis-à-vis Post announcement Period (~ 1 to ~45 days to + 1 to + 45 days) and iv) 91 days Window Period (-45 days to + 45 days).

Sample Size of Stock Splits Companies

The information on the stock splits announced by the listed companies is obtained from the Motilal Oswal data source and cross checked with the Share khan data base. It documents 894 stock splits announced during the period from 1998-99 to 2012-13. Of the 894 stock splits, 719 stock splits are initial stock splits. Out of the 719 initial stock splits, 86 initial stock splits i.e. 11.96% have been drawn as sample stock splits on the basis of the Regular interval selection method.

Abnormal Returns

The abnormal returns for the company i on day t are calculated as,

$$AR_{it} = R_{it} - \bar{R}_i$$

Where;

$$AR_{it}: \text{Abnormal returns for the company } i \text{ on day } t$$

$$R_{it}: \text{Actual returns for the company } i \text{ on day } t$$

$$\bar{R}_i: \text{Expected returns for the company } i \text{ on day } t$$

Expected Returns

The expected returns for the company i on day t are ascertained by using the following market model (regression);

$$\bar{R}_i = \beta_0 + \beta_1 R_{M} + \epsilon_{it}$$

(2)

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Where,

\[ R_{it} \] Expected returns for the company i on day t
\[ \alpha_i \] Intercept term (alpha) of the company i
\[ \beta_1 \] Beta (systematic risk component) of the company i
\[ R_{mt} \] Returns on the market portfolio on day t
\[ e_{it} \] Error term of the company i on day t

**Average Abnormal Returns (AARs)**

The Abnormal returns are averaged over the number of sample companies in order to eliminate the effect of any one company or group of companies on the abnormal returns. The abnormal returns of individual companies are averaged for each day, surrounding the event day as;

\[
AARs_{it} = \frac{1}{N} \sum_{t=1}^{N} AAR_{it} \quad \text{-------------------- (3)}
\]

Where;

\( AAR_{it} \) -- Average abnormal returns for sample companies on day t

\( AAR_{it} \) -- Abnormal returns for the company i on day t

\( N \) -- Number of companies in the sample

**Cumulative Average Abnormal Returns (CAARs)**

The Cumulative Average Abnormal Returns (CAARs) are computed with a view to know the cumulative effect of average abnormal returns on the days surrounding the event days, \( t_1 \) through \( t_2 \) by summing the average abnormal returns for these days as;

\[
CAARs_{t} = \sum_{t=t_1}^{t_2} AARs_{t} \quad \text{-------------------- (4)}
\]

Where;

\( CAARs \) -- Cumulative Average Abnormal Returns for sample companies on day t

\( AARs \) -- Average Abnormal Returns for sample companies on day t

**Review of Literature on the Stock Splits**

The literature on the stock splits has been reviewed chronologically as in the following;

Anttini (2000) examined 18 stock splits announcements of Finnish companies and 90 stock splits announcements of Swedish companies to investigate whether shareholder wealth effect exists around the announcement and execution dates of stock splits at the Helsinki and Stockholm stock exchanges from 1985 to 1997. He concluded that there exists statistically significant abnormal returns surrounding the announcement day on both the Finnish and Swedish markets and the statistically significant abnormal returns were also found around the execution date of the stock splits at the Stockholm Stock Exchange but not at” Helsinki Stock Exchange.

Wulf (2002) analyzed 78 stock splits for examining the announcement day effect and 83 stock splits for assessing the execution date effect by “firms listed on the Frankfurt stock exchange from 1994 to 1996. He used the event study methodology with the estimation period of over 200 days and the event window of 61 days. He found statistically significant abnormal returns around both the announcement and execution days for German stock splits. However, the abnormal returns found in the study were consistently much lower than the studies conducted on the American data. He stated that the difference is due to the legal restrictions on German companies to use stock splits for signaling.

Satyajit Dhar and Sweta Chhaocchharia (2007) analyzed 90 stock splits and 82 bonus issues announced by companies listed on the BSE from 2001 to 2007. The study used the event study methodology to examine the market reaction to stock splits and bonus issues by considering event window of -40 to +40 days relative to the event day. They found positive AARs of 1.8% in respect of bonus issues and 0.8% in the case of stock splits. They “concluded that bonus issues result in sharp spike on the announcement date while stock splits announcements are resulting in positive returns during the entire event window although effect on announcement date” is not that sharp.

Leledakis, et al (2009) examined 89 stock splits issued in the Athens Stock Exchange. The study used standard event study methodology with the estimation period of 100 days and the event period of 21 days i.e., -10 through +10 to study the effect of stock splits announcement on the abnormal returns. The study found that there is a positive abnormal returns (positive price reaction) around the announcement date.

Josiah Omollo Aduda and Chemarum Caroline S.C. (2010) analyzed stock splits from 9 companies during the period 2002 to 2008. They used the event “window of 101 days consisting of 50 days before and 50 days after the stock splits. The event study methodology was employed to determine the effect of stock splits. The abnormal returns were calculated by using the market model and t-tests were conducted to test the significance. The study found that there were positive average abnormal returns and cumulative abnormal returns across” the different event windows on the stock splits date and on days around the stock splits.

Mikko Reinikainen (2010) examined 38 stock splits by 31 Finnish listed companies during the time period from 1996 to 2007. He employed Standard event study methodology to examine whether the announcements of stock splits have caused abnormal behavior in the stock returns on the announcement dates. He found that the pure stock splits announcements do not cause any statistically significant abnormal behavior on the stocks around the announcement day and the event does not seem to induce pre or post announcement drifts. He concluded that the study did not find any evidence of the signaling effect of stock splits present in the Finnish stock markets during the period from 1996 to 2007.

Koustubh Kanti Ray (2011) studied 351 stock splits and 177 rights issues announced by the companies listed on the NSE from 1996 to 2008. He employed market model (Brown & Warner) to compute the abnormal returns. He considered the event window of 61 days consisting of –30 to +30 relative to the event day. He found positive CAARs of 2.4% for stock splits and 1% for rights issues on event announcement date.

**Research Gap**

The empirical studies in the past on the stock splits have examined signaling hypothesis to identify the effects of stock splits on the stock price for a
maximum window period of 61 days, i.e., 30 days before and 30 days after the event day. These studies have found a positive price reaction around the announcement day of stock splits. The present paper therefore adopts signaling hypothesis under the investigation and makes an attempt to examine the impact of stock splits announcement on the stock price for a maximum window period of 91 days i.e. 45 days before and 45 days after the event day.

**AARs from Stock Splits for 91 days Window Period**

The average abnormal returns for -45 days and +1 day window periods are compared with the average abnormal returns for -1 day and +45 days window periods respectively to assess whether there is any change in the average abnormal returns during those window periods. Similarly, the average abnormal returns for +1 day to +45 days window period are compared with the average abnormal returns for -1 day to -45 days window period to ascertain whether average abnormal returns for plus window period differ from the minus window period. Moreover, the average abnormal returns for -45 days to +45 days i.e., 91 days window period are assessed to know whether there are abnormal returns during the entire window period of 91 days. The average abnormal returns for 91 days window periods from the stock splits announcement have been analyzed and interpreted as in the following:

1) **Pre announcement Period**

   **Table No. 1: Pre announcement Period (-45 to -1 days Window Period) (Test Statistics)**

<table>
<thead>
<tr>
<th>Window Period</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Test statistics</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-45 to -1</td>
<td>45</td>
<td>-0.3384</td>
<td>0.3317</td>
<td>6.844**</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

Note: ** indicates significant at 1%

The above table depicts that the average abnormal returns in the pre stock splits announcement period for -45 to -1 days window period are negative (Mean < 0). Null hypothesis is rejected at 1% level of significance. The average abnormal returns from the stock splits are less than zero (negative and statistically significant) in the pre announcement period (AARs < 0). Therefore, the abnormal returns from the stock splits before the announcement are negative.

2) **Post announcement Period**

   **Table No. 2 Post announcement Period (+1 to +45 days Window Periods) (Test Statistics)**

Note: ** indicates significant at 1%

The Table No.2 indicates that the average abnormal returns after the announcement of stock splits for +1 to +45 days window period are negative (Mean < 0). Null hypothesis is rejected at 1% level of significance. The average abnormal returns from the stock splits after the announcement are negative and statistically significant (AARs < 0). Hence, there are negative abnormal returns from the stock splits in the post announcement period.

3) **Pre vis-à-vis Post announcement Period**

   **Table No. 3 Pre vis-à-vis Post announcement Period (-45 to -1 and +1 to +45 days Window Periods) (Test Statistics)**

Note: ** indicates significant at 1%

From the above table, it is clear “that the average abnormal returns before the announcement of stock splits for -45 to -1 days window period are negative and do not differ from the average abnormal returns for +1 to +45 days window period after the announcement of stock splits (Mean = 0). Null hypothesis is accepted at 1% level of significance. The average abnormal returns in the pre stock splits announcement period are equal to the average abnormal returns in the post stock splits announcement period (AARs = 0). Therefore, the abnormal returns in the post stock splits” announcements period do not differ from the pre stock splits announcement period.

4) **91 days window Period**

   **Table No. 4: 91 days window Period (-45 to +45 days Window Period) (Test Statistics)**

<table>
<thead>
<tr>
<th>Window Period</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Test statistics</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-45 to +45</td>
<td>90</td>
<td>-0.2396</td>
<td>0.3336</td>
<td>6.813**</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

Note: ** indicates significant at 1%

The Table No.4 shows that the average abnormal returns for -45 to +45 days i.e. 91 days window period are negative (Mean < 0). Null hypothesis is rejected at 1% level of significance. The average abnormal returns from the stock splits for 91 days window period are less than zero (AARs < 0). Therefore, the abnormal returns from the stock splits announcement for the entire window period of 91 days are negative.

**AARs for Different Window Periods from Stock Splits**

The average abnormal returns for -5 days window period to -45 days window periods and +5 days window period to +45 days window periods are compared with the average abnormal returns for -1 day window period and +1 day window period respectively to assess the trend in the average abnormal returns over different window periods. The average abnormal returns, similarly, for different plus window periods are compared with the average abnormal returns for different corresponding minus window periods to ascertain whether average abnormal returns for different plus window periods differ from the different corresponding minus window periods. The average abnormal returns for different plus and minus window periods are also analyzed to ascertain whether average abnormal returns for shorter window periods differ from the longer window periods and vice versa. The average abnormal returns for different window periods from the announcement of stock splits have been analyzed and interpreted with the help of the following:

1) **Pre announcement Period**

a) Difference in AARs from -1 to -45 days Window Periods;
Table No. 5.a: Difference in AARs from -1 to -45 days Window Periods

<table>
<thead>
<tr>
<th>Window Periods</th>
<th>AARs(-1WP)</th>
<th>AARs (+WPs)</th>
<th>AARs (Difference)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1 to -5</td>
<td>-0.1476</td>
<td>-0.5960</td>
<td>+0.4484</td>
</tr>
<tr>
<td>-1 to -10</td>
<td>-0.1476</td>
<td>-0.5880</td>
<td>+0.4404</td>
</tr>
<tr>
<td>-1 to -15</td>
<td>-0.1476</td>
<td>-0.4492</td>
<td>+0.3016</td>
</tr>
<tr>
<td>-1 to -20</td>
<td>-0.1476</td>
<td>-0.3970</td>
<td>+0.2494</td>
</tr>
<tr>
<td>-1 to -25</td>
<td>-0.1476</td>
<td>-0.3709</td>
<td>+0.2233</td>
</tr>
<tr>
<td>-1 to -30</td>
<td>-0.1476</td>
<td>-0.3944</td>
<td>+0.2468</td>
</tr>
<tr>
<td>-1 to -35</td>
<td>-0.1476</td>
<td>-0.3549</td>
<td>+0.2073</td>
</tr>
<tr>
<td>-1 to -40</td>
<td>-0.1476</td>
<td>-0.3727</td>
<td>+0.2251</td>
</tr>
<tr>
<td>-1 to -45</td>
<td>-0.1476</td>
<td>-0.3384</td>
<td>+0.1908</td>
</tr>
</tbody>
</table>

b) Test Statistics for difference in AARs from +1 to +45 days Window Periods;

Table No. 6.b: Difference in AARs from +1 to +45 days Window Periods

<table>
<thead>
<tr>
<th>Window Periods</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>t-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>+1 to -5</td>
<td>-0.0790</td>
<td>0.3125</td>
<td>0.5655</td>
<td>0.6019</td>
</tr>
<tr>
<td>+1 to +10</td>
<td>-0.0687</td>
<td>0.2885</td>
<td>0.7534</td>
<td>0.4705</td>
</tr>
<tr>
<td>+1 to +15</td>
<td>-0.1717</td>
<td>0.3550</td>
<td>1.8732</td>
<td>0.0821</td>
</tr>
<tr>
<td>+1 to +20</td>
<td>-0.0965</td>
<td>0.3413</td>
<td>1.2644</td>
<td>0.2214</td>
</tr>
<tr>
<td>+1 to +25</td>
<td>-0.1056</td>
<td>0.3242</td>
<td>1.6279</td>
<td>0.1166</td>
</tr>
<tr>
<td>+1 to +30</td>
<td>-0.1046</td>
<td>0.3035</td>
<td>1.8883</td>
<td>0.0690</td>
</tr>
<tr>
<td>+1 to +35</td>
<td>-0.1179</td>
<td>0.3061</td>
<td>2.2785*</td>
<td>0.0291</td>
</tr>
<tr>
<td>+1 to +40</td>
<td>-0.1417</td>
<td>0.3029</td>
<td>2.9582*</td>
<td>0.0052</td>
</tr>
<tr>
<td>+1 to +45</td>
<td>-0.1407</td>
<td>0.3083</td>
<td>3.0617*</td>
<td>0.0037</td>
</tr>
</tbody>
</table>

Note: * indicates significant at 5%, ** indicates significant at 1%

From the above analysis, it is clear that the average normal returns for +5, +10, +15, +20, +25 and +30 days window periods are negative as compared to +1 day window period but not significant. Moreover, the Average Abnormal Returns for +35 and +40 and +45 days window periods are also negative as against +1 day window period which are significant at 5% and 1% level of significance respectively. Therefore, there is an increase in the negative abnormal returns of longer window periods in the post stock splits announcement period.

3) Pre vis-à-vis Post announcement period

Table No. 7.a: Difference in AARs from +1 to -1 to +45 to -45 days Window Periods

<table>
<thead>
<tr>
<th>Window Periods</th>
<th>AARs(+WPs)</th>
<th>AARs (-WPs)</th>
<th>AARs (Difference)</th>
</tr>
</thead>
<tbody>
<tr>
<td>+1 to -1</td>
<td>-0.1669</td>
<td>-0.1476</td>
<td>-0.0193</td>
</tr>
<tr>
<td>+5 to -5</td>
<td>-0.0790</td>
<td>-0.5960</td>
<td>+0.5170</td>
</tr>
<tr>
<td>+10 to -10</td>
<td>-0.0687</td>
<td>-0.5880</td>
<td>+0.5193</td>
</tr>
<tr>
<td>+15 to -15</td>
<td>-0.1717</td>
<td>-0.4492</td>
<td>+0.2775</td>
</tr>
<tr>
<td>+20 to -20</td>
<td>-0.0965</td>
<td>-0.3970</td>
<td>+0.4935</td>
</tr>
<tr>
<td>+25 to -25</td>
<td>-0.1055</td>
<td>-0.3709</td>
<td>+0.2654</td>
</tr>
<tr>
<td>+30 to -30</td>
<td>-0.1046</td>
<td>-0.3944</td>
<td>+0.2898</td>
</tr>
<tr>
<td>+35 to -35</td>
<td>-0.1179</td>
<td>-0.3549</td>
<td>+0.2370</td>
</tr>
<tr>
<td>+40 to -40</td>
<td>-0.1416</td>
<td>-0.3727</td>
<td>+0.2311</td>
</tr>
<tr>
<td>Window Periods</td>
<td>Mean</td>
<td>Std. Deviation</td>
<td>t-value</td>
</tr>
<tr>
<td>----------------</td>
<td>------</td>
<td>----------------</td>
<td>---------</td>
</tr>
<tr>
<td>+5 to -5</td>
<td>-0.3375</td>
<td>0.4920</td>
<td>2.1693</td>
</tr>
<tr>
<td>+10 to -10</td>
<td>-0.3284</td>
<td>0.4368</td>
<td>3.3620*</td>
</tr>
<tr>
<td>+15 to -15</td>
<td>-0.3105</td>
<td>0.4036</td>
<td>4.2126*</td>
</tr>
<tr>
<td>+20 to -20</td>
<td>-0.2468</td>
<td>0.3857</td>
<td>4.0469*</td>
</tr>
<tr>
<td>+25 to -25</td>
<td>-0.2382</td>
<td>0.3569</td>
<td>4.7206*</td>
</tr>
<tr>
<td>+30 to -30</td>
<td>-0.2495</td>
<td>0.3534</td>
<td>5.4698*</td>
</tr>
<tr>
<td>+35 to -35</td>
<td>-0.2364</td>
<td>0.3439</td>
<td>5.7524*</td>
</tr>
<tr>
<td>+40 to -40</td>
<td>-0.2572</td>
<td>0.3353</td>
<td>6.8603*</td>
</tr>
<tr>
<td>+45 to -45</td>
<td>-0.2396</td>
<td>0.3336</td>
<td>6.8132*</td>
</tr>
</tbody>
</table>

Note: ** indicates significant at 1%


**IV. CONCLUSION**

The abnormal returns and cumulative abnormal returns from the announcement of stock splits are negative. Therefore, on the basis of the abnormal returns and the cumulative abnormal returns, the paper concludes that the market reacts negatively to the announcement of stock splits in the Indian context

**Scope for further research**

A further research work can be conducted on the topic “Market Reaction to Stock Splits Announcement --An Analysis of Abnormal Returns”: i) Abnormal returns for a longer window period of more than 91 days, ii) Abnormal returns for a larger sample size of more than 86 listed companies, iii) Abnormal returns from subsequent stock splits announcement and iv) Comparison of abnormal returns from initial stock splits announcement with subsequent stock splits announcement of the listed companies.

**REFERENCES**


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