The Equity Market around the Ex-Split Date: Evidence from India

Madhumita Chakraborty

Theory suggests that stock-splits are cosmetic corporate events as they simply increase the number of outstanding shares and decrease the price of each outstanding share. Hence, there should be no significant effect on the value of the firm. However, empirical evidence suggests that the market generally reacts favourably to stock splits. The contradiction between theory, which expects no change in firm value consequent to stock splits, and the reality, with scores of evidence of significant market reaction, motivates the present study.

The market response to stock splits is investigated with the dataset from an emerging country – India for the period from March 1999 to December 2008. Based on availability of data, analysis was possible for 234 splits. The result of the investigation is in line with the results of many other studies, which shows significantly positive returns on the day of split execution.

- The regression analysis suggests that the positive reaction can be attributed to the small firm hypothesis and liquidity hypothesis.
- The result for the post-split period is characterized by abnormally high negative returns which wipes out much more than the positive gain during the split execution. This seems to be mostly explained by the pre-split price increase, firm size, and size of transaction, suggesting that the firms which have experienced a high pre-split increase in price as well as the smaller firms are the ones which suffer the worst returns.
- The significantly positive co-efficient for transaction size along with the observation that post-split average size of transaction has declined, implies trading intensity by small investors, who face severe negative performance in the post-split period. It is possible that small investors are lured to the market on split execution, while the informed players exit the same when the prices are at their peaks leaving the uninformed small investors with over-priced stocks, whose prices fall rapidly in the post-split period.

These findings may have immense implications for the smaller investors in designing their trading strategies. There may also be implications for the market regulators in protecting the small investors.
In theory, stock splits are cosmetic corporate events as they simply increase the number of outstanding shares and decrease the price of each outstanding share. Hence, there should be no significant effect on the value of the firm. However, empirical evidence suggests that the market generally reacts favourably to stock splits. Over the years, several hypotheses have evolved to explain this puzzling phenomenon. One of the more prominent explanations is the signalling hypothesis according to which managers use stock splits as a signal of the firm’s favourable future prospects (Brennan and Copeland, 1988). The other hypothesis which received enormous attention is that of optimal trading range which suggests the use of stock splits as a means to return share prices to some optimal trading range, thus improving shareholder liquidity, at least for small investors, called the liquidity hypothesis (Baker and Gallagher, 1980; Baker and Powell, 1993). The tick size hypothesis regards stock split as a method for keeping the tick size relative to the stock price at an optimal level. Grinblatt, Masulis and Titman (1984) explain the response to stock splits in terms of attention hypothesis or neglected/small firm hypothesis which states that splits are intended to place the stock in the limelight. According to the tax-option hypothesis, a stock split provides a mechanism for a firm’s management to raise the tax option value of the stock, which increases shareholder wealth (Constantinides, 1984; Lamoureux and Poon, 1987).

The contradiction between theory, which expects no change in firm value consequent to stock splits, and the reality, with scores of evidence of significant market reaction, triggers the present study. The market response to stock splits is investigated with the dataset from an emerging country – India, which is distant from the West in terms of geographical location, economic development, institutional and legal framework. Not much is available in the Indian context, so far, except for the commendable work by Mishra (2007), which documents negative effect on price and return of stocks following splits thereby rejecting signalling hypothesis. The study also reports a positive effect on volatility and trading volume following the split events, lending support to the liquidity hypothesis. The present paper tries to provide a few additional insights on the issue and therefore, differs from Mishra’s (2007) study in the following ways. Firstly, the study does investigate the market behaviour on split execution, but goes beyond, in its attempt to explain why the market behaves in that manner. This is done with the help of regression analysis and covers issues like small firm hypothesis, price run up, trading range hypothesis and size of investors, which are unexplored in his paper. Secondly, Mishra’s study covers the period up to December 2005 and the present study investigates a longer and more recent period from March 1999 to December 2008.

The results of the present study shows significantly positive cumulative abnormal returns on split execution, following which there is a major decline in share prices which wipes out much more than the gain of the execution period. The signalling hypothesis does not seem to provide any explanation for the significant return on execution date, while the small firm hypothesis along with the liquidity hypothesis seem to contribute significantly towards the positive return occurring on the execution. The post-execution negative reaction is mostly explained by run up of stock prices preceding the execution, size of firms, and size of investors, suggesting that stocks which had high pre-split price increase as well as the small firms witness a price revision after split and it is the small investors who face the loss of the post-split period.

THEORETICAL BACKGROUND

Fama et al (1969) has been the pioneering study to examine the share price performance of splitting firms. Although the economic literature has not yet found a definitive explanation for either the abnormal returns observed around the announcement and execution dates, or the reasons why managers decide to split, different explanations, not necessarily mutually exclusive have been proposed. The more prominent hypotheses are the signalling hypothesis, the liquidity hypothesis, the tax-option hypothesis, the neglected firm hypothesis, and the managerial entrenchment hypothesis.

The Signalling Hypothesis

The signalling hypothesis proposes that, in a scenario of asymmetric information between managers and investors, managers may use stock splits to signal positive information to the market about the firm’s future expectations. To be a credible signal, the signal has to be costly. The costs of this financial signal are administrative, advertising, registration, and transaction expenses. Spence (1973) suggests that a stock split fulfils the con-
ditions required to act as a financial signal. The presence of positive abnormal returns around the stock split announcement that is found in many empirical studies, (Asquith, Healey and Palepu, 1989; McNichols and Dravid, 1990; Ikenberry, Rankine and Stice, 1996; Mukherji, Kim and Walker, 1997) provides evidence for the signalling hypothesis. Furthermore, Fama et al (1969) and Lakonishok and Lev (1987) suggest that the abnormal returns observed around stock split announcements are due to the use of stock splits as another financial signal: expectations of higher dividends in the future. However, Grinblatt, Masulis and Titman (1984) cast doubt on the above as they find that the high abnormal returns are present irrespective of the expectation of dividends.

Though the signalling hypothesis can be supported by empirical studies, it remains a puzzle why companies split their stocks. There can be other more unambiguous ways like higher dividends to issue a good signal. In addition, the signalling hypothesis cannot explain why excess returns are also observed around the ex-split date since there is no new information content after the split announcement. This induces researchers to look for other liquidity-based explanation.

Trading Range Hypothesis

According to the optimal trading range hypothesis, stock splits are used as tools to realign the share price to a desired price range so that it is more affordable for small investors to buy round lots of shares. If the pre-split share price is at a high level, then a stock split is justified for improving the marketability of the shares (Baker and Gallagher, 1980; Lakonishok and Lev, 1987; McNichols and Dravid, 1990). The reduction in trading price through stock splits enables the post-split shares to become more attractive to previously wealth-constrained investors.

The Liquidity Hypothesis

Another hypothesis closely related to the trading range hypothesis is the liquidity hypothesis. The management’s motivation to bring the share price to an optimal trading range arises from the desire to improve liquidity. A company wants to attract small or uniformed shareholders to invest in its stock as it expands the shareholder base. Small traders are considered as noise traders in contrast to informed traders. Black (1986) states that noise trading is essential to the existence of liquid mar-

kets, and the more noise traders there are, the more liquid the markets will be. However, the evidence for the liquidity hypothesis is mixed. Muscarella and Vetsuypens (1996), Desai, Nimalendran and Venkataraman (1998), and Menendez and Gomez-Anson (2003) observe an increase in trading volume during the post-split period, and hence provide support for the liquidity hypothesis of stock splits. On the other side, Conroy, Harris and Benet (1990) show an increase in bid-ask spreads after stock split announcements. Ferris, Hwang and Sarin (1995) present results of a reduction in depth. These results indicate that corporate liquidity decreases rather than increases after the split.

Other Hypotheses

The tax-option hypothesis, proposed by Lamoureux and Poon (1987), suggests that stock splits increase the return volatility of the splitting firms and hence allow the investors to benefit from tax-timing options. The increase in return volatility has received empirical support from the works of Ohlson and Penman (1985), Dravid (1987), and Dubofsky (1991).

The managerial entrenchment hypothesis argues that managers may split their stocks in order to reduce institutional ownership. In this way, management makes it more difficult for any one group of shareholders to initiate action against them (Mukherji, Kim and Walker, 1997) and deter possible takeovers (Lakonishik and Lev, 1987).

The small firm or neglected firm hypothesis suggests that since the smaller firms have fewer announcements published in the financial press, the split announcement is expected to create greater market interest than it would be in case of larger firms. So, small firms may have an incentive to adopt the stock splits to grab more attention. (Grinblatt, Masulis and Titman, 1984; Wulff, 2002).

The present study builds around some of these hypotheses to explain the share price reaction on split execution.

DATA AND METHODOLOGY

Data

The basic sample for the study is comprised of all Bombay Stock Exchange (BSE) equity stocks that have split between March 1999 and December 2008 and is recorded in the CMIE database Prowess 3.1 version. The choice
of the time period is guided by the fact that March, 1999 marked the beginning of a new era in stock splits when the Securities and Exchange Board of India (SEBI) allowed the companies to set the face value of their shares freely with the only restriction that the same could not be fractional. Prior to this, companies were required to keep the face value of shares at Rs 10 or Rs 100 only. The SEBI ruling of 1999, have allowed the companies to split their shares and have face values other than Rs 10 or Rs 100. There were a total of 603 stock splits during the period. The following criteria have been applied to include a company in the sample.

i) The announcement dates are available on the website, viz., http://www.abnamrobroking.co.in/Announcements/splits.

ii) The stock price data is available for 270 days prior to the announcement date.

iii) Data for 60 days are available for the post-split period.

iv) Other required financial information is available on the Prowess database.

After filtering on the basis of the above criteria, the number of firms on which the analysis could be carried out was 234.

Methodology to Ascertain Market Reaction around Stock Splits

In the present study, the event is the split execution date, defined as day 0. The estimation window is the 250 day period from -270 to -21 trading days before the announcement day. The estimation window is chosen as the period before the announcement, rather than the period before the execution, in order to avoid any bias that may arise after the announcement and therefore to keep the estimation period as a clean period. The post-split period examined in the study runs to 60 trading days after the split. In this study, the benchmark index chosen for running the regression for the market model is the BSE 100 index. This index represents around 67 per cent of the total market capitalization as in 2008.

The return on security $i$ in period $p$ is computed using the following:

$$ R_{ip} = \ln \left( \frac{\text{Price}_{ip}}{\text{Price}_{i,p-1}} \right) $$

The market model is

$$ R_{ip} = \alpha_i + \beta_i R_{mp} + \varepsilon_{it} $$

where, $R_{mp}$ is the return on a market index for day $p$, $\beta_i$ measures the sensitivity of firm $i$ to the market, $\alpha_i$ measures the mean return over the period not explained by the market, and $\varepsilon_{it}$ is a statistical error term, where, $\Sigma \varepsilon_{ip} = 0$.

The abnormal return (residual) on any stock $i$ in the event window (or investigation window) is measured by the difference between its actual return and the predicted return. Hence,

$$ \varepsilon_{it} = R_{ip} - (\hat{\alpha}_i + \hat{\beta}_i R_{mp}) $$

where $\hat{\alpha}_i$, $\hat{\beta}_i$ are the estimates of $\alpha_i$ and $\beta_i$. The $t$-statistic for abnormal returns on an event date is

$$ t = \frac{\bar{E}_p}{\hat{s}(\bar{E}_p)} $$

where $\bar{E}_p$ is average abnormal return of stocks involved in the test at day $p$, and $\hat{s}(\bar{E}_p)$ is the corresponding standard deviation. Mathematically, we have:

$$ \bar{E}_p = \frac{\sum_{i=1}^{N_p} E_{i,p}}{N_p} $$

$$ \hat{s}(\bar{E}_p) = \left[ \frac{\sum_{p=-210}^{-21}(\bar{E}_p - \bar{E})^2}{249} \right]^{1/2} $$

where $N_p$ is the number of stocks involved in the test at day $p$, $\bar{E}_p$ is the average abnormal return of $N_p$ stocks from day -270 to day -21, such that

$$ \bar{E} = \frac{1}{250} \sum_{p=-270}^{-21} \bar{E}_p $$

Brown and Warner (1985), and Corrado and Zivney (1992) have used these statistics. The $t$-statistic for abnormal returns in an interval is

$$ t_{a,b} = \sum_{p=a}^{b} \bar{E}_p \left/ \left( \sum_{p=a}^{b} \hat{s}(\bar{E}_p) \right)^{1/2} \right. $$

The first and the last days of the interval are $a$ and $b$, which are selected as -20 to 60, -20 to -1, 0 to 2, and 3 to 60 in this study.

In order to check for the robustness of the results, Corrado’s non-parametric test has also been applied.
Corrado (1989) states that for the parametric $t$-test to be optimal, the underlying distribution must be normal, and therefore, proposes a new non-parametric test based on ranks, which has been shown to offer improved specification under the null hypothesis and more power under the alternative hypothesis of abnormal security price performance.

The rank test procedure treats the 250-day estimation period and the 41-day event period as a single time series and assigns a rank to each daily return for each firm. Following the notation of Corrado (1989), let $K_{ip}$ represent the rank of abnormal return $\varepsilon_{ip}$ in the time series of 291 daily abnormal returns of stock $i$. Rank one signifies the smallest abnormal return and rank 291, the largest. Mean rank, is 146.

The rank statistic substitutes $(K_{ip} - 146)$ for the excess return, yielding the test statistic as

$$t = \frac{1}{N} \sum_{i=1}^{N} \left( K_{ip} - 146 \right) / S(K)$$

(9)

Here $N$ is the number of stocks under investigation. The standard deviation $S(K)$ is calculated using the entire 291 day sample period:

$$S(K) = \sqrt{\frac{1}{291} \sum_{p=290}^{291} \left( 1/N \sum_{i=1}^{N} (K_{ip} - 146)^2 \right)}$$

(10)

The abnormal return in an interval is tested by:

$$t = \frac{\sum_{p=a}^{b} \frac{1}{N} \sum_{i=1}^{N} (K_{ip} - 146)} {\sqrt{\sum_{p=a}^{b} S^2(K)}}$$

(11)

The first and the last days of the interval are $a$ and $b$.

**Explanatory Variables for the Regression Equation**

The significant cumulative abnormal return around the stock splits would need further probing in order to understand the market reaction to stock splits. Based on the past literature, an attempt is made to determine what factors possess some explanatory power for the significant CAR.

The hypotheses to be tested are the following:

**The signalling hypothesis**: Lakonishok, Shleifer and Vishny (1994), Haugen (1995), and Ikenberry, Rankina and Stice (1996) suggest the relation between price and book value as a measure of undervaluation. Low price to book value firms are more likely to be undervalued. If a stock split is a signal of undervaluation, and if price to book ratio is a good proxy for the degree of undervaluation, the magnitude of the split reaction should be negatively correlated with price to book ratio (Ikenberry, Rankine and Stice, 1996). This study uses the average price to book ratio of the 60 days prior to the split (PB), as a proxy for the undervaluation.

**The trading range hypothesis**: To test this hypothesis, the study uses the ratio of the firm’s share price at the close of the previous month to the average share price of all companies on the same day (PMAR), traded at the Bombay Stock Exchange. The results may be either way. If positive, then firms with relatively higher price earn higher returns and if negative, firms with relatively smaller price show better returns.

**The liquidity hypothesis**: The trading volume in the post-split period increases following splits, thereby suggesting an improvement in liquidity. (Elfakhani and Lung, 2003; Leung, Rui and Wang, 2005) The post- to pre-split trading quantity ratio is expected to have a positive relation with execution period CAR. The 60-day post-split trading quantity over 60 day pre-split trading quantity (VOLUMER) is used as the proxy for the liquidity measure in order to assess whether market reaction is explained by increase in liquidity.

**The small firm hypothesis**: If smaller firms attempt to generate attention of the investment community through stock splits, then, the proxy for the size of the firms should have a negative relation with the market returns. Following Grinblatt, Masulis and Titman (1984) and Wulff (2002), the study uses the variable MCAP, which is the logarithm of the market value of the firm 10 days prior to the split, as Brown, Kleidon and Marsh (1983) document that there exists an approximately log-linear relation between firm size and excess returns in their samples.

**Other variables**: In order to assess whether the stock price increase before the split has any effect on the market returns, a variable RUNUP (price increase from day -60 to -10) is included in the regression analysis, which is expected to have a negative sign because it measures the extent to which price has already reacted to positive possibilities of the firm and therefore, no further price reactions are expected for the splits (Grinblatt, Masulis...
and Titman, 1984). Another factor used is the Trade Size (TS) measure, defined as (Turnover\textsubscript{post}/Number of transactions\textsubscript{post})/(Turnover\textsubscript{pre}/Number of transactions\textsubscript{pre}). If the average trade size over a 60-day period after the split decreases in comparison to the average trade size over the 60 days prior to the split, it may possibly indicate that trading intensity of small investors have increased. It may have either a positive or a negative relation with event returns. If positive, companies with higher trading intensity of smaller/larger investors make smaller/larger returns, if negative, the reverse is the relationship.

The empirical results are best explained by the trading range hypothesis and liquidity hypothesis for the short-run, while RUNUP, size of the firms, and trade size seem to explain the longer period returns.

**EMPIRICAL FINDINGS**

**Market Reaction to Stock Splits**

Table 1 presents the average abnormal returns earned by target firms during the event window -20 to +60. The \( t \)-statistics along-side reveals that the AAR on day 0 is highly positive and is significantly different from zero at 1 per cent level of significance. The AARs on days -18 and -17 are significantly negative, while that on -7 is significantly positive at 5 per cent level. While the negative returns on days -17 and -18 cannot be explained by theory, the positive return on day -7 possibly implies that informed traders anticipating a price increase on execution bought shares prior to the same to make fast profits on execution. In the post-event period, day 1 and day 2 also show positive, but insignificant returns. But beginning on the third day after split up to 60 days later, the AARs are negative on 52 days and are significantly so on 21 days. Corrado’s test also presents similar results with highly significant day 0 returns and negative returns on 53 days in the post-event period.\(^4\)

A look at Figure 1, which plots the Cumulative Abnormal Returns (CAR) for the full event window from day -20 to day +60, reveals that after a rise in CAR up to day +2, the decline seems to be incessant and dips to -16.39 per cent by day +60. Table 2 further analyses the CARs and shows that for the entire investigation window from
Table 1: Average Abnormal Returns around Split Execution along with their t-Statistics and Corrado's Statistics

<table>
<thead>
<tr>
<th>Day</th>
<th>Average Abnormal Returns</th>
<th>t-Statistics</th>
<th>Corrado's Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>-20</td>
<td>-0.00111</td>
<td>-0.53433</td>
<td>-0.49954</td>
</tr>
<tr>
<td>-19</td>
<td>0.001163</td>
<td>0.558873</td>
<td>0.958771</td>
</tr>
<tr>
<td>-18</td>
<td>-0.00408</td>
<td>-1.96199*</td>
<td>-0.64108</td>
</tr>
<tr>
<td>-17</td>
<td>-0.00455</td>
<td>-2.18796*</td>
<td>-1.11805</td>
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<tr>
<td>-16</td>
<td>0.00125</td>
<td>0.60092</td>
<td>0.717325</td>
</tr>
<tr>
<td>-15</td>
<td>-0.00147</td>
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<td>-0.15794</td>
</tr>
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<td>-14</td>
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<td>-0.0533</td>
<td>0.354938</td>
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<td>-13</td>
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<td>0.327989</td>
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<td>-9</td>
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<td>-4</td>
<td>0.003306</td>
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<tr>
<td>-3</td>
<td>0.002384</td>
<td>1.145846</td>
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<tr>
<td>-1</td>
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<td>0</td>
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<td>12.52302**</td>
<td>6.1947**</td>
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</tr>
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<td>8</td>
<td>-0.01333</td>
<td>-6.40794**</td>
<td>-4.95708**</td>
</tr>
<tr>
<td>9</td>
<td>-0.0076</td>
<td>-3.65404**</td>
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</tr>
<tr>
<td>10</td>
<td>-0.0044</td>
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<tr>
<td>11</td>
<td>-0.00663</td>
<td>-3.18597**</td>
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</tr>
<tr>
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<tr>
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<tr>
<td>18</td>
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<td>19</td>
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<td>-2.97654**</td>
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<td>20</td>
<td>-0.00364</td>
<td>-1.74843</td>
<td>-0.68643</td>
</tr>
</tbody>
</table>

Note: If the t-statistics is larger in absolute value than 1.96 or 2.58, the relevant AARs are statistically non-zero at the 5% and 1% level of significance respectively. *, ** indicate significance at 5% and 1% level respectively.
day -20 to day +60, the CAR is significantly negative with $t = -8.75$. Further probing shows that the pre-event CAR from day -20 to -1 is not significant, while the on-event CAR from day 0 to day 2 are significant at 1 per cent level. The post-event CAR from day +3 to +60 are significantly negative at 1 per cent level. In fact, the negative effect in the post-event period is so high that it wipes out the 3.3 per cent gains on days 0, 1, and 2 after which it makes a negative return of 19.7 per cent from day 3 to day 60. A careful examination of the data suggests that these abnormal returns, i.e., positive on ex-day and negative on post-split, are probably not caused by outliers. Even after deleting the firms with ex-date returns in the top decile, and post-split returns in the lowest decile, the results remain virtually the same.

These results point to the fact that the euphoria regarding stock splits is very short-lived and dies immediately after. This probably suggests that after the split, the investors have a re-look at the fundamentals of the companies and this drives the prices nearer to their intrinsic values. The results are in line with that of Ikenberry, Rankine and Stice (1996) for the US and Mishra (2007) for India.

It may also be interesting to compare the share trading volumes in the pre- and post-split periods. Table 3 presents some of the indicators relating to the same for the average of 60 days immediately preceding and 60 days immediately following the split execution. The turnover and split-adjusted traded quantity have not been significantly different in the two periods. But, the number of transaction and the average size of transaction have been significantly higher and lower respectively in the post-split period. This suggests that the overall money and the number of shares involved in the transactions have not changed significantly, but the size of investors at play have become significantly smaller after the split.

### Table 3: Volume-related Comparison of Pre- and Post-Split Periods

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Pre-split Mean</th>
<th>Post-split Mean</th>
<th>t-Stat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turnover (Rs crore)</td>
<td>6.0443</td>
<td>6.8085</td>
<td>-1.299</td>
</tr>
<tr>
<td>Traded quantity</td>
<td>355423</td>
<td>337371</td>
<td>0.366</td>
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<tr>
<td>No. of transactions</td>
<td>975.578</td>
<td>1776.079</td>
<td>-4.676**</td>
</tr>
<tr>
<td>Average size of</td>
<td>0.0039</td>
<td>0.0023</td>
<td>7.418**</td>
</tr>
<tr>
<td>transaction (Rs crores)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:** If the t-statistics is larger in absolute value than 1.96 or 2.58, the relevant AARs are statistically non-zero at the 5% and 1% level of significance respectively. *, ** indicate significance at 5% and 1% level respectively.

### Cross-sectional Regression Analysis

The significantly positive return on the split execution and the highly negative CAR from the third day of split need further empirical investigation. A cross-sectional regression analysis is made to identify the factors that contribute towards the highly positive return on execution and significantly negative cumulative return in the post-execution period. The regression models can be represented as follows:

\[
\text{Day 0 return} = a + b_1PB + b_2\text{PMAR} + b_3\text{VOLUMER} + b_4\text{MCAP} + b_5\text{RUNUP} + b_6\text{TS} + \varepsilon \tag{12}
\]

\[
\text{CAR(+3to+ 60)} = a + b_1PB + b_2\text{PMAR} + b_3\text{VOLUMER} + b_4\text{MCAP} + b_5\text{RUNUP} + b_6\text{TS} + \varepsilon \tag{13}
\]

where, $PB =$ average price to book value of the 60 days prior to split, $\text{PMAR} =$ ratio of the firm’s share price at the close of the previous month to the average share price of all companies on the same day, $\text{VOLUMER} =$ 60-day post-split trading quantity over 60-day pre-split trading quantity, $\text{MCAP} =$ logarithm of the market value of the firm 10 days prior to the split, $\text{TS} =$ (Turnover$_{\text{post}}$/Number of transactions$_{\text{post}}$) over a 60 day period / (Turnover$_{\text{pre}}$/Number of transactions$_{\text{pre}}$) over a 60 day period. RUNUP = price increase from day -60 to day -10. 

The results are presented in Table 4. The regression equations are run, first with the dependent variable as the on-event return on day 0, and then with the post-event return on day +3 to +60.
period CAR beginning on day +3 to day +60 as dependent variables. Day +3 to +60 is used, rather than day +1 to +60, because the negative phenomenon seems to have started from day +3 (see Table 1). While running the multivariate regression equation, stepwise method has also been used to find the model with most parsimony. In case of Day 0 return, the coefficients of the variables that relate to the small firm hypothesis (MCAP) and the liquidity hypothesis VOLUMER turn out to be significant with t-statistics of -3.261 and 2.131 respectively (Table 4, Panel A, stepwise model). The significance of the positive constant term means that return on the event has been positive regardless of the other variables involved. The remaining variables do not present any significant result. The negative MCAP implies that the smaller companies received attention on stock splits and were in more demand triggering the high return on ex-day. The positive coefficient of VOLUMER (proxy for liquidity hypothesis), suggests that those firms with relatively higher post-split traded quantity compared to the pre-split period, earn higher returns. It may be pointed out here that the overall traded quantity did not show any significant difference between pre- and post-split periods (Table 3). Thus, the regression result only says that firms whose liquidity was relatively better in the post-split period witness higher returns on execution. The positive market reaction on the ex-split day, therefore, seems to be explained by the small firm hypothesis as well as the liquidity hypothesis.

The post-split CAR of +3 to +60 has been used in a regression equation to understand which variables explain the drastic post-event negative returns to the shareholders. According to the results in Table 4, the significant negative constant implies negative returns irrespective of the variables in the regression. Among the explanatory variables, RUNUP, MCAP, and TS have been the significant ones. This implies that those firms which had the higher price run-ups prior to the split are the ones with the lower returns in the post-split period. The high increases in prices before the split were therefore, not according to fundamentals and the splits have actually induced a revision of optimistic valuations of these firms. Probably, this revaluation has pushed the prices down. The coefficient for MCAP (size of firms) has been significantly positive and this suggests that the smaller the firms, the smaller the returns in the post-split period. The observation from equation 12, that many smaller firms have witnessed a high return on execution, because of a spurt in demand on split execution, was actually a market mis-reaction and the correction process began soon after the second day of the split. The post-split negative coefficient for MCAP supports this contention. The third significant variable is that of TS (average size of transaction) which has a positive relation with the post-split CAR. The smaller, the size of the transaction in the post-split period relative to the pre-split period, the lower the return is, i.e., firms which have attracted more small investors have experienced lower returns. The negative returns during the post-split period along with the observation of lower post-split size of transaction (Table 3) suggests the presence of smaller investors who have suffered the most of post-split loss.

In order to test for the robustness of the findings, regressions have also been run by changing the inputs. For example, average PB (price to book value ratio) was calculated from days -60 to -31, VOLUMER (proxy for liquidity) was calculated for various ranges of days as 30 days preceding and 30 days following, 10 days preceding and following, 3 days preceding and following, MCAP (size of firms) was calculated for an average of 15 days before the split, RUNUP (price movement before split execution) was calculated for 250 days prior to the split. TS was used over the period 30 days preceding and 30 days following. The results were qualitatively the same as reported in Table 4.

To sum up, the findings reveal the following. On the split execution, the smaller firms as well as those for which trading volume increased during the post-split period, are the ones which generate euphoria. This creates a positive abnormal return for the shareholders. But soon afterwards, the small firms which have witnessed a price increase on the split execution, along with those firms which had experienced a pre-split price increase (RUNUP), have faced market revaluations and the price levels seemed to be moving much below the pre-split levels causing an approximately 19.7% (Table 2) wealth reduction for shareholders in the post-split period alone. The observations seem to suggest that the investors initially interpret these firms to have more positive potentials, but are disappointed as post-split events unfold, similar to what Ikenberry, Rankine and Stice (1996) report for the US market for a period one year after the split.
It also appears that smaller investors are lured into the market to purchase the stocks on split execution, and once the prices are high with higher demand, the larger informed players seem to exit the market. The uniformed smaller investors are then left with stocks whose prices are above fundamentals and which quickly fall to move closer to their intrinsic levels. The small investors, thus, suffer enormous losses on the whole. This may have implications for the regulators in protecting the smaller investors.

CONCLUSION

Lakonishok and Lev (1987) refer to the stock splits as just a finer slicing of a given cake, and therefore, should have no effect on the market behaviour around stock splits. Yet, empirical evidence in the US and some other markets concludes that splits tend to impact the share price beyond the theoretical expectation. To the author’s knowledge, except for Mishra (2007), no such evidence on Indian markets is available. This study attempts to contribute to the literature by studying a longer time period and addressing additional research issues, such as explaining why the market reacts in the manner observed in the study. Thus, this study examines the market behaviour surrounding split execution in the Indian market for the period from March 1999 to December 2008.

In line with the results of many other studies, significantly abnormal returns are found on the day of split execution. The regression analysis suggests that the positive reaction can be attributed to the small firm hypothesis and liquidity hypothesis. The result for the post-split period is characterized by abnormally high negative returns which wipes out much more than the positive gain during the split execution. This seems to be mostly explained by the pre-split price RUNUP, MCAP (firm size), and the TS (size of transaction) suggesting that the firms which have experienced a high pre-split increase in price as well as the relatively, smaller firms are the ones which suffer the worst returns. Since the coefficient of transaction size (TS) is significantly positive, along with the observation that average transaction size has declined on ex-day and post-split period suggests higher trading intensity of smaller investors who suffer the maximum loss of post-split period. A spurt in demand by small investors causing market over-reaction and followed by severe negative performance is what characterizes the Indian stock splits. The smaller investors seem to be lured to purchase the stocks on split execution, while the informed larger players exit the same when the prices are at their peaks leaving the uninformed small traders with over-priced stocks, who suffer the maximum loss of post-split period. These findings may have immense implications for the smaller investors in designing their trading strategies. There may also be implications for the market regulators in protecting the small investors.

Table 4: Results of Regression on Ex-day and Post-execution Abnormal Returns

<table>
<thead>
<tr>
<th>Variables</th>
<th>Panel ADay 0 Return (Equation 12)</th>
<th>Panel BCAR (3 to 60) (Equation 13)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Full Model</td>
<td>Stepwise (reduced) Model</td>
</tr>
<tr>
<td>Constant</td>
<td>0.060 (4.070)***</td>
<td>0.063 (4.598)***</td>
</tr>
<tr>
<td>PB</td>
<td>0.000 (.771)</td>
<td>-</td>
</tr>
<tr>
<td>PMAR</td>
<td>0.000 (-1.121)</td>
<td></td>
</tr>
<tr>
<td>VOLUMER</td>
<td>0.006 (2.135)*</td>
<td>0.005 (2.131)*</td>
</tr>
<tr>
<td>MCAP</td>
<td>-0.007 (-2.849)**</td>
<td>-0.007 (-3.261)**</td>
</tr>
<tr>
<td>RUNUP</td>
<td>0.003 (.331)</td>
<td>0.101 (2.142)*</td>
</tr>
<tr>
<td>TS</td>
<td>0.063</td>
<td>0.054</td>
</tr>
<tr>
<td>R²</td>
<td>0.040</td>
<td>0.046</td>
</tr>
</tbody>
</table>

Note: (a) $PB = \text{Average price to book value of the 60 days prior to split}, PMAR = \text{Ratio of the firm’s share price at the close of the previous month to the average share price of all companies on the same day}, VOLUMER = \text{60-day post-split trading quantity over 60-day pre-split trading quantity}, MCAP = \text{Logarithm of the market value of the firm 10 days prior to the split}, TS = (\text{Turnover pre}/\text{Number of transactions pre}) over a 60 day period/ (\text{Turnover post}/\text{Number of transactions post}) over a 60 day period. RUNUP = Price increase from day -60 to day -10. (b) Figure in parentheses are the t-statistics. If the t-statistics is larger in absolute value than 1.96 or 2.58, the relevant AARs are statistically non-zero at the 5% and 1% level of significance respectively. *, ** indicate significance at 5% and 1% level respectively.
ENDNOTES


2. To ensure robustness of the findings, regressions were also run by changing the inputs, for example, PB was also computed as the average of days -60 to -31. Similarly, inputs for other independent variables were also changed.

3. If the split date fell within the first 10 calendar days, the previous to previous month closing price was considered so as to avoid the period immediately preceding the split, as the price may be influenced by the imminent split execution. However, this decision is arbitrary.

4. An investigation was also made excluding those companies which had made a dividend announcement along with that of split. For this pure sample, too, the results were the same. Further, investigation was also made with the estimation period as days -270 to -21 before the ex-day. The results were virtually the same. These results are available on request.

5. The stepwise procedure selects the variables based on the highest $R^2$ of the regression, thereby eliminating any redundant variables and avoiding any possible multi-collinearity among the remaining variables.

6. The insignificant price to book value factor, which is a proxy for signalling, is understandable as there was no new information on split execution and so the signalling hypothesis could not have had any impact at this point in time; if it all, signalling would have any effect, it was expected on the announcement. The other factors are eliminated mostly because of the problem of multi-collinearity.

7. An examination of the average size of the transaction (TS) reveals that on day zero, the same has been significantly lower than that of the pre-split period ($t=9.789$), indicating entry of smaller investors. Similarly, as reported in Table 3, the post-split average size of the transaction has been significantly lower than that of pre-split ($t=7.418$), implying higher trading intensity of smaller investors.

REFERENCES


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**Madhumita Chakraborty** is an Assistant Professor in the Accounting and Finance Area at the Indian Institute of Management (IIM), Lucknow. She has taken her Ph.D from the Faculty of Management Studies, University of Delhi.

e-mail: madhumita@iiml.ac.in