POST-GRADUATE STUDENT RESEARCH PROJECT

Stock Splits: Reasons and valuation effects

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Abstract

Maximising shareholder wealth has been a driving force for all corporate actions including stock splits. There have been numerous empirical studies covering diverse aspects of a stock split. The splitting company's stock price has been seen to react differently through the stages of the split life-cycle, starting from the event announcement date to the record date, and even beyond. While some researchers believe that stock split announcements are a signal of the management's optimism about the company's future earnings, others argue that the firms use the positive reaction to the split announcement to raise more funds at a higher price after the split. Yet others believe that a split is meant to boost liquidity.

The results of the current study indicate that in the post-announcement period, while the stock prices of the firms that announce the split earned only insignificant excess returns over the broad market, the firms announcing the split were successful in increasing the liquidity of their stocks. The historical price movement indicates that for a given holding period (5-day, 10-day, 30-day, 60 day and 360 day), buyers of stock in the post-split period are inadequately rewarded compared to the pre-split/pre-announcement buyers.

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Stock Splits: Reasons and valuation effects

1. Introduction

A stock split is a corporate action in which a company divides its existing shares into multiple shares. Conceptually, a stock split event is not expected to materially affect a splitting company's financials. The splitting company's existing shareholders continue to hold the same percentage holding in the company before and after a stock split. Despite these theoretical aspects, a company's stock split announcement has been observed to be a net positive impact event. After a split, new investors might be interested in buying the stock as it is available at a lower price, in the hope that they would stand to gain (reverse split events—wherein the stock price is higher—have been non-existent for the time period in question).[1] Do such investors actually end up gaining? A stock split may have no impact on the value of the investment if the fundamentals of the company remain the same. However, one would expect the market forces of demand and supply to determine the true price for the share as the liquidity increases and more floating shares become available after the split. The price performance of the share depends on the state of the market in addition to the fundamentals of the company. Hence, would it be right to argue that if the company fundamentals are strong, the stock will trade up and vice versa?

These questions highlight that it is extremely important for investors to understand the intentions and the objectives of a firm that goes for a split. This paper addresses these questions in the Indian context. The aim of this paper is to examine four important aspects related to the stock split event: the effect on the liquidity of firms that go in for a split; the trading range hypothesis related to the impact on stock price; the signalling hypothesis related to the company's growth prospects; and the multiple events hypothesis. The study focused on companies listed on the National Stock Exchange (NSE) in India.

The paper is organised as follows. The following section presents a review of the existing literature on corporate stock splits. Section 3 discusses the data sample collection process, the

[1] A reverse stock split is a process by which shares are effectively merged to form a smaller number of proportionally more valuable shares. Investors who purchased the shares before the split may stand to benefit from the increased share price resulting from the reverse split.

characteristics of the sample firms, and the methodology used in the study. Section 4 presents the results of the study and section 5 concludes the paper.

2. Literature Review

2.1 Liquidity Hypothesis

The liquidity hypothesis states that splits provide better liquidity and reduce trading costs. The positive valuation effects of split announcements that have been reported in the literature can be explained using the liquidity hypothesis (Fama et al., 1969; Asquith et al., 1989; Grinblatt et al., 1984; Malony and Mulhering, 1992; Conard and Conroy, 1994). Baker and Gallagher's (1980) survey of chief financial officers (CFOs) found that for companies with a stock split, over 98% of the CFOs felt the split helped "make it easier for small stockholders to purchase round lots"; 94% of the group responded that stock splits allowed them to keep the stock price in an optimal range. In related research, Lin et al. (2009) studied split factor choices and the rationale for companies not to choose a high split factor.[2] In the sample set of our study, about 41% of the firms had a split factor of 5, 30% had a split factor of 10, 20% had a split factor of 2, and 9% of the firms came under other split categories.

2.2 Trading Range Hypothesis

According to the trading range hypothesis, splits help firms to create an optimal ticket size for the stock. The trading range has been observed to be associated with illiquidity. Illiquidity is expected to increase if the firm's stock prices trade below their optimal price level. The hypothesis argues that keeping the stock within a lower price range would attract a larger ownership base, providing better liquidity and thereby reducing the cost of trading in the stock. This paper analyses the post- and the pre-announcement drift in stock prices and volume to verify the trading range hypothesis.

[2] A split factor here refers to the adjustment factor. For example, a 2 for 1 stock split refers to an action wherein the face value of a stock is cut in half and after the split execution date, there will be twice the number of shares of that stock.

Ikenberry et al. (1996) and Desai and Jain (1997) reported a positive drift during the one-year period after the announcement of stock splits from 1975 to 1991 and from 1976 to 1992, respectively. Subsequently, Daniel et al. (1998) based their model on psychological or behavioural biases supporting the semi-strong efficient markets paradigm. Fama (1998) argued that the long-term anomalies reported in the previous literature were not sufficient to disprove the efficient markets paradigm, which holds that market efficiency will depend on how information is factored into the price. Fama (1970) proposed three types of efficiency: strong-form; semi-strong form; and weak efficiency. In the weak form, the information would include only historical prices, which could be predicted from the historical price trend, while in the semi-strong form, all public information and company announcements would already be reflected in prices. The strong form would be one where all information sets including private information are incorporated in the price trend. The findings reported in Byun and Rozeff (2003) supported the the long-run positive performance of two-for-one stock splits in particular. Byun and Rozeff (2003) concluded that the markets are efficient with respect to such splits. Boehme and Danielsen (2007) reconciled the conflicting findings of two nearly simultaneous studies by Ikenberry and Ramnath (2002) and Byun and Rozeff (2003); they showed that the long-run post-announcement drift that previous studies reported (referred to as the "post-split" drift) actually occurred during a much shorter window, and that the short-duration return drift was related to market frictions rather than a behavioural bias.

2.3 Signalling Hypothesis

The signalling hypothesis states that stock splits are used by firms to signal the firm's favourable future and its earnings growth prospects. Gupta and Kumar (2007) analysed split events from 1999 to 2004 for a sample of 60 Indian stocks. They reported significant positive abnormal returns on the day following the announcement, but negative returns during subsequent periods. Dyl and Elliot (2006) concluded that firms manage their share prices "to reflect the desires of the firm's owners". Menendez and Anson (2003) pointed out that in addition to signalling, firms that go for a split focus on improved liquidity and an optimal trading range.

Another aspect that is usually discussed within the ambit of the signalling hypothesis is whether splits involve the reduction of informational asymmetries. The rationale behind this is the argument that a split transmits signals that were previously only privately known to the markets

(Easely et al., 2001). Past evidence on how splits reduce informational asymmetries have been mixed and, to a large extent, limited. If the split is assumed to send signals to the market and to contribute to any reduction in informational asymmetries, the price subsequent to the split should be reflective of these signals captured by the market. This paper examines whether the firms that used stock splits to signal positive growth reported an increase in earnings/growth attributes post the split announcement. This is analysed by using fundamental ratio variables such as price-to-earnings (P/E) ratio, price-to-book (P/B) ratio, earnings per share (EPS), and sales growth in percentage to understand whether the firm has moved from being a growth stock to a value stock, or vice versa.

Wulff (2002) studied German firms; the findings were similar to the results reported by prior studies dealing with U.S. firms. Wulff (2002) highlighted the legal restrictions that limit the German firms from using stock splits for signalling. The paper also produced evidence of substantial increases in liquidity in contrast to the empirical findings in the U.S. and other capital markets. In the Indian context, Joshipura (2008) studied the price and the liquidity effect associated with the split around the time of the announcement and on the effective day; the study showed that the stock split event does not impact shareholder wealth but does improve the liquidity of the stock significantly. Banerjee's and Nagar (2010) contributed to the existing literature by providing additional insights into existing theories about abnormal returns; they also analysed the impact of other factors such as market capitalisation, book–to-market ratio, average trading volume, promoter holdings, and institutional stock holdings. Banerjee et al. (2012) focused on the implications of the expectations of future profitability signalled by the splits on the ownership pattern of individual and institutional investors such as foreign investors (FIs) and foreign institutional investors (FIIs).

2.4 Multiple Events Hypothesis

A few prior studies also focused on why firms issue equity after splitting stocks. It is argued that firms split their stocks to reveal information and then issue stocks after a split in the hope that the share price will be higher. The intention of such firms is to use the positive impact of the higher prices to raise more funds after the split (D'Mello et al., 2003). This is known as the multiple events hypothesis. This paper looks at firms in India that have issued equity following a split to examine whether this hypothesis holds true in the Indian context.

3. Data and Methodology

The stock split samples in this paper were obtained from the Bloomberg database; the focus was on firms on the CNX 100 index (an NSE index for Indian listed firms) that reported splits in the period between January 1, 2002 and May 31, 2013. Additional criteria were also considered before a stock split event could qualify for inclusion in this research:

1. The common stock must trade on the NSE and must be an ordinary common stock of an India-domiciled corporation.
2. The stock split announcement date must appear in the Bloomberg database.

The sample universe used was the CNX 100 index. The CNX 100 is a diversified 100 stock index accounting for 38 sectors of the Indian economy. The CNX 100 was chosen because it represents about 80.81% of the free-float market capitalisation of the stocks listed on the NSE; the total traded value of all index constituents for the last six months ending June 2013 is approximately 73.11% of the traded value of all stocks on the NSE. A total of 44 firms announced a split between the period of January 2002 and May 2013 and all of these firms constituted our sample.

In order to examine whether the multiple events hypothesis was valid in the Indian context, all the firms that had issued equity in the time frame under test were considered. Of these firms, the following companies were excluded:

1. Firms that offered equity prior to the split announcement date.
2. Firms that issued equity outside the window of around 365 days post the announcement of a split (since split news has been observed to have the greatest impact within the period of 365 days).

To test the price and liquidity effects on the firms that announced a split, we used the following window lengths before and after the split (AD refers to the announcement date and ED stands for the execution date of the split):

1. **Pre-announcement window:** Price and volumes over a trading window of 1 day (AD-1), 5 days (AD-5), 10 days (AD-10), 30 days (AD-30), 60 days (AD-60), and 360 days (AD-360) before the split were observed. This data was compared with the price and liquidity

increase/decrease post the announcement to examine whether the split event contributed to the increased tradability of the stock.

2. **Window between AD and ED:** The number of days between the announcement date and the execution date was different in each case of the split; hence, the length of this window would be different for each firm in the sample. If the split is assumed to send signals to the market and contribute to any reduction in informational asymmetries, the price subsequent to the announcement of the split and before/on the execution date should be reflective of the signals captured by the market.
3. **Post-announcement window:** The window used in this context not only captured the period between the AD and ED but also included a sufficient period post the execution date. The window would include 1 day (AD+1), 5 days (AD+5), 10 days (AD+10), 30 days (AD+30), 60 days (AD+60), and 360 days (AD+360) after the split announcement date (AD). The average gap between AD and ED was around 33 days for a 1-for-2 split, 60 days for a 2-for-1 split, 45 days for a 5-for-1 split, and 45 days for a 10-for-1 split, among others.

4. Results

4.1 Liquidity and Trading Range Hypotheses

The liquidity and the trading range hypotheses contend that splits help firms to create an optimal ticket size for the stock, which provides better liquidity and thereby reduces trading costs. The increase in liquidity would be a result of the stock being traded at the optimal ticket size; hence, the two hypotheses have been combined for the analysis here.

Hypothesis 1: Splitting firms enjoy increased liquidity post the split announcement.

In order to understand the liquidity hypothesis, information on the 5-day average value traded for the different trading windows mentioned above (post-announcement window, pre-announcement window, and the window between AD and ED) for all the firms that split between January 1, 2002 and May 31, 2013 was obtained. The change in the 5-day average value traded was considered an appropriate test parameter, as it has been observed to capture the net change in liquidity for the split firm. This is because the 5-day average avoids the problems of non-

synchronicity where some stocks may only trade for a day/a few days. The 5-day average also flattens the short-term momentary surge or decline in volume caused by the occurrence of any event. The general behaviour of the price of the split stocks before and after the announcement was then analysed to understand the impact on price in relation to all the other factors. The percentage increase/decrease in price for each category of splits was compared to the relative performance of the Nifty index during the same period. It is to be noted that the CNX 100 index came into existence in 2006; for consistency across the test period, Nifty was used as a comparison index.

The movement in stock price relative to the overall movement of the Nifty index before and after the announcement of the split and the changes in the 5-day average value traded were subjected to the following hypothesis test:

Null Hypothesis: *X-bar* <= 0%

Alternate Hypothesis: *X-bar* > 0%

X-bar for the purposes of this test would be the movement in stock prices or the movement in average value traded.

The results of the test are summarised below:

1. From the hypothesis test on the relative performance of individual stocks on CNX 100 as against those on Nifty, it was observed that the stock prices experienced an increase over and above the market for most of the pre-announcement periods (AD-10, AD-30, AD-60, and AD-360) at a 95% confidence level. In the post-announcement period, excess returns were noted only in the case of AD+1 (the day immediately following the split). When tested at a 90% confidence level, the results were no different except that the excess returns were observed for one additional test period (AD-1) in addition to those observed at the 95% level of confidence. This result is suggestive of two things:
    a. Statistically significant outperformance of the stocks in the pre-announcement period indicates gaps in market efficiency and potential information asymmetry about the split.
    b. Post-split underperformance (at 90% and 95% confidence intervals) as against the outperformance at the pre-announcement stage suggests that post-split buyers for the stock may be inadequately rewarded compared to the pre-announcement buyers.

Table 1 and Table 2 present the results of the hypothesis test on stock price relative to Nifty in the post-announcement and pre-announcement periods, respectively. The results are based on a *t*-statistic value at 95% and 90% confidence levels.

Table 1: Movements in Price Relative to Nifty in Post-Announcement Period

	Days Following Split Announcement					
Hypothesis Test: Price relative to Nifty	1	5	10	30	60	360
Mean (*x*)	1%	1%	2%	3%	24%	42%
Std. Dev.	0.04	0.07	0.09	0.15	1.39	2.21
t-value	1.73	1.12	1.29	1.17	1.13	1.25
p-value	0.04	0.13	.10	.12	.13	.10
Tabular values at 95% confidence	1.68	1.68	1.68	1.68	1.68	1.68
N	44	44	44	44	44	44
X-bar	0%	0%	0%	0%	0%	0%
Reject Null Hypothesis at 95% confidence?	Yes	No	No	No	No	No
Tabular values at 90% confidence	1.30	1.30	1.30	1.30	1.30	1.30
Reject Null Hypothesis at 90% confidence?	Yes	No	No	No	No	No

Table 2: Movements in Price Relative to Nifty in Pre-Announcement Period

	Days Before Split Announcement					
Hypothesis Test: Price relative to Nifty	-1	-5	-10	-30	-60	-360
Mean (*x*)	1%	1%	2%	3%	5%	65%
Std. Dev.	0.04	0.05	0.07	0.12	0.17	0.87
t-value	1.33	1.00	1.86	1.70	2.09	4.95
p-value	0.09	.16	.03	.05	.02	.00
Tabular values at 95% confidence	1.68	1.68	1.68	1.68	1.68	1.68
N	44	44	44	44	44	44
X-bar	0%	0%	0%	0%	0%	0%
Reject null hypothesis 95% at confidence?	No	No	Yes	Yes	Yes	Yes
Tabular values at 90% confidence	1.30	1.30	1.30	1.30	1.30	1.30
Reject null hypothesis at 90% confidence?	Yes	No	Yes	Yes	Yes	Yes

2. The hypothesis test on the movement in the 5-day average value traded of individual stocks showed that the average value traded experienced an increase for the following periods at 95% level of confidence:

   a. Post-announcement windows AD+1, AD+5, AD+60, and AD+360 with an average increase of 10%, 27%, 90%, and 247%, respectively (Table 3).

   b. Pre-announcement windows AD-5, AD-10, AD-30, and AD-360 with an average increase of 51%, 56%, 58%, and 763%, respectively (Table 4).

   The results at 90% confidence level indicate positive returns over AD-1 and AD+30 in addition to the periods observed at 95% confidence level. This emphasises that although the prices did not earn any excess return over the market in the post-announcement period, the overall value traded of the stock showed an increase in the different intervals mentioned in the post-announcement and pre-announcement periods.

   Table 3 and Table 4 present the results of the hypothesis test on average value traded in the post-announcement and pre-announcement periods, respectively. The results are based on a *t*-statistic value at 95% and 90% confidence levels.

Table 3: Change in Average Value Traded in Post-Announcement Period

	Days After Split Announcement					
Hypothesis Test: Average value traded	1	5	10	30	60	360
Mean (*x*)	10%	27%	51%	24%	90%	247%
Std. Dev.	0.259	0.721	3.647	1.148	2.943	6.604
t-value	2.65	2.47	0.93	1.39	2.02	2.48
p-value	0.005	.008	.18	.1	.02	.008
Tabular values at 95% confidence	1.68	1.68	1.68	1.68	1.68	1.68
N	44	44	44	44	44	44
X-bar	0%	0%	0%	0%	0%	0%
Reject null hypothesis at 95% confidence?	Yes	Yes	No	No	Yes	Yes
Tabular values at 90% confidence	1.30	1.30	1.30	1.30	1.30	1.30
Reject null hypothesis at 90% confidence?	Yes	Yes	No	Yes	Yes	Yes

Table 4: Change in Average Value Traded in Pre-Announcement Period

	Days Before Split Announcement					
Hypothesis Test: Average value traded	-1	-5	-10	-30	-60	-360
Mean (*x*)	33%	51%	56%	58%	277%	763%
Std. Dev.	1.501	1.381	1.170	1.515	15.513	24.961
t-value	1.45	2.46	3.15	2.53	1.19	2.03
p-value	0.1	0.009	0.001	.007	.121	.024
Tabular values at 95% confidence	1.68	1.68	1.68	1.68	1.68	1.68
N	44	44	44	44	44	44
X-bar	0%	0%	0%	0%	0%	0%
Reject null hypothesis at 95% confidence?	No	Yes	Yes	Yes	No	Yes
Tabular values at 90% confidence	1.30	1.30	1.30	1.30	1.30	1.30
Reject null hypothesis at 90% confidence?	Yes	Yes	Yes	Yes	No	Yes

3. Combining the results of these tests, one can conclude that splitting firms were able to increase the liquidity of their stock in the post-announcement period, thereby supporting the liquidity hypothesis.

   a. **Intervals of excess price return over the market:**

      Post-announcement window AD+1, with an average excess return of 1% (Table 1).

      Pre-announcement windows AD-1, AD-5, AD-10, AD-30, AD-60, and AD-360 with an average excess return of 1%, 1%, 2%, 3%, 5%, and 65%, respectively (Table 2).

   b. **Intervals of positive percentage change in value traded:**

      Post-announcement windows AD+1, AD+5, AD+60, and AD+360 with an average increase of 10%, 27%, 90%, and 247%, respectively (Table 3).

      Pre-announcement windows AD-5, AD-10, AD-30, and AD-360 with an average increase of 51%, 56%, 58%, and 763%, respectively (Table 4).

c. **Intervals of suggestive increased liquidity:**

Post-announcement windows AD+5, AD+60, and AD+360; pre-announcement windows AD-5 and AD-60.

This increased liquidity could also be indicative of the optimal ticket size for the stocks as expressed under the trading range hypothesis.

In addition to the pre-announcement and post-announcement intervals, the movements in price between the execution date (ED) and the announcement date (AD) were tracked. The results of this test (presented in Table 5) indicate that there were no excess returns over the short run (AD+5) while there were minimal excess returns over the longer term (AD+5, AD+30, AD+60 and above).

Table 5: Movements in Price Relative to Nifty in the ED-AD Interval

Difference between ED and AD in days	No. of Firms	Average Excess Returns over Nifty
Less than 5	1	-1%
5–10	3	1%
10–30	19	2%
30–60	5	4%
60 and above	16	5%

4.2 Signalling Hypothesis

According to the signalling hypothesis, stock splitting firms signal positive future expectations and the intent to increase growth.

Hypothesis 2: Splitting firms show an increase in positive earnings post the split announcement and tend to change their average attributes, i.e., from being value stocks, they turn into growth stocks.

In order to test the signalling hypothesis, the fundamental attributes that determined the growth and the value characteristics for firms were identified. The parameters that were used to identify a value stock were the trailing 12 months' price-to-earnings (P/E) ratio and the price-to-book (P/B) ratio. The parameters that were used to identify a growth stock were the earnings per share (EPS) and sales growth in percentage over the years of study. Data on these parameters were

obtained from the Bloomberg database. For all the years under study, the firms that constituted the CNX 100 index were assigned a rank based on these parameters.

The results of the test are summarised in Table 6.

Table 6: Results of Test of the Signalling Hypothesis

Parameter	**Percentage of Firms**
Transition from value firms to growth firms	20%
Transition from growth firms to value firms	23%
Firms that moved **up** both value and growth rankings	25%
Firms that moved **down** both value and growth rankings	14%
Firm with insufficient data for rankings	18%

For the sample set, there was no trend or inclination of the split firms to move from value stocks to growth stocks, or vice versa. Around 45% (20% + 25%) of the firms moved up the growth rankings while 48% (23% + 25%) of them moved up the value rankings.

Table 7a and Table 8a provide the ranks of each of the split firms along the value chain and the growth chain, respectively, for the years following the announcement of the split. Table 7b and Table 8b summarise the results of Table 7a and Table 8a, respectively.

Each of the split firms' movements along the value track were traced using two ratios—price-to-earnings (P/E) ratio and price-to-book (P/B) ratio. Both these ratios for the stocks listed on the CNX 100 index were calculated for the period January 1, 2002 to May 31, 2013. The firms were then assigned a rank on a scale of 1–100 (1 being the highest) for each year. The firms that reported lower P/E and P/B ratios compared to the rest of the firms during a particular year were assigned a higher rank. Once this was done, a combined rank was assigned by providing equal weightage to both the parameters (P/E ratio and P/B ratio). The combined ranks across the different years are documented in Table 7a.[3]

Consider Sample 1 in Table 7a, for example. The firm announced a split in 2002 and ranked 56 in the value parameters in 2003. During 2004–2013, the firm moved down the value ranking to a

[3] The following notations have been used in Table 7a: "NA" means either that the firm was not listed in the index that year or that no data was available in the Bloomberg for that year; "U" indicates that the firm moved up in ranking; "D" indicates that the firm moved down in ranking; "Neutral" indicates that there was no relative movement in ranking, i.e., the closing rank in 2013 was the same as the opening rank in 2003.

low of 90; the same firm moved down the growth ranking (refer Table 8a) years after the split, with a closing rank of 37 that was consistent with its opening rank in 2003.

Table 7a: Ranks and Movement along the Value Chain

	Split AY*	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Rank Mvmt
Sample 1	2002	56	72	68	69	68	77	47	79	83	80	90	D
Sample 2	2003	NA	NA	NA	NA	NA	NA	NA	66	65	80	81	D
Sample 3	2003	NA	NA	NA	NA	NA	NA	68	58	62	40	24	U
Sample 4	2003	NA	NA	NA	NA	NA	NA	NA	33	38	28	28	U
Sample 5	2004		NA	NA	NA	NA	81	70	67	78	73	64	U
Sample 6	2004		20	57	69	82	81	73	63	66	62	55	D
Sample 7	2004		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sample 8	2004		NA	NA	NA	NA	NA	NA	NA	NA	79	80	D
Sample 9	2004		NA	NA	NA	NA	NA	NA	75	63	39	33	U
Sample 10	2005			NA	NA	NA	NA	57	30	27	52	33	U
Sample 11	2005			47	39	32	46	28	44	61	66	69	D
Sample 12	2005			73	67	56	28	69	NA	73	52	60	U
Sample 13	2005			67	58	54	63	73	51	57	70	64	U
Sample 14	2005			59	64	66	85	70	79	89	90	90	D
Sample 15	2005			21	22	11	5	47	21	29	11	9	U
Sample 16	2005			NA	NA	NA	NA	NA	33	38	28	28	U
Sample 17	2006				NA	NA	NA	NA	NA	NA	NA	91	NA
Sample 18	2006				79	87	79	71	82	84	77	77	U
Sample 19	2006				NA	NA	NA	NA	NA	NA	NA	NA	NA
Sample 20	2006				NA	NA	NA	NA	NA	NA	73	70	U
Sample 21	2006				NA	NA	NA	NA	70	55	50	42	U
Sample 22	2006				NA	51	39	58	NA	NA	64	57	U
Sample 23	2007					NA	NA	NA	NA	NA	NA	75	NA
Sample 24	2007					NA	NA	NA	66	65	80	81	D
Sample 25	2007					NA	NA	68	58	62	40	24	U
Sample 26	2007					84	62	71	42	31	61	54	U
Sample 27	2007					NA	NA	NA	NA	NA	NA	NA	NA
Sample 28	2008						NA	NA	34	31	14	12	U
Sample 29	2009							NA	47	68	72	75	D
Sample 30	2010								51	60	59	52	D

	Split AY*	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Rank Mvmt
Sample 31	2010								NA	NA	NA	NA	NA
Sample 32	2010								74	76	68	70	U
Sample 33	2010								85	81	84	81	U
Sample 34	2010								59	67	71	75	D
Sample 35	2010								83	85	74	70	U
Sample 36	2010								NA	NA	NA	87	NA
Sample 37	2010								79	83	80	90	D
Sample 38	2010								36	39	28	37	D
Sample 39	2010								33	44	51	41	D
Sample 40	2011									NA	93	92	D
Sample 41	2011									NA	NA	NA	NA
Sample 42	2011									77	76	76	U
Sample 43	2011									42	NA	56	D
Sample 44	2011									56	33	27	U

*Split AY: Split Announcement Year

Table 7b: Summary of Results

Summary of Results	Percentage Firms
Firms moved up in ranking (U)	48%
Firms moved down in ranking (D)	34%
No relative movement (Neutral)	-
No data available (NA)	18%

Each of the split firms' movements along the growth track were traced using two parameters—earnings per share (EPS) and sales growth in percentage. Both these parameters for the stocks listed on the CNX 100 index were calculated for the period January 1, 2002 to May 31, 2013. The firms were then assigned a rank on a scale of 1–100 (1 being the highest) for each year. The firms that reported a higher EPS and sales growth percentage as compared to the rest of the firms during a particular year were assigned a higher rank. Once this was done, a combined rank was

assigned by providing equal weightage to both the parameters (EPS and sales growth percentage). The combined ranks across the different years are documented in Table 8a.[4]

Table 8a: Ranks and Movement along the Growth Chain

	Split AY*	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Rank Mvmt
Sample 1	2002	37	52	58	41	53	40	59	82	45	39	37	Neutral
Sample 2	2003	NA	NA	NA	NA	NA	NA	NA	46	59	39	36	U
Sample 3	2003	NA	NA	NA	NA	NA	NA	24	50	44	21	61	D
Sample 4	2003	NA	NA	NA	NA	NA	NA	NA	57	75	49	46	U
Sample 5	2004		NA	NA	NA	NA	NA	56	58	66	74	49	U
Sample 6	2004		40	26	46	36	23	23	37	40	38	35	U
Sample 7	2004		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sample 8	2004		NA	NA	NA	NA	NA	NA	NA	NA	45	42	U
Sample 9	2004		NA	NA	NA	NA	NA	NA	65	41	35	55	U
Sample 10	2005			NA	NA	NA	NA	47	18	20	29	50	Neutral
Sample 11	2005			38	23	69	70	62	69	76	75	65	D
Sample 12	2005			NA	25	34	61	75	91	38	50	84	D
Sample 13	2005			60	46	53	82	64	31	84	51	41	U
Sample 14	2005			49	48	56	71	70	57	75	72	53	D
Sample 15	2005			34	40	21	26	72	63	61	69	77	D
Sample 16	2005			NA	NA	NA	NA	NA	57	75	49	46	U
Sample 17	2006				NA	NA	NA	NA	NA	NA	NA	32	NA
Sample 18	2006				24	33	62	36	52	41	45	36	D
Sample 19	2006				NA	NA	NA	NA	NA	NA	NA	NA	NA
Sample 20	2006				NA	NA	NA	NA	NA	66	84	56	U
Sample 21	2006				NA	NA	NA	NA	63	72	81	87	D
Sample 22	2006				NA	48	66	84	84	76	75	86	D
Sample 23	2007					NA	NA	NA	NA	NA	NA	41	NA
Sample 24	2007					NA	NA	NA	46	59	39	36	U
Sample 25	2007					NA	NA	24	50	44	21	61	D
Sample 26	2007					53	77	77	42	44	61	50	U

[4] The following notations have been used in Table 8a: "NA" means either that the firm was not listed in the index that year or that no data was available in the Bloomberg for that year; "U" indicates that the firm moved up in ranking; "D" indicates that the firm moved down in ranking; "Neutral" indicates that there was no relative movement in ranking, i.e., the closing rank in 2013 was the same as the opening rank in 2003.

	Split AY*	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Rank Mvmt
Sample 27	2007					NA	NA	NA	NA	NA	NA	NA	NA
Sample 28	2008						NA	NA	32	18	70	74	D
Sample 29	2009							32	26	64	87	84	D
Sample 30	2010								23	15	16	37	D
Sample 31	2010								NA	NA	NA	NA	NA
Sample 32	2010								49	21	49	34	U
Sample 33	2010								47	52	54	25	U
Sample 34	2010								25	67	55	35	D
Sample 35	2010								48	53	53	43	U
Sample 36	2010								NA	NA	NA	44	NA
Sample 37	2010								82	45	39	37	U
Sample 38	2010								58	56	40	59	U
Sample 39	2010								40	34	47	40	Neutral
Sample 40	2011									NA	50	65	D
Sample 41	2011									NA	NA	NA	NA
Sample 42	2011									54	32	30	U
Sample 43	2011									85	60	53	U
Sample 44	2011									40	58	69	D

*Split AY: Split Announcement Year

Table 8b: Summary of Results

Summary of Results	Percentage Firms
Firms moved up in ranking (U)	41%
Firms moved down in ranking (D)	34%
No relative movement (Neutral)	7%
No data available/Cannot be determined (NA)	18%

In order to understand the general behaviour of the firms that announced a split, the average growth and value rankings were calculated across the years. The results documented in Table 9 indicate that on average, firms that underwent a split ranked 56 based on value parameters in 2003 and moved down to a rank of 59 in 2013. Split firms ranked 37 based on growth parameters in 2003 and moved down to a rank of 51 in 2013. Thus, for the period under study, the average firm moved down the value and the growth rankings post the split announcement. However, the

fall in the growth rankings was significantly higher when compared to that in the value rankings. Thus, the results suggest that the splits did not necessarily better the top-line and/or the bottom-line growth for such firms.

Table 9:Average Growth and Value Rankings of Split Firms between 2003–2013

Years	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Average Value Ranking	56	46	56	58	59	58	62	57	60	60	59
Average Growth Ranking	37	46	44	37	45	57	54	51	53	51	51

4.2.1 Choice of split factor and impact on post- and pre-announcement returns

Research by McNicholas and David (1990) showed that the choice of the split factor signals information about future earnings and that investors revise their beliefs about the firm value based on the size of the split factor. Kuse and Yamamto (2004) also found that firms with a larger split factor had a higher return immediately after the stock split announcement. Much of this could be attributed to the fact that financial analysts tend to increase their earnings forecast when the split factor is high.

In order to understand whether the size of the split factor sent signals about the value of the firm, we calculated the correlation of the split factor to the returns on the individual stock over and above the Nifty. Evidence from the analysis documented below suggests that split factors exhibit no strong correlation with price.

Table 10: Correlation between Split Factor and Stock Returns in Excess of Nifty

Correlation Coefficient	AD-1	AD-5	AD-10	AD-30	AD-60	AD-360
	0.46	0.40	0.26	0.04	0.06	0.12
	AD+1	AD+5	AD+10	AD+30	AD+60	AD+360
	0.09	0.18	0.10	0.07	(0.22)	(0.22)

4.3 Multiple Events Hypothesis

The multiple events hypothesis posits that companies first split their stock to reveal information and then issue stocks after the split in the hope that the share price will be higher. With a higher share price, the company would raise more money through its subsequent equity offering (SEO).

Hypothesis 3: Splitting firms utilise positive increases in share prices to raise money within a stipulated time after the announcement of the split.

In order to test the multiple events hypothesis, information on all firms that announced an equity offering subsequent to the split announcement was obtained. The purpose of this test was to examine whether these firms benefitted from the positive signals and experienced an increase in prices subsequent to the split and whether these firms used such increase in prices to raise more capital from the market subsequently.

Table 11 presents the number of firms in the overall sample that went for an equity offering within a year of the announcement of the split during the period January 1, 2002 to May 31, 2013. All the firms on the CNX 100 index that announced stock splits were first identified and these firms were tracked for any equity offerings subsequent to the split. There were 19 firms in all that issued equity in the years subsequent to the year that the split was announced. However, for the purposes of our analysis, we looked at only those firms that offered equity within a year of the announcement of the split, as this would give us an indication of whether the firms intended to benefit from the increase in prices when they subsequently announced an equity offering. Only 6 firms fell within this category.

Table 11: Stock Splits and Subsequent Equity Offerings

Split Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Year of SEO*				2006					2010 (1) 2011 (3)	2011		
Number of SEOs	0	0	0	1	0	0	0	0	4	1	0	0

*SEO: Subsequent Equity Offering

The results of the hypothesis test indicate that only 14% (6 of the total 44 firms) of the firms that split between January 1, 2002 and May 31, 2013 issued equity within the AD+360 window (Table 11). Of these 6 firms, only 3 firms experienced an increase in price between the split announcement/execution date and the equity offering date. The size of the firms that went for an equity offering was insignificant; at the same time, the number of firms that registered a price increase between the split date and the equity offering date was also minimal. Hence, the assumption of the multiple events hypothesis that split firms utilise positive increases in share

prices to raise money within a stipulated time after the announcement does not hold true in the case of the Indian firms that underwent a split between January 1, 2002 and May 31, 2013.

4.3.1 Effect of the financial crisis on split announcements of Indian firms

Table 12 presents the number of stocks in the overall sample by year and by split factor that announced a forward stock split during the period January 1, 2002 to May 31, 2013. All the firms on the CNX 100 index that announced a split of any factor during this period were first identified (a total of 44 cases). From this set, firms with split factors of 1-for-2, 2-for-1, more than 2-for-1 (4-for-1, 5-for-1, and 10-for-1), and other split factors were put into different buckets. The sample dataset was formed by considering only those firms for which returns data was available on the Bloomberg database for the period under review.

Table 12: Stock Splits by Year

	Split Factor				
Year	**Other Splits**	**1-for-2**	**2-for-1**	**> 2-for-1**	**Total**
2002	0	0	1	0	1
2003	1	0	1	1	3
2004	0	1	0	4	5
2005	1	0	1	5	7
2006	0	0	0	6	6
2007	0	0	1	4	5
2008	0	0	0	1	1
2009	0	0	1	0	1
2010	0	0	4	6	10
2011	0	0	0	5	5
2012	0	0	0	0	0
Until May 31, 2013	0	0	0	0	0
Total	2	1	9	32	44

In 2008, the world economy faced its most dangerous crisis since the time of the Great Depression. The signs of crisis began when home prices went sky high in 2006–2007 and went decisively downward when the sub-prime mortgage market in the U.S. began to exhibit an increasing rate of mortgage defaults. Consumer spending and GDP fell, leading to a recession in

the U.S. In September 2008, Lehman Brothers went bankrupt and until about 2009, the U.S. witnessed a series of banking failures. The National Bureau of Economic Research concluded that the recession ended in June 2009.

Table 12 shows that for the period under consideration, 28 of the total 44 firms split in the pre-crisis period (between 2002 and 2008) and the remaining 16 firms split in the post-crisis period (after 2008, until May 31, 2013).

The effects of a split announcement on stock prices before and after the financial crisis are presented in Table 13 and Table 14, respectively.

Table 13: Average Excess Returns over Nifty (Abnormal Returns) in Pre-Crisis Period (2002–2008)

	AD-1	AD-5	AD-10	AD-30	AD-60	AD-360
Price	1%	1%	2%	4%	8%	83%
	AD+1	AD+5	AD+10	AD+30	AD+60	AD+360
	2%	3%	4%	7%	5%	13%

Table 14: Average Excess Returns over Nifty (Abnormal Returns) in Post-Crisis Period (2009–May 2013)

	AD-1	AD-5	AD-10	AD-30	AD-60	AD-360
Price	0%	1%	2%	0%	1%	30%
	AD+1	AD+5	AD+10	AD+30	AD+60	AD+360
	0%	-1%	0%	-2%	-1%	3%

The results show that the market reaction did not change to a significantly positive one in reaction to a stock split announcement in the post-crisis period, as is evidenced by the fairly negative returns or lack of excess returns over Nifty (otherwise referred to as abnormal returns) across the different windows. In contrast, positive abnormal returns were observed over a longer period before the financial crisis.

5. Conclusion

Based on the evidence from the liquidity and trading range hypothesis testing, it can be concluded that split firms have enjoyed positive price effects as against the market (CNX 100 index) in the pre-split period but the post-split excess returns over the market have been statistically insignificant. The results from the liquidity and trading range hypothesis test are thus suggestive of gaps in market efficiency. Policy makers and regulators would need to examine why this surge in volume and prices in the pre-split period is being observed. The analysis of the 5-day average value traded for split firms before and after the split announcement indicated that firms tend to benefit from an increased liquidity over the short and long run (AD+5, AD+60, and AD+360) This increased liquidity could also be indicative of the optimal ticket size for the stocks as expressed under the trading range hypothesis.

The results from the signalling hypothesis tests do not clearly indicate that the split firms transitioned from being a value stock to a growth stock post the announcement of the split. The evidence from the tests of the multiple events hypothesis provides no basis to conclude that the intention of the splitting firms was to utilise the positive increases in share prices to raise money subsequent to the split.

An interesting subject for further research would be to understand how many firms that went for a split also announced a reverse split in the subsequent periods and how the market factored in such a move.

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