Stock split and reverse split- Evidence from India

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Abstract: This study expands on why managers decide to split and reverse split their companies share and what are the kind of effects they have on the share pricing and liquidity of shares. This focuses on splits and reverse splits between 2006-2014. Splits declaration were highest in year 2010 (104 companies) whereas reverse splits were evenly distributed over years. To validate our hypothesis historical data have been used. The results suggest that there is an optimal price for the shares, at which they appear to be best value for money. On analyzing the data, we reached a conclusion that splitting of shares substantially increases the wealth of shareholders, but no such conclusion can be drawn for reverse splitting.

Key Words: Stock Split, Shareholders, Reverse Split

Introduction

A Stock split (or forward split) is a simple phenomenon where a company changes the number of shares outstanding and its face value changes with no effect on any other item of the financial statement. "Reverse splits" is an opposite phenomenon and is normally done when the share prices reduce substantially and managers decide to increase the market price by increasing the face value, this would then reduce the volume available in the market, transaction cost would also would decrease and in the long run the share will be concentrated in fewer hands. Since the classic research by Fama, Fisher, Jensen, & Roll (1969) the trading range and signaling hypothesis is considered as a leading explanation to splits. Also the existence of abnormal return around splits supports the signaling hypothesis (Asquith, Healy, & Palepu, 1989), (Grinblatt, Masulis, & Titman, 1984), (Dravid, 1987). Behaviour of reverse splits is associated with negative abnormal returns and is associated with getting the price in an attractive trading range (Peterson & Pamela, 1992).

Research on trading range (Baker & Powell, 1993) provided evidence that managers (91% of managers surveyed) would opt for share splits when the shares move out of the trading range ($20-$35), In the Indian context 75% managers in India opted for split only when the shares were trading outside the ideal trading range of Rs.400 (Mehta, Jain, & Yadav, 2009). Average price before Split for 519 Stocks (forward splits) covered in the study was Rs.731, and this could have been a compelling reason to declare splits.

This study focuses on splits and reverse splits between 2006-2014, Splits declaration were highest in year 2010 (104 companies) whereas reverse splits were evenly distributed over years. The Indian market (S&P BSE Sensex) is unique in many ways. Since inception it has given annualized return of 17%. Indian regulator

of stock market SEBI, mandates that (SEBI, 2004) Rs.1 should be the minimum Face value, and majority of splitting companies have deliberately chosen to reduce their face value from Rs. 10 to either Rs.1 or Rs. 2, which leaves no room for these companies in the future to split shares.

Reverse split is not very common and it is ironical that all the 38 companies which declared reverse splits had declared split in the past. The idea behind declaring reverse split is to increase the share price and concentrate the number of shares into fewer hands. The end result of reverse split should increase in price and decrease in volumes.

This study would explore how Indian markets reacted to split and reverse split announcement as there are contrary opinions across the globe with regards to change in liquidity and wealth effect. Based on empirical study, we also elaborate on the implications for short and long term investors.

Literature review

Preferred trading range hypothesis suggests that one of the purpose of share split is to bring the shares price into a better trading range and improve liquidity (Baker & Powell 1993); (Lakonishok & Lev, 1987).In the Indian context Mehta, Jain, & Yadav (2009) validate the trading range hypothesis and 90% of managers surveyed expressed that ideal price range should be less that Rs 400. Research by (Lakonishok & Lev, 1987) also proves that firms that declare splits have a higher short-term growth rate in Earning versus companies which do not declare splits. A Study by (Ikenberry, Rankine, & Stice, 1996) suggest the splits would help managers to realign the price to a lower trading range, but their decision to split is a function of their expected future performance of the company. Fama, Fisher, Jensen, & Roll (1969) advanced the theory to dividend signals and suggested that abnormal returns around splits are a function of increased expectation for higher dividends. The study on dividend signals was extended by (Nayak & Prabhala, 2001) and proved that around 54% of splits announcements can be attributed to increase in dividend information.

Second, the Liquidity hypothesis (Lakonishok & Lev, 1987) (Ikenberry, Rankine, & Stice, 1996) suggest that as the share move into a preferred trading range the stock is in demand by more investors and hence the liquidity of the stock increases. Study of Copeland, 1979 concludes that there is a decrease in liquidity after the split event. Study of (Conroy, Harris, & Benet, 1990) (Bley, 2002) concludes that there is no change in volume due to splits.

The Tax timing hypothesis suggests that capital gains on stocks splits occur when the shares are sold and hence splits offer the receiver a timing option and capital gains can be deferred. Study of (Constantin ides, 1983) proved that stock returns are more volatile after splits and hence have a higher tax option value.

The Cash substitution hypothesis suggests that the reason for companies to declare stock splits is to substitute with lower cash dividends payments. Study of (Lakonishok & Lev, 1987) suggested that stock dividend is a temporary substitution for lower cash dividends.

Signaling hypothesis indicate that when managers (who are insiders) are optimistic with regards to company prospects they would take the decision to split. Study of Ikenberry et.al 1996 validates the theory with significant post-split excess returns (7.93% in the first year). Managers as insiders are more aware with regards to future performance and so a decision of stock split signals to the market positive sentiments of the managers with regards to future earnings and returns.

Study of Ohlson & Penman, 1985 validates these findings and proves that volatility of stock return is significantly higher post-split (for splits larger than 2:1).A Study by Dravid, 1987 extends the work of Ohlson and Penman to all forms of split and validates the hypothesis that after splits volatility increases. The reverse of a stock split is reverse split or consolidation and study of Wooldridge & Chambers, 1983 proves that reverse split is associated with abnormal negative returns, the price of companies declaring reverse splits decline after the announcement date and after the ex-date. Study of Ohlson & Penman, 1985 provides evidence that stock return variance (NYSE) increases after the stock split for splits greater than 100% and study of Dravid, 1987 also supports the findings. There is also evidence of excess return around split which is consistent to the signaling hypothesis. Study of Asquith, Healy, & Palepu, 1989 extends the argument of information in stock splits and proves that there is a significant increase in earning four year prior to the declaration of split and even up to five years after split the increase in earnings are positive and significant. Study of Kim, Klein, & Rosenfeld, 2008 concludes that the behaviour of reverse splitting stock is just the opposite of share splitting companies and there is evidence of negative abnormal return over three years from the date of reverse split, thereby suggesting that market participants use this as a negative performance signal.

Attention seeking hypothesis suggest that managers in order to seek attention of analyst declare splits. Brennan and Hughes (1991) concluded that there is an inverse relationship between price and analyst coverage and hence in order to get attention from greater number of analyst covering companies declare splits. Hence, there appears to be some conflicting empirical evidence.

Objectives

The research objectives of this study are :

- Testing the conflicting empirical evidence with reference to the Indian scenario.
- Measuring the impact of share splitting and reverse splitting stocks on variables relating to liquidity and shareholder wealth creation.

- Measuring abnormal and cumulative abnormal returns around the event dates.

Sample and Data

An initial sample of stock splits during 2006-2014 (9 years) was identified from Capitaline Database. The splits are executed by firms listed on Bombay stock exchange. For each stocks split in the sample, this study takes daily information of split ratio, Ex-Date, closed price, volume, number of trades for 30 days pre and post-split.

To ensure valid estimates for research following additional issues were considered:

1. Splitting shares are listed on BSE at the time of event.
2. Capital line database should have daily stock prices of these stocks for at least 365 days prior to split for obtaining the slope and intercept.
3. Splitting firm which had undergone reverse split were included in the reverse split dataset.
4. Splitting forms must have had financial information available for minimum of 30 trading days pre-split and post-split. 30 trading days will transform into 6 weeks, 42 days pre and post-split (total 84 days window). Companies with data less than 84 days were removed from the analysis.
5. This study uses the adjusted share price and daily return is calculated from adjusted price. (Adjusted for split factor).
6. Liquidity parameters are adjusted volume and number of actual trades (unadjusted) pre and post-split.
7. Volatility of stock is measured as the square of daily return (Ohlson & Penman, 1985) (Dubofsky, 1991) (Mishra, 2007).

Research Methodology

Test of significance level, for Price, return, volume and number of trade before and after split this study relies on few test starting with T-test (paired) as proposed by (Lakonishok & Lev, 1987) (Mishra, 2007) (Ikenberry, Rankine, & Stice, 1996)

H_0= *No difference in Mean value Post and Pre Split*

H_1=*Mean values Post and Pre Split are significantly different*

Volatility is risk measured by comparing the variability of average mean squared return pre-split and post-split by using the daily return matching methodology proposed by (Ohlson & Penman, 1985) (Dravid, 1987) (Dubofsky, 1991) (Koski, 1998).

Non-parametric test (The sign test for paired data) proposed by (Ohlson & Penman, 1985) is used to validate the robustness of study. Z-test is used to measure the change in volatility, price, return, volume and number of trades.

In this methodology squared return of the first trading day post-split is considered matched with first day Pre-split, this matching continues for the 30 days period before and after split.

As the data points are large a conservative statistical test which does not rely on specific assumption about the distribution of return like proportionality test will solve the problem.

$$p = \bar{X}2_2 > \bar{X}1_2 \sum_{>.5\ Under\ Alternate\ Hypothesis}^{=.5\ under\ Null\ hypothesis}$$

$$\bar{X}2_2 = Mean\ Post - split\ and\ \bar{X}1_2 = Mean\ Pre - Split$$

Test statistics is simply computed as tallying proportion of cases where the mean return post-split is greater than pre-split, assuming independence across N observations.

The Binomial Statistics is: $z \equiv 2(p - 0.5)(\sqrt{N})$

Alternatively $:Z = \frac{\bar{x}-\mu}{\sigma}$

$$\mu = np$$

$$\sigma = \sqrt{n\,p\,q}$$

For all four variables a comparison of average Post-split values greater than pre-split values is denoted by "Pr." proportion of cases where Post is greater than Pre.

Hypothesis

Testing the significance using T-test and Z-test

H_0: Price / Return / Volume / Trade are not affected by Splits

$H_0 = \mu 1 = \mu 2$

H_1: Price / Return / Volume / Trade are affected by Splits

$H_1 = \mu 1 \neq \mu 2$

Event Time Methodology findings for share splitting firms

A standard event time methodology (Lamoureux & Percy, 1987) (Mishra, 2007) is used to determine the abnormal return pattern around the Ex-date. The market-model is assumed for approximating security price movement, also assuming the standard Gauss-Markov assumptions.

$$AR_{i,t} = R_{i,t} - (\alpha_i + \beta_i r_{m,t}) \quad ..1$$

$AR_{i,t} = Abnormal\ return\ for\ firm\ i\ at\ day\ t$

$R_{i,t} = Actual\ Return\ on\ security\ i\ at\ day\ t$

$\alpha + \beta =$ *are OLS estimate from the market model regression*

Event day is denoted as day-0 for calculating the Alpha and Beta, regression coefficients are calculated for 365 days before day-0. From the 365 data pre-split 30 trading days eliminated and result is obtained for remaining days. For each stock alpha and beta values are calculated based on 335 data points. Critical event window for analysis is -30 to +30 trading days from the event day and critical period is tested for abnormal return.

The average abnormal return (AAR) is the average of abnormal return given by equation 2 :

$$AAR_t = \frac{1}{N}\sum_{i=1}^{N} AR_{i\,t} \quad ..2$$

Daily abnormal return (AR) is summed over period for obtaining the cumulative average abnormal return (CAAR) over the pre specified time period starting at τ_i. through τ_2.

$$CAAR_i(\tau_i, \tau_2) = \sum_{t=t_1}^{t_2} AAR_{it} \quad ..3$$

Subsequently the average Expected return and Actual return for the period +30 to 30 is tested to determine the significance levels (Lamoureux & Percy, 1987).

AAR= Average Abnormal return/ also referred as Average residual (Garcia de Andoain & Bacon, 2009)

CAAR= Cumulative Average Abnormal return/ also referred as cumulative average residual

Impact of share split and reverse splits on variables

Table-1 Analysis after share split

Variables	N	Mean Pre-split	Dev. Pre-split	Mean Post-Split	Mean Std. Dev. Post-Split	P(T<=t) two-tail	Pr.
Price	519	117.8	16.9	122.3	17.0	0.17	0.59
Return	519	0.00	0.03	0.00	0.03	0.00*	0.27
Volume	519	415400.5	512857.4	352114.4	411749.3	0.01*	0.36
Trades	519	947.9	967.5	1342.4	1210.8	0.00*	0.64

*P critical .05

P value (t-Test) for variable price is suggestive that there is no difference between the pre and post-split prices, even though for 59% companies' average prices of share post-split were higher than pre-split. For all other variables, it is below the significance level. H0 is rejected for variables like Return, Volume and Trades. As can be seen 64% of companies' experience an increase in trade post-split which strongly supports the liquidity hypothesis and preferred trading range hypothesis.

Table-2 Analysis after Reverse split

Vari-ables	N	Mean Pre-split	Dev. Pre-split	Mean Post-Split	Mean Std. Dev. Post-Split	P(T<=t) two-tail	Pr.
Price	38	29.8	8.3	36.9	4.4	0.16	0.37
Return	38	0.0	0.4	0.00	0.02	0.84	0.34
Volume	38	60031.7	86430.6	85031.2	103306.6	0.24	0.71
Trades	38	370.0	378.0	974.3	1041.3	0.24	0.61

**P critical .05*

P value (t-Test) on reverse split is suggestive that results pre and post-split are not significantly different. H0 is accepted on all parameters (price, return, volume and trades).

Table-3 z-test (nonparametric)

Z-test for splitting and reverse splitting companies

	Share splitting firms		Reverse split	
Variables	N	z-Stat	N	z-Stat
Volatility	519	-2.77	38	-4.96
Price	519	-4.08	38	1.44
Return	519	10.67*	38	1.76
Volume	519	6.28*	38	-2.72
Trades	519	-6.36	38	-1.44

z critical at .05 is 1.96

Table-3, z-test suggest no change in volatility for splitting and reverse splitting stocks. On variables return and volume there is a significant difference for companies splitting shares, suggesting that splits have significant impact on return and volume.

All variables for reverse splitting shares are insignificant, suggesting that this is a non-event activity.

Risk levels

Table-4

Share splitting firms					Reverse split			
Vari-ables	N	Mean Std. Dev. Pre-split	Mean Std. Dev. Post-Split	Pr.	N	Mean Std. Dev. Pre-split	Mean Std. Dev. Post-Split	Pr.
Price	519	16.89	17.01	0.52	38	8.25	4.43	0.29
Return	519	0.03	0.03	0.61	38	0.41	0.16	0.39
Volume	519	512857	411749	0.39	38	86431	103307	0.68
Trades	519	967.53	1210.81	0.56	38	378.00	1041.31	0.55

Table -4 comparison of risk (Standard deviation) indicates that after splits there is an increase in risk as the number of companies in which the standard deviation of Price, Return and Trades is increasing. The maximum impact can be seen on Return (61%) and Trades (56%). The findings are in line with previous finding of (Ohlson & Penman, 1985) (Lamoureux & Percy, 1987).

For companies which declared reverse split there is an increase in risk with regards to volume and number of trades. There is a considerable fall in mean standard deviation of price and return for reverse splitting stocks.

Overall conclusion for variables price and return is that there is an increase in risk for splitting firms and decreases in risk levels for reverse splitting firms, findings are consistent to the findings of Peterson (Peterson & Pamela, 1992). Almost 55% have increase in trades for splitting and reverse splitting firms.

Table-5 (Splitting Firms)

Trading Day	Mean Actual return	AAR	p-values	CAAR	Pr.
-30	0.00	0.00	0.00*	0.00	0.56
-28	0.00	0.01	0.00*	0.02	0.55
-26	0.00	0.01	0.00*	0.03	0.53
-24	0.00	0.00	0.00*	0.04	0.56
-22	0.00	0.01	0.00*	0.05	0.56
-20	0.00	0.01	0.00*	0.06	0.55
-18	0.00	0.01	0.00*	0.07	0.54
-16	0.00	0.01	0.00*	0.08	0.55

-14	0.00	0.01	0.00*	0.10	0.57
-12	0.00	0.01	0.00*	0.11	0.55
-10	0.00	0.01	0.00*	0.12	0.55
-9	0.00	0.01	0.00*	0.13	0.57
-8	0.00	0.01	0.00*	0.13	0.57
-7	0.01	0.01	0.00*	0.14	0.59
-6	0.01	0.01	0.00*	0.15	0.58
-5	0.00	0.01	0.00*	0.16	0.55
-4	0.01	0.01	0.00*	0.17	0.58
-3	0.01	0.01	0.00*	0.17	0.58
-2	0.00	0.01	0.00*	0.18	0.58
-1	0.01	0.01	0.00*	0.19	0.61
0	0.02	0.03	0.00*	0.22	0.74
1	0.01	0.01	0.00*	0.20	0.57
2	0.00	0.00	0.02*	0.21	0.52
3	0.00	0.00	0.39	0.21	0.46
4	0.00	0.00	0.32	0.21	0.47
5	0.00	0.00	0.03	0.21	0.50
6	-0.01	0.00	0.00*	0.21	0.40
7	-0.01	-0.01	0.00*	0.20	0.40
8	0.00	0.00	0.34	0.20	0.47
9	0.00	0.00	0.22	0.20	0.46
10	0.00	0.00	0.25	0.20	0.49
12	0.00	0.00	0.73	0.20	0.48
14	0.00	0.00	0.59	0.20	0.49
16	0.00	0.00	0.76	0.20	0.49
18	0.00	0.00	0.18	0.21	0.51
20	0.00	0.00	0.31	0.21	0.50
22	0.00	0.00	0.10	0.22	0.51
24	0.00	0.00	0.18	0.22	0.51
26	0.00	0.00	0.03	0.23	0.52
28	0.00	0.00	0.06	0.24	0.48
30	0.00	0.00	0.03	0.24	0.52

Table-5 Indicates the result of t-test, the very first instance where the t-test value exceeds the critical value is on Day-3 after the Ex-Date (Day-0) or the split execution date. This indicates that abnormal return continues for 2 days after the event day. In simple terms markets sentiments for share splitting stocks remain positive for the 2 days after the event date. 74% of the companies recorded abnormal returns on the Event date.

Chart-1- AAR % (Over Regression Return for splitting firms)

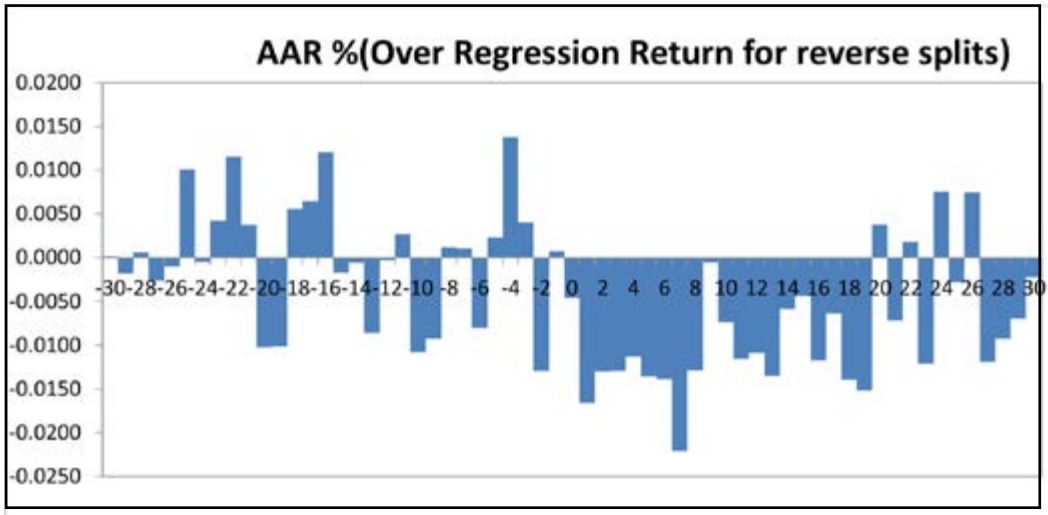

Chart-1, depicts the behavior of Average Abnormal return over the long run OLS estimates. It is very evident that abnormal return continues for 2 days after event date, and maximum abnormal return occur on Event date. On event date average abnormal return is around 2.8% .

Chart-2- CAAR % (Over Regression Return for splitting firms)

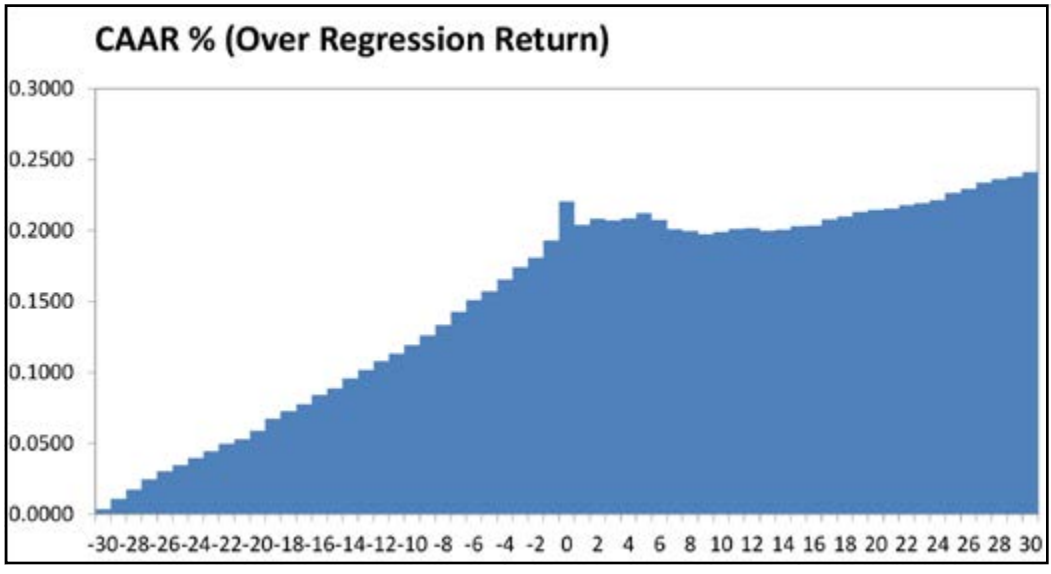

Chart-2 indicates that the cumulative abnormal return flattens out after Event date and most importantly it does not decrease, which means that the increase in wealth of the shareholders pre-split continues in the post-split period.

Table-6 (Splitting Firms)

Variables	N	Mean Pre-Split	Std. Deviation Pre-Split	Mean Post-Split	Std. Deviation Post-Split	P(T<=t) two-tail
Ab-normal return	519	0.01	0.03	0.00	0.03	0.00*
CAAR	519	0.19	0.42	0.08	0.42	0.00*

**P critical .05*

Table-6 Result of t-test concludes that abnormal return and CAAR are significantly different pre-split and Post-split.

Mean CAAR Pre- Split is around 19%, which indicates that market player perceive splits as a positive signal and share prices increase abnormally before the Ex-Date. Between the announcement date and Ex-Date the abnormal movement can also be attributed to speculation or insider trading (starting almost 30 trading days prior to the Ex-date, 73% companies had abnormal excess return on Ex-date) this abnormal movement flattens after the Ex-date.

Trading Day	Mean Actual return	AAR	p-value	CAAR	Pr.
-30	0.00	0.00	0.44	0.00	0.47
-28	0.01	0.00	0.16	0.00	0.50
-26	0.00	0.00	0.16	0.00	0.45
-24	0.00	0.00	0.83	0.00	0.50
-22	0.01	0.01	0.32	0.02	0.58
-20	0.00	-0.01	0.56	0.01	0.39
-18	0.01	0.01	0.46	0.01	0.50
-16	0.01	0.01	0.21	0.03	0.61
-14	0.01	0.00	0.36	0.03	0.45
-12	0.00	0.00	0.81	0.02	0.47
-10	-0.01	-0.01	0.08	0.01	0.45
-9	0.00	-0.01	0.80	0.00	0.34
-8	0.00	0.00	0.77	0.00	0.47
-7	0.00	0.00	0.13	0.00	0.47

-6	0.00	-0.01	0.52	-0.01	0.42
-5	0.00	0.00	0.70	0.00	0.45
-4	0.01	0.01	0.19	0.01	0.47
-3	0.01	0.00	0.57	0.01	0.50
-2	-0.01	-0.01	0.45	0.00	0.26
-1	0.00	0.00	0.39	0.00	0.45
0	0.00	0.00	0.60	0.00	0.37
1	-0.02	-0.02	0.13	-0.02	0.34
2	-0.01	-0.01	0.20	-0.03	0.32
3	-0.01	-0.01	0.18	-0.05	0.39
4	-0.01	-0.01	0.19	-0.06	0.34
5	-0.01	-0.01	0.10	-0.07	0.32
6	-0.01	-0.01	0.08	-0.08	0.42
7	-0.01	-0.02	0.01	-0.11	0.26
8	-0.01	-0.01	0.07	-0.12	0.37
9	0.00	0.00	1.00	-0.12	0.53
10	0.00	-0.01	0.42	-0.13	0.29
12	-0.01	-0.01	0.07	-0.15	0.32
14	0.00	-0.01	0.31	-0.17	0.47
16	-0.01	-0.01	0.17	-0.19	0.37
18	-0.01	-0.01	0.01*	-0.21	0.34
20	0.01	0.00	0.68	-0.22	0.47
22	0.00	0.00	0.99	-0.22	0.37
24	0.01	0.01	0.40	-0.23	0.53
26	0.01	0.01	0.37	-0.22	0.47
28	-0.01	-0.01	0.14	-0.24	0.50
30	0.00	0.00	0.82	-0.25	0.45

Table-7 Results of t-test conveys that there is no significant relationship between the abnormal returns and expected return for reverse splitting stocks. On the event day there is abnormal return of -0.05% and the cumulative return after 30 days of the event date is -25%. Findings are similar to the earlier findings of (Wooldridge & Chambers, 1983) (Kim, Klein, & Rosenfeld, 2008) (Dravid, 1987)

Chart-3

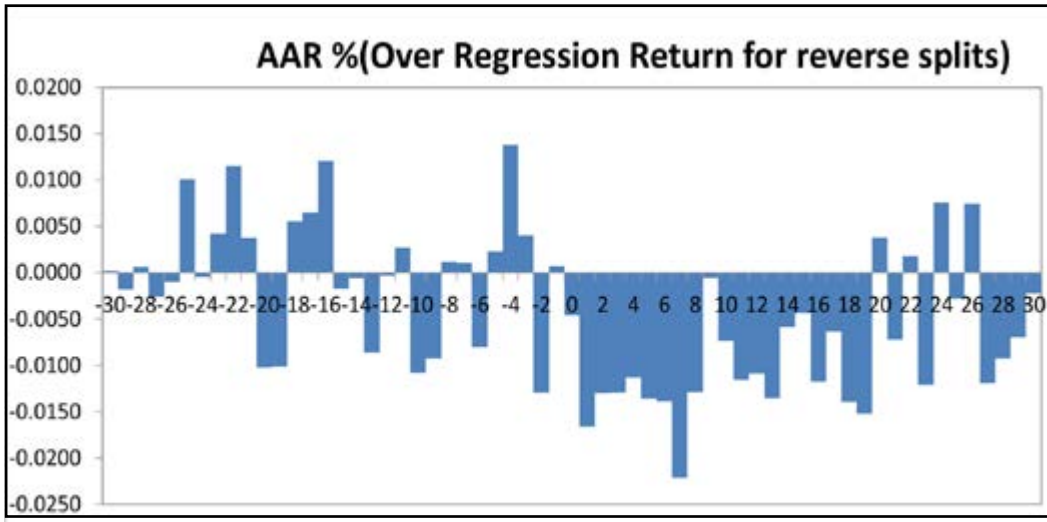

Chart-3 highlights that there is no effect of the reverse split news on the stocks returns. abnormal returns are within the range of +1% to -2%.

Chart-4

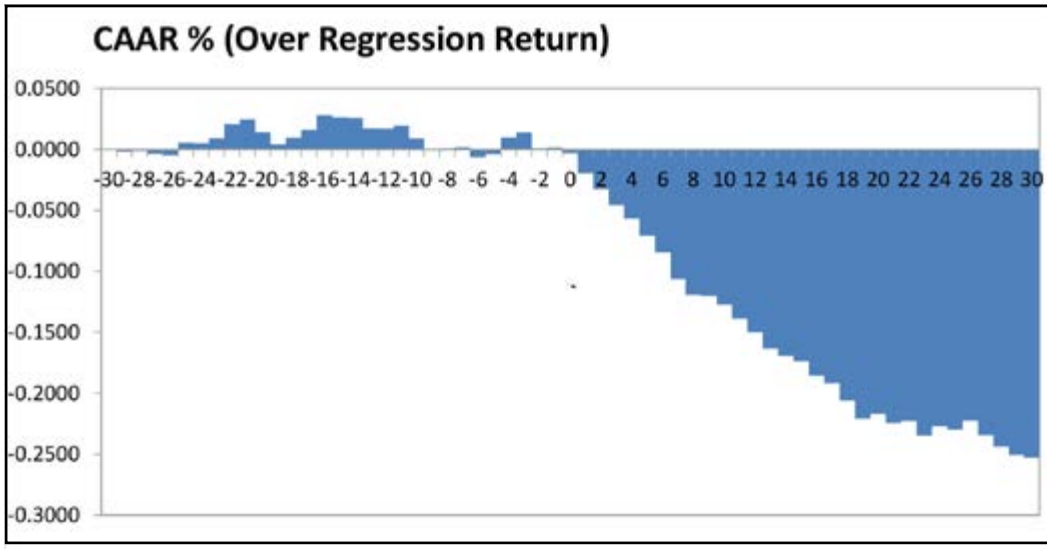

Chart-4 for reverse split stocks indicate that cumulative abnormal returns pre splits are negligible and 30 days after the event date CAAR is around -25%. In fact the shaded area of negative cumulative returns (after the event date) is much larger in comparison to the positive cumulative returns (after the event date)

Conclusion

For share splitting stocks there is an increase in liquidity (64% companies had higher number of trades after split) and the average prices post splits are higher for

59% companies but the average price levels are not significantly different. Pre and post-split return, volume and number of trades are significantly different.

For reverse splitting stocks there is no difference in average levels of price, return, volume and trades, which concludes that reverse split is a nonevent activity and there are no market reactions.

The findings of the non-parametric test also suggest that market does not react to reverse splits and for all variables there is no difference in pre and post behavior. For share splitting companies, there is a significant difference pre and post- split for variable return and volume.

For share splitting companies, event time methodology leads to the conclusion that 73% of companies report average abnormal return on the Ex-Date and average return is around 3% on the Ex-date. Cumulative abnormal returns flatten out after the ex-date which signifies that the abnormal increases in share price is permanent and continues to remain high after the event date. Statistical test also supports the findings that abnormal return exists between -30 days to +2 days of the Ex-date. This also indicates that market takes around 2 days after the event date for incorporating the news of split.

For reverse splitting companies event time methodology leads to the conclusion that the behavior is opposite to the splitting companies and on the event date abnormal return is negative (-0.5%). On the event date 37% companies reported an abnormal profit whereas 63% companies had abnormal losses.

CAAR for Splitting stocks after 30 days of the event date is close to 24% whereas for reverse splitting stock the CAAR -25%.

Taken together stock splits are not merely cosmetic events and majority of the shareholder do have a permanent increase in wealth. Reverse splits do not achieve the same purpose and shareholders lose wealth after reverse splits. Shareholders can maximize profit by selling shares of companies before +2 days; as CAAR stabilizes after two days of event day. In case of reverse splitting companies, shareholders can benefit by immediately selling the share (when the news of reverse split is out) or by short selling the stock.

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