Impact of Stock Splits on Liquidity

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Abstract:

A stock split increases the number of shares outstanding by reducing the face value of equity shares, without affecting the equity. A stock split is done to improve liquidity of the shares. The analysis of the average volume around announcement day and ex-split day shows that stock splits is not exhibiting strong impact on average volume when simple t-test is conducted. The analysis of the average number of shares traded around announcement day and ex-split day shows that stock splits is not exhibiting strong impact on average number of shares traded around announcement day. If stock splits convey positive information about future profitability to the market then theoretically, after announcement day trading of shares should increase because investors will desire more of the shares which are split. The result show no significant effect on shares traded even after announcement day. Thus signaling cannot be a reason for stock splits in India. The result strengthens suggestion of leakage of information and insider trading around announcement day of stock splits.

Keywords: *Stock splits, Liquidity*

1. Introduction

Theoretically stock splits should not have any effect on share prices and stock returns. But significant effect on share prices and positive ARs are observed on and around stock splits.Liquidity is a dynamic concept with multiple dimensions. In the present study definition of liquidity given by Amihud et al.[1] (2005) is adopted to define the term liquidity. Liquidity plays a critical role in price discovery process. So to analyse behaviour of share prices around stock splits, liquidity aspect of impact of stock splits is also analysed.This article presents results of the study relating to impact of stock splits on liquidity.

2. Literature Review

Different researchers have taken different measures to evaluate impact of stock splits on liquidity and each measure along with related result is discussed one by one in the section below. The different measures of liquidity taken are-volume, number of shares, number of transactions, share turnover etc.Many studies took trading volume as basis to measure liquidity.One group of researchers are of view that Liquidity improvement hypothesis is based on assumption that low-priced shares draw more investors and generate greater trading volume, enhancing marketability and reducing bid–ask spread.

The effects of stock splits on liquidity were examined by Copeland (1979), by taking help of finite time series model related to trading volume for a sample of randomly selected 25 NYSE stock splits. He concluded that relative liquidity calculated using variables like trading volume, brokerage revenues and bid-ask spread decreased after stock splits. According to him benefits arising out of signalling and diversification were much higher than liquidity costs incurred in relation to stock

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[1]According to Amihud et al. (2005) liquidity effects required returns of traded assets. They suggested   that level of liquidity and liquidity risk are priced. They reported that effects of liquidity on asset prices are significant both statistically and economically.

splits.

Murry (1985) reported no change in volume. Ohlson and Penman (1985) suggested that differences in returns after stock splits and larger gains seen after ex-split day were due to high volume of trading after stock split announcements. Lakonishok and Lev (1987) compared trading volume of sample companies that issued stock splits with trading volume of companies that did not experience stock splits. They found that trading volume in both samples were quite similar and concluded that splits are not associated with change in trading volume.

Lamoureux and Poon (1987), Brennan & Copeland (1988) using split adjusted volume and Conroy et al. (1990) reported decrease in trading volume. Brennan and Hughes (1991) were of view that brokers wait for ex-split day to sell shares to earn higher incentives which affect trading volume and share prices on ex-split day. After ex-split day more trading is done by small uninformed investors may be due to pushing of such shares by agents and institutions who work on commission and bonus.

Wulff (2002) reported considerable increase in trading volume subsequent to stock splits in Germany. Kunz and Majhensek (2002) carried out a review in Switzerland and reported that daily trading volume and liquidity was constant around stock splits. Leemakdej (2007) studied Stock Exchange of Thailand and observed a decrease in trading volume.

In India Mishra (2006) reported an increase in trading volume after ex-split day of stock splits.Gupta and Gupta (2007) in India examined changes in liquidity around ex-split day and found that average trading volume increased in case of 90% companies after ex-split day.Joshipura (2008) found significant improvement in traded volume (turnover) as a result of stock splits both around announcement and ex-split day. He was of opinion that if stock splits alone are the reason for increase in volume than increase must be restricted to announcement day only, but an increase in volume around ex-split day was also noted by him.

Datta and Banerjee (2012) considered diversification tendency of investors according to which when share price is low there is a tendency for diversification by investors. As a result there may be an increase in demand but there may be a change in supply also on account of change in attractiveness of offload. They studied change in volume of trade for shares split in Indian market before and after split to capture this effect. They found that impact of stock splits on large priced share and small priced share was different due to diversification tendency of investors. Suresha and Naidu (2013) found an increase in volume of shares traded and trading activity around stock splits.

3. Objective
  1. To analyse the impact of stock splits on liquidity.

4. Research Methodology
In order to achieve the above objective the following research hypotheses were tested:
HYP: 1- Stock splits have impact on share volume around announcement day.
HYP: 2- Stock splits have impact on share volume around ex-split day.
HYP: 3- Stock splits have impact on number of shares traded around announcement day.
HYP: 4- Stock splits have impact on number of shares traded around ex-split day.

The study revolves around two days: announcement day and ex-split day. Announcement day is the day when the stock splits announcement first comes into the market. Ex-split day is the day on which shares in stock market start getting transacted at new face value. A lot of studies in past in India have considered ex-split day only. Theoretically any information content relating to stock splits should be absorbed and reflected in price movement on announcement day. There should not be any change in

liquidity variables around ex-split day. The past studies in India have reported significant impact on liquidity around ex-split day. The current study analyses the impact of splits on different measures of liquidity around ex-split day .In the current study measures of liquidity taken in order to test research hypotheses relating to impact of stock splits on liquidity are:

- **Volume traded in rupees**- It is defined in terms of millions of rupees and refers to traded volume of shares of sample companies on a day in event window.
- **Daily number of shares traded** - It is defined in terms of number and refers to number of shares traded of sample companies on a day in event window.

Sample size and data

There are **1,092** stock splits announced in period of study. The sample comprises of stock splits announced by companies listed on Bombay Stock Exchange (BSE) which became effective during period starting from 1st January 1999 and till 30th June 2013. The closing share prices data for the sample along with values of BSE Sensitive Index[2] is collected from Prowess 19.1, a database of Centre for Monitoring Indian Economy (CMIE)[3]. The companies are included in the sample on the basis of following conditions:

- Companies are included in sample if announcement[4] dates, ex-split dates and stock split ratios (split factor) are available in Prowess database.
- There must be sufficient gap in two stock splits of same company, so that both splits can be included. Any subsequent stock splits done by same company are excluded provided subsequent stock splits occur within one year of first stock split.
- A company is included in sample if there is no announcement or ex-day effect present for any other type of corporate announcements like dividend, bonus, merger, acquisition, public issue etc. in estimation and event windows so that share price data is free from price reaction related to any other event other than stock splits. This condition was also considered by Grinblatt et.al (1984) and Michayluk and Zhao (2009).
- Companies are included in sample if daily closing share prices[5] data is available in Prowess database for entire estimation window and event windows.
- Stock splits of more than one company must not occur on same day. This is done to prevent clustering[6] of event on a single day.
- Companies are excluded if - trading in the share is not done on event day or event windows are overlapping.

After applying above conditions sample companies used for analysis is reduced to **214**.

In order to analyse the daily change in liquidity paired *t*-test for two consecutive days in the event window is conducted for each measure of liquidity. The null hypothesis tested is that there is no

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[2] BSE Sensitive index is a robust representative of Indian stock market and used as proxy for market portfolio because it is value weighted index which uses free float market capital as value weights and appropriate for such type of analysis same is suggested by Womack et al. (1996) and Fama (1998).

[3] CMIE is an independent private sector economic research organization. It has built largest database on Indian economy and companies in form of databases and research reports. It is widely used by academics and industries in India..

[4] Announcement day is the date when information relating to stock splits becomes public for the first time. If more than one announcement dates are available for a stock split like announcement day and board meeting day then earliest of the two days is taken as announcement day.

[5] The daily closing share prices data is adjusted for changes in face value that takes place on ex-split day to ensure that returns relating to different face values around announcement day, before ex-split day and after ex-split day are comparable.

[6] Clustering of an event may result in cross-sectional correlation among returns and lead to undervaluation of variances of average stock returns. To avoid it Brown and Warner (1985) suggested use of daily or weekly data. Friederich et al.(2002) and Bernard (1987) suggested use of sample of companies belonging to diversified industries.

significant difference in measure of liquidity for two consecutive days. Liquidity of shares in the current study is assessed on the basis of average share volume traded in rupees and average number of shares traded.

5. Impact on average share volume (Rs.) - announcement day

The liquidity of shares around announcement day is first analysed by taking average share volume traded in rupees as its measure. **Figure 1** shows average volume around announcement day when analysed through a graph. The volume is highest on t_0 day.
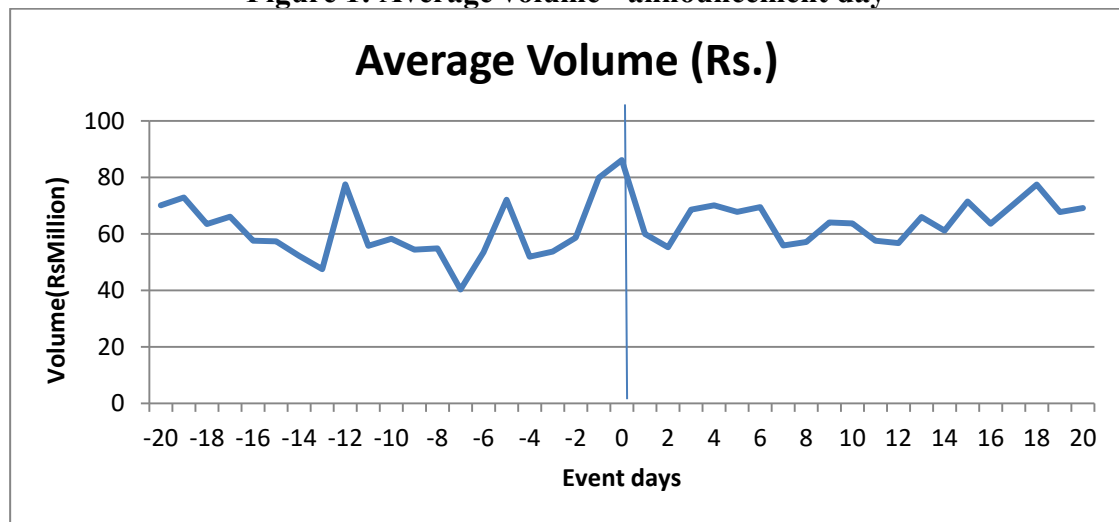
Figure 1: Average volume - announcement day

Table 2 shows increase in average volume with significant p-value on t_{-5} day at 5% level of significance when day-wise paired t-test is conducted. The liquidity measures before and after announcement day in event window of 41 days are compared to test the null hypothesis that there is no significant difference in liquidity measures before and after the announcement day using two-tailed t-test.

For volume null hypothesis tested is that there is no significant difference in average volume before and after announcement day. **Table 1** shows that null hypothesis is not rejected at 5% level of significance for any period in event window of 41 days.

Table1: t-test Values - announcement day (average share volume)

Event days	t-test values	t-critical	p-values*
-20 to +20	-1.78	2.04	0.09
-10 to +10	-1.38	2.14	0.19
-5 to +5	-0.18	2.45	0.87
-2 to +2	1.07	12.71	0.48
*Values in bold are significant at 5% level of significance.			

Table 2: Average Number of Shares Traded and Share Volume - announcement day

Event Day	Average Share Volume (Rupees million)	p-values for paired t-test*	Average Number of Shares Traded	p-values for paired t-test*
-20	70.14		74,001	
-19	72.88	0.647	68,980	0.593
-18	63.50	0.263	63,262	0.446

| Event Day	Average Share Volume (Rupees million)	*p*-values for paired *t*-test*	Average Number of Shares Traded	*p*-values for paired *t*-test*
-17	66.12	0.699	67,513	0.539
-16	57.60	0.514	72,468	0.677
-15	57.36	0.962	65,858	0.434
-14	52.21	0.386	58,749	0.433
-13	47.50	0.146	57,572	0.836
-12	77.57	0.212	56,969	0.948
-11	55.79	0.389	64,796	0.347
-10	58.30	0.668	76,857	0.055
-9	54.46	0.355	61,805	0.299
-8	54.88	0.967	62,631	0.897
-7	40.33	0.189	48,527	**0.027**
-6	53.50	0.288	59,979	0.094
-5	72.14	**0.050**	96,053	0.131
-4	51.93	0.294	68,866	0.071
-3	53.76	0.850	68,826	0.996
-2	58.69	0.799	65,756	0.625
-1	79.85	0.104	96,726	0.326
0	86.16	0.590	94,489	0.947
+1	59.99	0.183	78,452	**0.046**
+2	55.30	0.759	73,201	0.532
+3	68.59	0.246	72,695	0.950
+4	70.11	0.848	75,972	0.753
+5	67.81	0.647	78,420	0.640
+6	69.48	0.812	77,526	0.931
+7	55.92	0.092	61,551	0.085
+8	57.18	0.832	60,795	0.916
+9	64.04	0.151	65,626	0.492
+10	63.75	0.947	63,145	0.728
+11	57.60	0.323	64,753	0.887
+12	56.77	0.926	72,998	0.462
+13	66.02	0.364	68,021	0.485
+14	61.16	0.565	66,137	0.806
+15	71.46	0.119	63,887	0.801
+16	63.64	0.485	71,564	0.567
+17	70.53	0.344	64,678	0.546
+18	77.52	0.203	68,586	0.593
+19	67.76	0.303	57,742	0.147
+20	69.17	0.907	63,685	0.442

*Values in bold are significant at 5% level of significance

Impact on average share volume (Rs.) – ex-split day
The average volume is calculated for each day in the ex-split window. The **Figure 2** shows average

volume around ex-split day. The average volume is maximum on t_{+12} day after ex-split day.

Figure 2: Average volume - ex-split day
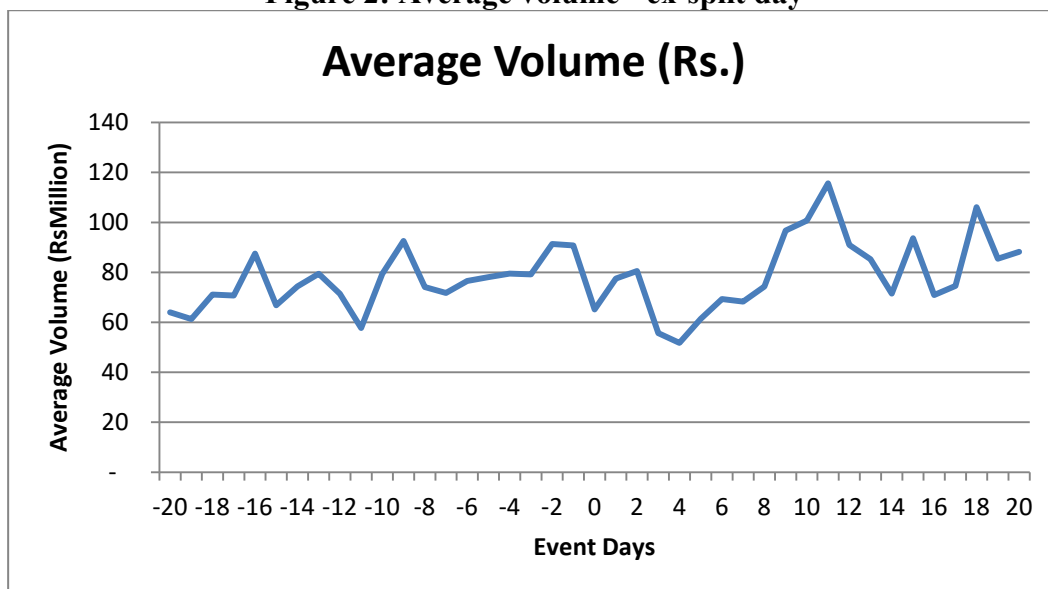
The paired *t*-test is conducted to test the null hypothesis that there is no significant difference in average volume for two consecutive event days. It can be observed in **Table 4** that null hypothesis is not rejected on any day around ex-split day.

The two tailed *t*-test is conducted to test the null hypothesis that there is no significant difference in average volume before and after the ex-split day. **Table 3** shows that null hypothesis is rejected at 5% level of significance for event window of shorter duration (11 and 5 days) in 41 days period.

Table 3: *t*-test values - ex-split day (average share volume)

Event days	*t*-test values	*t*-critical	*p*-values*
–20 to +20	-1.17	2.04	0.25
–10 to +10	1.37	2.16	0.19
–5 to +5	2.82	2.45	**0.03**
–2 to +2	7.94	12.71	**0.08**
*Values in bold are significant at 5% level of significance.			

Table 4: Average number of shares traded and share volume - ex-split day

Event day	Average volume in (rupees million)	*p*-values for paired *t*-test*	Average number of shares traded	*p*-values for paired *t*-test*
-20	64.00		56,737	
-19	61.29	0.838	61,819	0.453
-18	71.14	0.220	54,687	0.321
-17	70.75	0.950	57,313	0.512
-16	87.54	0.086	74,861	0.063
-15	66.80	0.088	56,992	0.062
-14	74.35	0.351	58,328	0.771
-13	79.46	0.515	62,745	0.426
-12	71.42	0.286	70,647	0.410
-11	57.75	0.128	64,910	0.641
-10	79.37	0.246	54,322	0.300

Event day	Average volume in (rupees million)	*p*-values for paired *t*-test*	Average number of shares traded	*p*-values for paired *t*-test*
-9	92.59	0.361	60,944	0.268
-8	74.12	0.161	60,428	0.932
-7	71.76	0.739	57,366	0.529
-6	76.55	0.599	69,162	0.119
-5	78.07	0.864	60,759	0.237
-4	79.48	0.782	73,088	0.231
-3	79.17	0.959	66,462	0.490
-2	91.34	0.268	76,564	0.111
-1	90.76	0.948	111,305	**0.032**
0	65.17	0.080	366,366	**0.000**
+1	77.53	0.577	313,426	0.391
+2	80.51	0.554	433,846	0.258
+3	55.65	0.224	248,485	0.103
+4	51.77	0.706	225,431	0.299
+5	61.38	0.277	251,500	0.193
+6	69.35	0.268	241,854	0.691
+7	68.32	0.802	300,286	0.355
+8	74.32	0.554	268,033	0.650
+9	96.72	0.135	282,384	0.720
+10	100.70	0.658	278,941	0.918
+11	115.65	0.320	436,269	**0.019**
+12	90.96	0.152	298,722	0.057
+13	85.28	0.642	271,415	0.303
+14	71.49	0.128	228,238	0.063
+15	93.70	0.224	264,280	0.275
+16	70.95	0.293	256,131	0.765
+17	74.61	0.644	385,762	0.330
+18	106.12	0.161	353,701	0.750
+19	85.45	0.353	314,809	0.466
+20	87.81	0.902	252,005	0.112
*Values in bold are significant at 5% level of significance				

Impact on average number of shares traded - announcement day
The average number of shares traded is calculated for each day in the announcement window. **Figure 3** shows average number of shares traded around announcement day of stock splits.

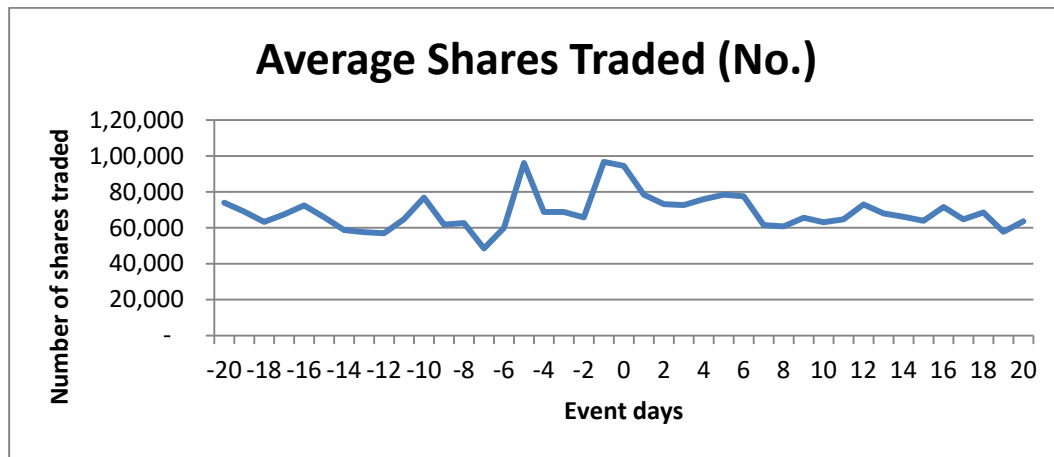**Figure 3: Average shares traded (no.) - announcement day**

Table 2 shows that average number of shares traded decreases as there is significant p-value on t_{-7} day and increases with significant p-value on t_{+1} day. Thus around the announcement day the number of shares traded increases for a very short time period in a significant manner.

It can be observed in **Table 5** that null hypothesis (there is no significant difference in average number of shares traded before and after announcement day) is not rejected for event windows of different lengths.

Table 5: *t*- test Values - announcement day (average number of shares traded)

Event days	*t*-test values	*t*-critical	*p*-values*
-20 to +20	-0.22	2.05	0.83
-10 to +10	-0.03	2.16	0.98
-5 to +5	0.51	2.78	0.64
-2 to +2	0.34	12.71	0.79
*Values in bold are significant at 5% level of significance.			

Impact on average number of shares traded - ex-split day
The average number of shares traded is calculated for each event day. **Figure 4** displays average number of shares traded around ex-split day of stock splits. It can be noted that average number of shares traded start increasing from t_{-2} day and this increase is persistent after ex-split day also.

Figure 4: Average number of shares traded - ex- split day
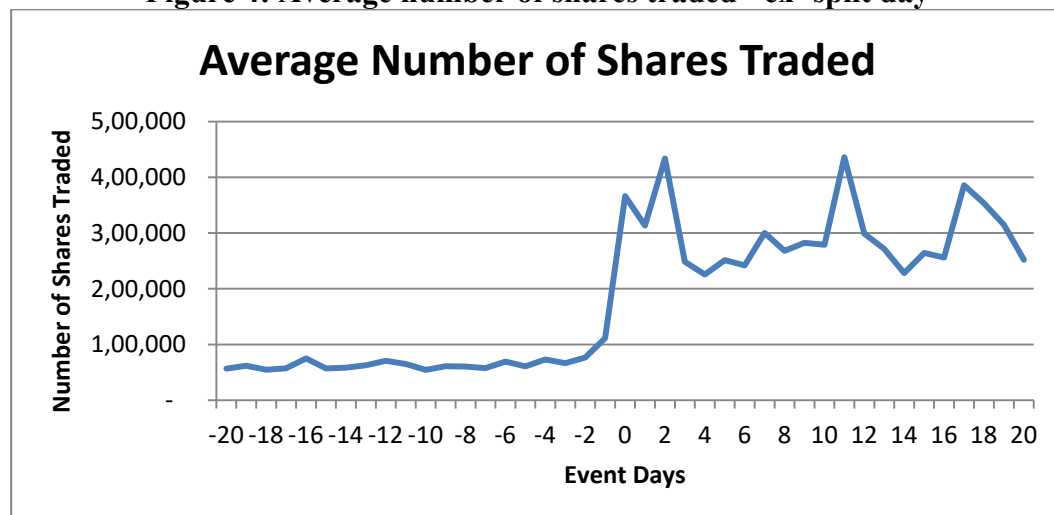
Average number of shares traded when taken as proxy to liquidity it can be observed in **Table 4** that on t_{-1} and t_0, t_{+11} days null hypothesis (no difference in average number of shares traded for two consecutive event days) is rejected because of an increase and significant p-values are present.

The two tailed *t*-test is conducted to find whether there is significant difference in average number of shares traded before and after the ex-split day. It can be observed in **Table 6** that null hypothesis is rejected at 5% level of significance for event windows of all lengths except when event window is of short duration that is t_{-2} to t_{+2}.

Table 6: *t*-test values - ex-split day (average number of shares traded)

Event days	*t*-test values	*t*-critical	*p*-values*
-20 to +20	-16.15	2.08	**0.00**
-10 to +10	-11.11	2.23	**0.00**
-5 to +5	-5.59	2.78	**0.01**
-2 to +2	-4.46	12.71	0.14
*Values in bold are significant at 5% level of significance.			

65. Conclusion

From above discussion, it can be inferred that around announcement day stock splits is not exhibiting strong impact on average volume when simple *t*-test is conducted. An increase in volume with significant *p*-value is present on t_{-5} day. The result strengthens suggestion of leakage of information and insider trading around announcement day of stock splits. From the above results it can be inferred that impact of splits on liquidity around announcement day is same that is positive no matter what is the measure of liquidity. Also it can be inferred that stock splits is exhibiting a positive strong impact on volume but this effect is not long lasting. The results are similar to those reported by Maloney and Mulherin (1992) and Desai et.al, (1998) who reported presence of post-split increase in volume and number of trades after ex-split day. The above analysis shows that stock splits are exhibiting a strong impact on average number of shares traded spread over a longer duration around ex-split day. This stronger long lasting impact on average number of shares traded around ex-split day may be because of change in composition of ownership structure as number of small shareholders increases after stock splits. The similar view was given by Baker and Gallagher (1980).

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