

Market Reaction around the Event of a Stock Split: An Analysis on the Dhaka Stock Exchange

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Abstract

Stock splits, in an efficient market, are not supposed to bear any consequence on the price of a company's stocks. However, both corporate management and regulators have tended to go through this exercise which make us think that through a stock split, either a management-induced event or a mandatory regulatory event, companies and regulators must expect to gain something. This study analyzes one such event of regulator-induced stock split in the Bangladesh markets that took place in December 2011. After studying the empirical results based on the sample of 117 mandatory stock splits in December 2011, it is found that there is overall sort of an equal distribution of positive and negative excess return pattern on both sides of the event date. Moreover, we accept the null hypothesis since the calculated t-values for the **aer** and **caer** during the 30 trading days (the event window) fall mostly within the acceptance region. Therefore, unlike some of the views presented in earlier literature concerning effects of stock splits in different markets around the world, this study found that stock splits, especially when they are undertaken as per regulatory directives, are basically a neutral event. One strong explanation for this finding can be the mandatory nature of the split because most of the previous studies undertaken used sample data sets containing management-decision induced stock splits.

Keywords: Stock splits, event study, market efficiency, abnormal return, excess return

JEL Classification: G14, G38

1. Introduction

1.1 *The Curious Case of Stock Splits*

If we assume that capital markets are efficient, stock splits, to their purest form of definition, should have no bearing on the stock prices because essentially what a stock split does is it spreads the capital invested over a higher number of stocks of smaller (face) values. It is, therefore, no different from slicing the same pizza into thinner slices. Since this non-economic event does not have a bearing on the potential cash flows of a firm, it is reasonable to expect that the market (proxied by the stock prices) would not react whenever there's an announcement and execution of such events. There should be no expectation of value creation from this kind of event (voluntary or regulatory) and therefore there should not be any significant change in stock prices from which investors can generate abnormal returns.

This kind of background ultimately makes us curious as to why firms might consider splitting their stocks if no value creation can be expected from a stock split. Not only that: The company will even have to pay transaction costs if different forms for carrying out the stock splits. Therefore, it sounds rather foolish (from an economic reality) to execute stock splits.

However, since firms do announce and therefore execute stock splits, either being a management-induced event or a mandatory regulatory event, they do possess some sort of expectation to gain something out of it. This is what we would like to examine in this paper.

1.2 *Regulatory Stock Splits and Abnormal Returns in Bangladesh*

The stock market regulator Bangladesh Securities and Exchange Commission (BSEC) (erstwhile Securities and Exchange Commission), in September 2011 issued a circular with a view to creating a uniform face value of stocks of all sorts at BDT 10. This measure of converting the par values of all the shares into BDT 10 gave rise

to a mandatory stock split for companies having face value of shares of more than BDT 10 (usually BDT 100 or 1000). As of September 26, 2011, there were 138 stocks with a BDT 100 par value, 129 stocks with a BDT 10 and one mutual fund with BDT 1 par value listed in the Dhaka Stock Exchange (DSE), country's premier bourse.

1.3 Incentives of and Theories for Stock Split

There might be some possible consequences and explanations behind the event of stock splits. Three of the most notable are:

The optimal price range hypothesis: The optimal price range hypothesis asserts that there is a range of prices where a company's stocks trade in the most liquid manner possible. Therefore, if a company's stock, after trading for a while, becomes overvalued, a split can bring the stock's prices back into that optimal range of prices. Another study suggests that managers may want to deliberately stage stock splits to bring back their firm's stock prices to a level that is remarkably stable over time (Conroy and Harris (1999)). Lakonishok et al. (1987) argues that just like benchmark/rule of thumb ratios for different industrial sectors, there exist rule-of-thumb-figures in the investors' minds when it comes to stock prices. It goes on to suggest that managers consciously follow these "comparative figures" and therefore want to look good in the eyes of the investors by bringing the stock prices back to the "optimal range" or the benchmark range of stock prices.

Lamoureux et al. (1987) asserts that managers might want to exploit a stock split event to expand the base of shareholder with the assumption that a lower range of stock prices might be more attractive to minority shareholders. This view was confirmed by Schultz (2000) whereby he analyzed stocks from the NASDAQ and NYSE/AMEX. He found that there was a significant upsurge in small orders after the event of a split, and that the substantial portion of those were invariably 'buy' orders. Likewise, Angel et al. (2004) discovered increased trading activity by retail investors after the splitting event: Activity by small-size shareholders doubled over a 40-day period following a split, whereas large-volume traders significantly decreased their trading involvements in those stocks.

On the basis of a market microstructure sequential trade model, Easley, O'Hara, and Saar (2001) provide supportive evidence to the "optimal trading range hypothesis". They draw the conclusion that trading activity of uninformed (i.e., relatively smaller) market participants increased following stock splitting events. All of these outputs serve as proof of the hypothesis that managers might want to exploit a stock split event to expand shareholder base.

The market-maker hypothesis: This theory hypothesizes that firms often want to trade based on an optimal tick size (Angel 1997) under certain conditions. If there is an absolute tick size on a bourse, firm management can influence the relative tick size through a stock split. But why is the tick size so important? Schultz (2000) contends that splits have the capacity to increase the profitability of market making as it can boost liquidity through quoting bid and ask prices. According to him, the bid-ask spreads are higher (than average) after a splitting event takes place. He also finds evidence, although weak, against the hypothesis that trading errors decrease after a split.

The signaling hypothesis: According to this hypothesis, stock splits might be used as means of transcending private information to investors. A firm can try to reduce information asymmetries that might exist between stockholders and management through a stock split. The stock price reduction resulting from a stock split conveys management's conviction of rising future earnings. Therefore, one might postulate that a firm's top management announces a split only if it is assumed that the present level of stock price (and earnings) is unlikely to face a permanent downfall. Another point in support of the potency of the signaling hypothesis concerns the antithesis of false signals: Since a false signal would punish the firm with a free-fall later on, a split is often deemed to be a more trustworthy form of informational event than the other traditional forms of events. Ikenberry et al. (1996) confirms that there is an opposite relationship between size of a firm and the returns generated following such a splitting event announcement. Further support is provided by Conroy et al. (1999) through the discovery of significantly higher excess returns after splitting events in the face of a larger-than-expected one.

2. Literature Review

Stock split related studies can be categorized in three broad classes: the *theoretical class* tries to explain the theoretical underpinnings of why managers may want to stock splits and stock dividends. The *empirical class* consists of predominantly empirical studies and investigates and documents the reaction of the aggregate stock market around the announcement (and/or the ex-date) of the decision to split (The current study falls under this second class or empirical class). The third class of papers studies the long term implications of stock splits and

compares market variables such as rates of returns, variance, short interest, market betas, traded volume, bid-ask spread, liquidity during pre- and post-event date periods.

Three of the most notable theoretical explanations are, as mentioned previously, the optimal trading range hypothesis, the signaling hypothesis, and the market maker hypothesis. In explaining the motivation behind stock splits, the optimal trading range hypothesis suggests that a stock split changes the stock price to a more optimal trading range which in turn increases the demand for stock, leading to a positive stock price effect (Lakonishok & Lev, 1987).

Forjan and McCorry (1995) claim evidence for an increase in market liquidity. Several studies like that of Lamoureux and Poon (1987) report that the number of shareholders increases after a split.

Myers and Barkay (1948); Barker (1956); Johnson (1966) and McNichols and Dravid (1990) provide further support for an optimal trading range.

Markets where dealers perform the task of the market maker have a different set of consequences of stock splits. Another school of theorists proposed the market maker hypothesis and argued that a stock split can increase the relative bid-ask spread, whereby the market maker will be more active in promoting the stock, leading to a positive stock market effects (Angel, 1997; and Schultz, 2000).

According to Ross (1977) and Leyland and Pyle (1977), managers use financial decisions such as stock split and stock dividends to convey favorable private information about the current value of the firm. Klein and Peterson (1989), Lakonishok and Lev (1987) provide further support for this.

The market generally react positively to the announcement of a stock split as suggested by Woolridge (1983), McNichols and Dravid (1990), Masse et al (1997), Lijleblom (1989), Bar-Yosef and Brown (1977). Numerous studies like that of Ramachandran (1985), Obaidullah (1992), Rao (1994), Rao and Geetha (1996), Srinivasan (2002), Budhraj I, Parekh P and Singh T (2004), and Mishra (2005) in India have dealt with the information content of various types of announcements.

A number of empirical studies report excess returns around the stock split event dates. Desai and Jain (1997) concluded that after splits, an excess HPR of 7.05% was realized for the following one year. They covered 5596 stock splits from 1976 to 1991. Studying 1275 stock splits by NYSE and ASE firms from 1975 through 1990, Ikenberry et al. (1996) got results further cementing the notion of excess returns around the event dates. They found 7.93% and 12.15% excess returns in the first year and the first three years after a splitting event, respectively. On the event date itself, 3.38% excess returns were realized according to their study.

However, contradicting views are also not uncommon. For example, Byun and Rozeff (2003) studied 12,747 stock splits for the period of 1927 to 1996. They found that stock splits were, in effect, value-neutral economic events.

Positive excess returns are not only common in the US markets but also available in other parts of the developed and developing markets both. For the Hong Kong bourses, Wu and Chang (1997) found excess returns upon studying 67 splits during 1986 and 1992. Their results show that 18.2% excess returns could have been generated for t-3 and t+3 days around a split announcement, indicating a rather weak informational efficiency for the Hong Kong stock exchange back at that point of time.

The story was not so different in the German stock exchange: Taking an event window of eight days (t+4 and t-4), Wulff (2002) reported excess returns around t=0. The magnitude of the returns are, however, significantly lower than the US markets. Similarly, in Denmark, a 2.5% excess return was found by Bechmann and Raaballe (2004). An increased payout from the splitting companies was the rationale behind such returns, as put forward by the researchers. For the Canadian stock splits, Elfakhani and Lung (2003) found out positive cumulative abnormal returns.

In looking at other types of impacts (mostly related to the market microstructure), researchers looked at liquidity using different types of proxies. Bley (2002) studied 40 stock splits in the German bourses during 1994 and 1996. He found that, after stock splits, daily trading volume decreased significantly for the class of high market capitalization stocks. Others like Conroy et al. (1990) used "bid-ask spreads" as a measure of liquidity and found an increase in them after a split, supporting the previous claims of decreased liquidity after the split.

3. Method

The Study uses the Event Study method to test the research questions put forward. It also borrows its economic model from Greene (2006). Below are descriptions of each of them.

3.1 Empirical Model and Data Details:

3.1.1 Model Specification:

The study uses the well accepted “event study method” to test the reaction of the DSE investors to the news of making the share face value BDT 10 on share prices in September 2011. For this purpose, the study used adjusted daily prices for sample stocks. In order to carry out an event study, we determine the event window as $t = -14$ to $t = +15$ relative to the event day $t = 0$ (effective date of the regulatory announcement of making the share face value BDT 10).

The two-tailed null has been hypothesized like the following:

$$H_0: AER_t = 0$$

$$(H_A: AER_t \neq 0)$$

Where AER_t means Average Excess Returns (AER) on day t .

3.1.1.1 Model for Short-Term Effects

We focus on the excess return (ER), i.e., the difference between the adjusted equity price and the expected return as proxied by the market return. This ER is calculated using a simple model:

$$ExRet_{i,t} = \frac{SP_{i,t}}{SP_{i,t-1}} - \frac{SP_{m,t}}{SP_{m,t-1}}$$

Where:

$ExRet_{i,t}$: excess return on equity i on trading day t ,

$SP_{i,t}$: stock price (adjusted) of equity i on day t ,

$SP_{i,t-1}$: stock price (adjusted) of equity i on the previous day $t-1$,

$SP_{m,t}$: value of the stock index M on trading day t , and

$SP_{m,t-1}$: value of the stock index, M , on the previous trading day, $t-1$.

The return on the market portfolio is proxied by the DGEN which used to be the broad index of the Dhaka Stock Exchange at that point in time. The DGEN is a market-cap weighted index. This study looks at the excess returns on individual stocks and not portfolio of stocks:

$$AER_t = ExRet_{i,t}, \quad t = [-14, -14, \dots, 0, \dots, +14, +15]$$

Where:

Where AER_t is the discrete Average Excess Returns (AER) on day t and $ExRet_{i,t}$ is the excess return on equity i on day t .

The two-tailed null has been hypothesized like the following:

$$H_0: AER_t = 0$$

$$(H_A: AER_t \neq 0)$$

The discrete returns are then transformed into log-returns (aer_t):

$$aer_t = \ln(1+AER_t)$$

The test statistic for the applicable t-test is as follows:

$$\frac{aer_t}{s}, (t = 30)$$

Where s is the sample standard deviation for 30 trading days surrounding $t = 0$, the effective date. aer_t is the transformed log-returns for every day traded.

3.1.1.2 Model for Long-Term Effects

To identify any longer-term trend that might be present in the data, we use firstly the discrete cumulative excess returns like the following:

$$CAER_t = \prod_{t=-14}^{t=+15} (1 + AER_t) - 1$$

Where:

$CAER_t$, cumulative average excess return up to trading day t and

AER_t is defined like before.

Again, we use the t-test after transforming the discrete cumulative returns into logarithmic returns like the following:

$$\frac{caer_t/t}{s/\sqrt{t}}, \sim t_{(t-1)}, t = \{1,2,3, \dots, 30\}$$

Where s and t are defined as above and $caer_t$ is the continuous cumulative average excess return over t days.

3.2 Data Details

3.2.1 Data and Sample

Two sets of data have been used in serving the purpose of this study. The first set of data consists of daily adjusted closing prices of the stocks selected for the study at the Dhaka Stock Exchange for the period covered by this study. Daily-adjusted closing prices are used in the study as these are assumed to reflect the consensus of the market participants regarding price of the stock at the end of the trading. Monthly data was not considered as there can be many surprises in a month besides the information content effect of BDT 10 face value of shares being studied. To be precise on testing the market efficiency, it is important to measure the impact of the event using the smallest interval possible. As per the availability of the data in DSE, daily data has been taken. The second set consists of the DGEN index of ordinary share prices compiled and published by the Dhaka Stock Exchange on daily basis. Data is collected from DSE library.

The sample consisted of 117 stock splits effective at or just after December 4, 2011 by companies listed on the DGEN index during the period November 13, 2011 to December 27, 2011.

The event date is defined as the effective date of the split determined by the Securities and Exchange Commission (SEC). This approach assumes that the information was first known to the market on the event date itself.

3.3 Setting the Context: Historical Risk-Return Performance of the Broad Market Index

Although the DSEX is the broad market index in vogue right now, the period of the event study tells us that the broad market index of interest for us is the-then broad market index, the Dhaka Stock Exchange General Index (DGEN). It was constructed back in November 24, 2001 using the IOSCO methodology and has been discontinued since 2013. It used to have two versions:

1. Current Index
2. Closing Index

For the current index, following is the algorithm:

$$\text{Current Index} = \frac{\text{Yesterday's Closing Index} \times \text{Current Market Capitalization}}{\text{Opening Market Capitalization}}$$

On the other hand, for Closing Index, the following algorithm is used:

$$\text{Closing Index} = \frac{\text{Yesterday's Closing Index} \times \text{Closing Market Capitalization}}{\text{Opening Market Capitalization}}$$

The formulae for calculating Current and Closing Market Capitalization are as follows:

$$\text{Current Market Capitalization} = \sum (\text{Last traded price} \times \text{No. of indexed shares})$$

$$\text{Closing Market Capitalization} = \sum (\text{Closing price} \times \text{No. of indexed shares})$$

The directive regarding the introduction of such an index was issued at November 17, 2001 by the Bangladesh Securities and Exchange Commission (BSEC) (erstwhile Securities and Exchange Commission (SEC)). The

beginning value of the stock was 817.63704 at November 24, 2001.

3.4 DGEN Return Analysis

Below are analyses of the DGEN from 2009 to 2011.

Following is a daily overview of DGEN during 2011 which includes trading data of 235 days during the year 2011. As can be seen, the year started with a value of just over 8,000 and after much fluctuation throughout the year, it ended at around 5,000. Therefore, the market lost around 38% of its value during one single year.

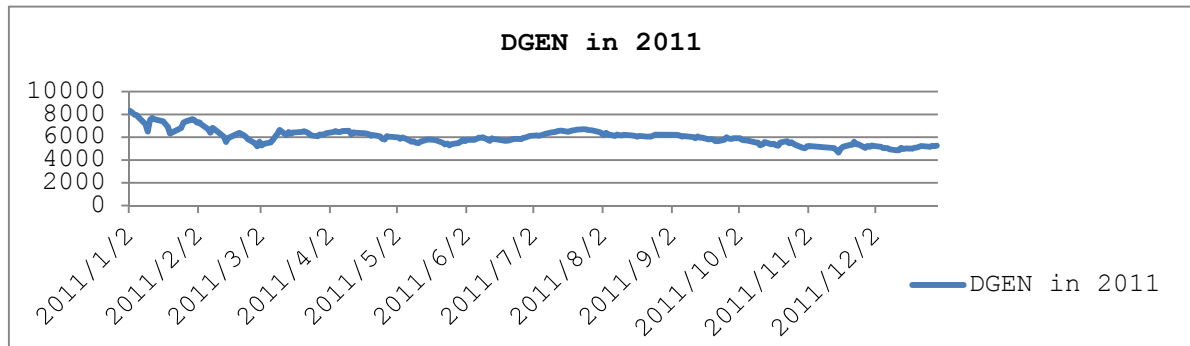


Figure 1. Daily DGEN during 2011

Following is a daily overview of DGEN during 2010 which includes trading data of 244 days. As can be seen, the year started with a value of just over 4,500 and again after much fluctuation throughout the year, it ended up at a value of just over 8,000. Therefore, the market gained around 77.8% of its value during the year.

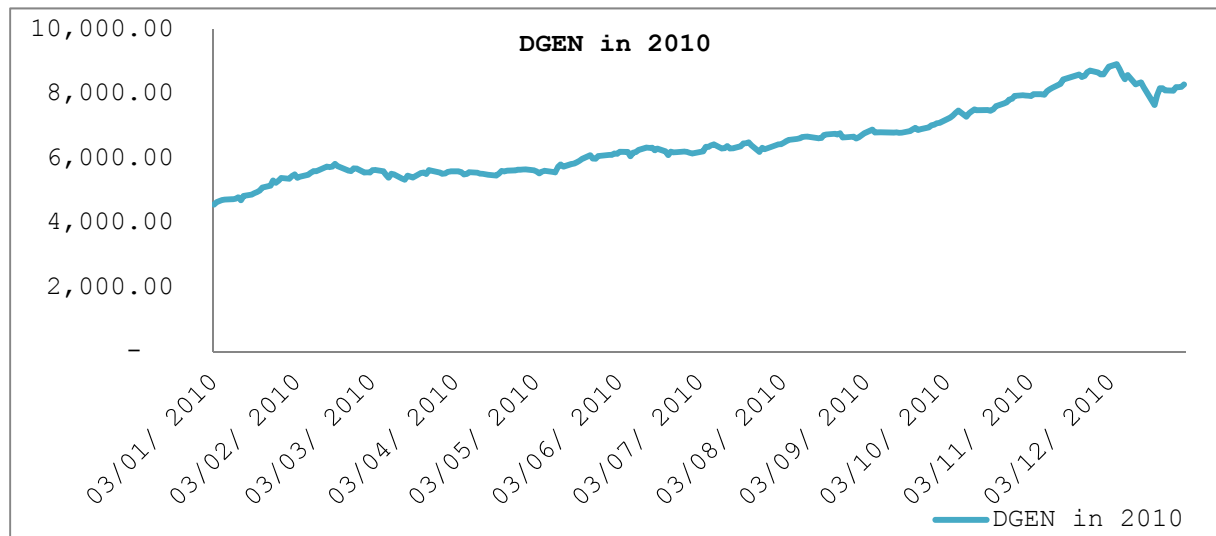


Figure 2. Daily DGEN during 2010

Following is a daily overview of DGEN during 2009 which includes trading data of 244 days. As can be seen, the year started with a value of just below 3,000, grew in a steady fashion throughout the year (with a sharp rise in the aggregate performance during the terminal months of the year when the much awaited national elections were due), it ended up touching the mark of 4,500. So, in other words, compared to the previous year, the market grew its capitalization by around 55%.

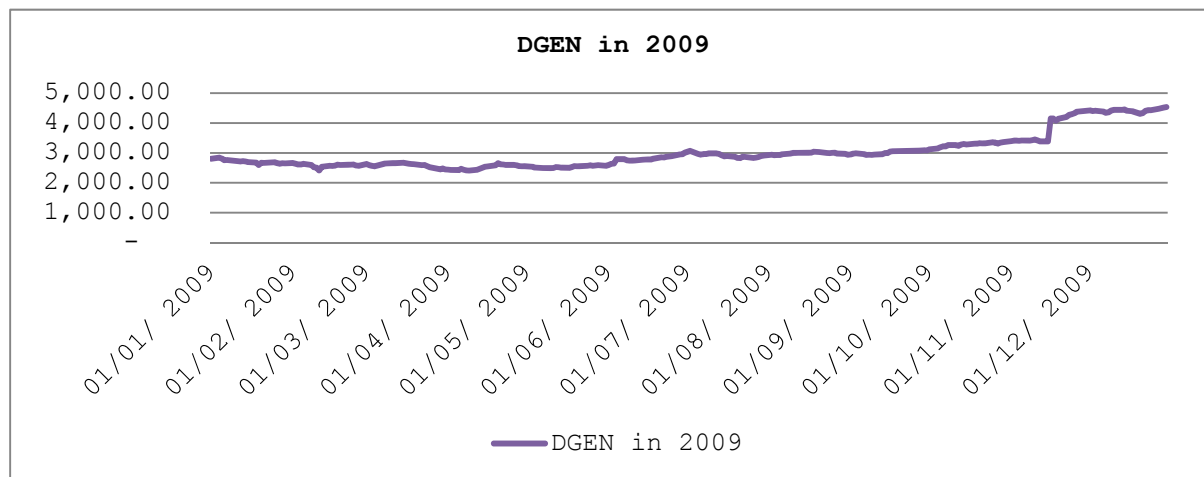


Figure 3. Daily DGEN during 2009

4. Results and Discussions

The main empirical results are presented in the following four tables. They illustrate the results of the entire sample consisting of 117 stock splits and two different time-bound dimensions of the analysis.

Table 1. Pattern of the average excess return (AER)

	Aer	T _{CALC} @ 5%	T _{CALC} @ 10%	T _{CALC} @ 20%
PRE-EVENT PERIOD	-14	-0.015156	-1.250054*	-1.250054*
	-13	-0.017233	-1.421390*	-1.421390
	-12	-0.010246	-0.845093*	-0.845093*
	-11	-0.001556	-0.128331*	-0.128331*
	-10	0.017819	1.469717*	1.469717*
	-9	0.021571	1.779147*	1.779147
	-8	0.026031	2.147004*	2.147004
	-7	0.010135	0.835970*	0.835970*
	-6	-0.004629	-0.381810*	-0.381810*
	-5	-0.010547	-0.869958*	-0.869958*
	-4	-0.003368	-0.277779*	-0.277779*
	-3	-0.002519	-0.207789*	-0.207789*
	-2	-0.001257	-0.103640*	-0.103640*
	-1	0.011508	0.949180*	0.949180*
	0	-0.010487	-0.864946*	-0.864946*
POST-EVENT PERIOD	1	-0.009773	-0.806038*	-0.806038*
	2	-0.006855	-0.565434*	-0.565434*
	3	-0.001134	-0.093569*	-0.093569*
	4	-0.005628	-0.464182*	-0.464182*
	5	0.017949	1.480456*	1.480456*
	6	0.015141	1.248860*	1.248860*
	7	-0.003851	-0.317611*	-0.317611*
	8	0.005278	0.435311*	0.435311*
	9	0.001779	0.146768*	0.146768*
	10	0.011671	0.962657*	0.962657*
	11	0.012082	0.996544*	0.996544*
	12	0.020307	1.674947*	1.674947
	13	0.005091	0.419941*	0.419941*
	14	-0.012101	-0.998104*	-0.998104*
	15	0.014766	1.217935*	1.217935*

In this study excess return from the market or market adjusted return has been considered. For examining the effects of stock splits in the short-run, average excess return on the securities has been used. The table shows the continuous average excess return (aer) and calculated respective T-values for examining the significance and deciding on whether to accept or reject the null hypothesis.

The symbol * indicates statistical significance.

It can be seen from the outcome table that there were 9 negative excess returns in the pre-event period. That means 5 returns from the pre-event period were positive. For the post-event period, there were 6 days with negative excess returns whereas 9 days with positive excess return were observed. The returns followed the following pattern.

Table 2. Outcome table of pre-event and post-event period

	Number of days									
Negative aer	4		5		Event	4		1		1
Positive aer		4		1	day		2		6	1

All the values at 5% significance level fall within the acceptance region whereas only 2 consecutive days were not within the acceptance region at 10% significance level. These two days were t-9 and t-8.

For values at 20% significance level, t-13, t-10, t-9, t-8, t5, and t12 days had values falling outside of the acceptance region.

The distribution of the average excess return depicts that there has been a strikingly equal distribution of days for positive and negative excess return. However, the T-values also portray the fact that an investor should not expect to have any significant excess negative or positive return by taking position before or after the event of the stock split, which is mandatory by nature.

The following figure shows the average excess return (continuous) pattern of the 117 securities that were split at December 4, 2011, following a regulatory step by the Securities and Exchange Commission. The pattern does not show any consistency in either of the periods: pre- and post-event.



Figure 4. Continuous Average Excess Return during the event window

Table 3. Pattern of the Cumulative Average Excess Return (CAER)

	Caer	T _{CALC} @ 5%	T _{CALC} @ 10%	T _{CALC} @ 20%
PRE-EVENT PERIOD	-14	-0.015156	-0.489919*	-0.489919*
	-13	-0.032654	-0.746400*	-0.746400*
	-12	-0.043242	-0.807037*	-0.807037*
	-11	-0.044867	-0.725174*	-0.725174*
	-10	-0.026238	-0.379305*	-0.379305*
	-9	-0.004100	-0.054109*	-0.054109*
	-8	0.022036	0.269233*	0.269233*
	-7	0.031952	0.365167*	0.365167*
	-6	0.027468	0.295976*	0.295976*
	-5	0.017208	0.175905*	0.175905*
	-4	0.013898	0.135455*	0.135455*
	-3	0.011413	0.106505*	0.106505*
	-2	0.010171	0.091189*	0.091189*
	-1	0.021563	0.186293*	0.186293*
	0	0.011301	0.094326*	0.094326*
POST-EVENT PERIOD	1	0.001639	0.013248*	0.013248*
	2	-0.005205	-0.040806*	-0.040806*
	3	-0.006345	-0.048345*	-0.048345*
	4	-0.012009	-0.089058*	-0.089058*
	5	0.006155	0.044491*	0.044491*
	6	0.021204	0.149575*	0.149575*
	7	0.017435	0.120155*	0.120155*
	8	0.022621	0.152475*	0.152475*
	9	0.024361	0.160744*	0.160744*
	10	0.035753	0.231147*	0.231147*
	11	0.047413	0.300579*	0.300579*
	12	0.066789	0.415499*	0.415499*
	13	0.071553	0.437110*	0.437110*
	14	0.060292	0.361913*	0.361913*
	15	0.074200	0.437914*	0.437914*

The symbol * indicates statistical significance.

The cumulative average excess returns (caer) are used to see the long-run impact of the stock splits on the securities returns. The table shows the continuous cumulative average excess return (caer) and calculated respective T-values for examining the significance and deciding on whether to accept or reject the null hypothesis. The striking fact is that all the values at 5%, 10%, and 20% significance levels fall within the acceptance region. The T-values also portray the fact that an investor should not expect to have any significant excess negative or positive return by taking position before or after the event of the stock split, which is mandatory by nature.

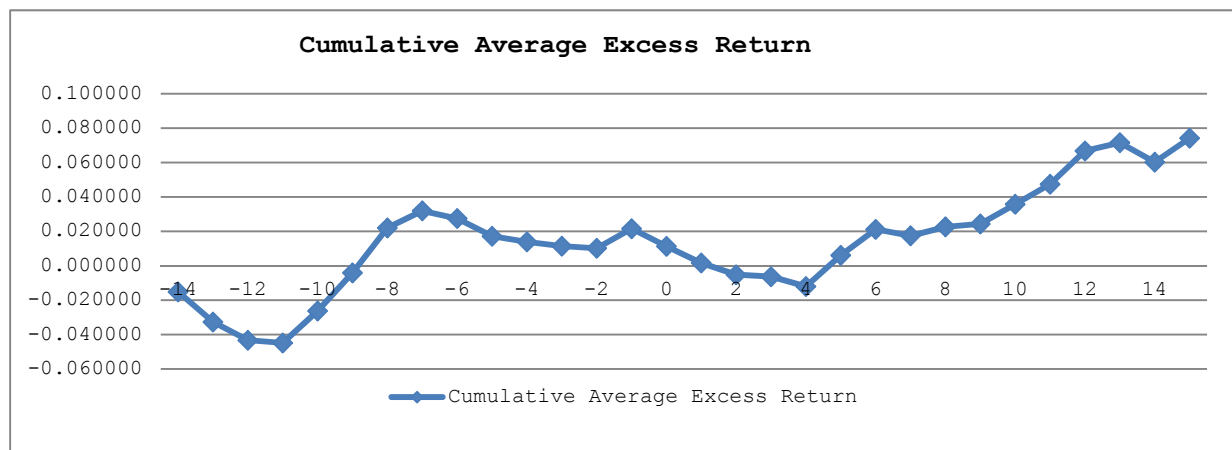


Figure 5. Continuous Cumulative Average Excess Return during the event window

From the distribution of the caer, it can be seen that there has been a symmetric wave-like trend before the event and a steady growth from $t+4$ which continued till $t+13$ and again came back at $t+14$ and $t+15$.

5. Discussions

After studying the empirical results based on the sample of 117 mandatory stock splits in December 2011, it is found that there is overall sort of an equal distribution of positive and negative excess return pattern on both sides of the event date. Moreover, the calculated T-values for the aer and caer during the 30 trading days (the event window) falling mostly within the acceptance region makes us fail to reject the null hypothesis.

Therefore, unlike some of the views presented in earlier literature concerning effects of stock splits in different markets around the world, this study found that stock splits, especially when they are undertaken as per regulatory directives, are basically a neutral event.

One strong explanation for this finding can be the mandatory nature of the split because most of the previous studies undertaken used sample data sets containing management-decision induced stock splits.

This study, if extended further with a two-sample data set, can provide important insight into effects of two different events: firstly, it can help understand whether there is a significant difference between management-decision induced splits and splits mandated by mandatory regulatory moves, and secondly it can help gain insight on whether the claim made by the SEC to bring harmony (or create a level-playing field) among the securities were correctly reflected in the view of the market participants. However, gaining these two insights would require much bigger data set and more complex econometric models like that of Brown and Warner, 1985.

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