Stock split announcement and return volatility: Evidence from Malaysia*

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Abstract

This study examines the impact of stock split announcement on stock return volatility in Bursa Malaysia during 2004–2014. The study uses event study methodology and investigates interaction relationships between various control variables. We found significantly positive abnormal returns on both splits announcement and announcement of book closing date, while they are insignificant on the splits execution date and circular-day. The finding indicates a stronger market reaction to the split announcement and execution date in the third period (2010-2014) compared to the first (2004-2006) and second (2007-2009) period. Also, the significant and positive abnormal return on the Ex-date in the third period demonstrates the effective role of securities regulation changes and improvement. We also found a significantly positive abnormal announcement return for the sub-samples, implying that from investors' viewpoint the stock splits in Bursa Malaysia is good news.

Keywords: stock splits, stock return, abnormal return, disclosure regulation

JEL Classification: G24, G28, G31, N25

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1 Introduction

Stock splits have become quite common and popular in stock markets as early as the beginning of the 20th century. Lakonishok and Lev [1] reported that 150 out of 837 firms implemented stock splits in the New York Stock Exchange (NYSE) during 1921–1930. Numerous studies have reported a positive market reaction to the stock split announcements. For instance, Ariff, Khan and Baker [2] found a significantly positive abnormal announcement return (0.8%) for Singaporean firms between 1983 and 2000. As such, Grinblatt, Masulis and Titman [3] indicated a significantly positive excess return (3.94%) in a three-day period around split announcement day for the listed firms in the Wall Street Journal Index. However, Ghazali, Taib and Othman [4] using Malaysian data found an insignificant abnormal return on announcement day during the period 1980–1993. Ghazali et al. [4] stated in their conclusion section: "Due to shortcoming of this study using old data, future rigorous study should be undertaken using recent data enabling comparison of ... However, it must be forewarned that data availability is far below expectation and is probably time-consuming to identify the actual event date."

The contradictory result between Ghazali et al. [4] and the other abovementioned studies is the first motivation to test splits announcement impact on stock returns using recent data. On the Bursa Malaysia's website, firms inform investors of every stage of a stock split procedure, which starts with an initial proposal on announcement day. After the split announcement, the firms file documents, and apply to get approval from Bursa Malaysia, then, firms dispatch a split circular to the shareholders. The circular informs investors of the date of the extraordinary general meeting (hereafter EGM) to seek shareholders' approval. After the approval, they announce book closing date and splits execution date (hereafter Ex-date) on a day called by Bursa Malaysia as the announcement of book closing date (hereafter Ann-BC day). The firms also set the payable date and record date in the next two days after the Ex-date. Since firms publish all stages of stock split procedure on the Bursa's website, investors are frequently being informed of a stock split. In other words, Bursa Malaysia motivates/forces firms to make repetitive announcements of the stock split. In the Speeds Activity Timeline (Appendix A) decreed by Bursa

Malaysia, the Ann-BC day is set at eight days prior to split Ex-date. In fact, investors are informed of the Ex-date on the Ann-BC day. This might reduce investors' uncertainty concerning whether/when a stock split is to be executed, and consequently, leads to a market reaction on the Ann-BC day. As for Australia, the study of Sloan [5] indicates a significant abnormal return in a five-day period prior to splits Ex-date. Moreover, Krieger and Peterson [6] found that abnormal returns are not associated with the anticipated stock splits. Investors being aware of Ex-date by the announcement of book closing date marks the execution of the stock split as an anticipated event. In this condition, being aware of Ex-date on Ann-BC day, a researcher might find an insignificant abnormal return on the split Ex-date. This expectation is also consistent with the finding of Sloan [5], which reports no abnormal return on the Ex-date. However, the finding of Sloan [5] differs with that in other studies on the U.S. capital market that indicate a significant abnormal return on splits Ex-date (Hardin, Liano and Huang [7], Maloney and Mulherin [8]). Sloan [5] presented some possible explanations, including small split sample size, and differences between institutional arrangements between U.S. and Australia. By incorporating the announcement of book closing date, this study provides more insight to researchers in clarifying market reaction to stock splits in the period prior to and on the Ex-date especially in Malaysia.

Moreover, Malaysia's Securities Commission (SC) has achieved the highest rank in the world in 2013.[1] According to Chapter 13 of the book of Listing Requirement set out in 2006 to the main market by Bursa Malaysia, a firm must submit an application for a stock split within a month after proposing the initial announcement. After Bursa's approval, firms must dispatch a circular to shareholders to get approval before execution in the market[2]. In December 2009, the SC issued a decree, which requires all

[1] According to the report of the Malaysian Reserve on 15 March 2013, Malaysia's securities regulation fully implemented 34 out of 37 (92%) securities-related principles assessed under the Financial Sector Assessment Programme (FSAP). The US scored only 16 out of 29 (55%) principles under the assessment in 2010, while Australia was ranked second after Malaysia with the implementation of 24 out of 37 (65%) principles. When releasing the SC annual report 2012, the Securities Commission (SC) executive chairman Datuk Ranjit Ajit Singh said, "This achievement is the highest among countries that recently underwent the assessment". He also pointed out that the major objectives of the Securities Commission were further strengthened in disclosure deadlines for the listed firms.

[2] This step, mandating firms to get approval from shareholders prior to Ex-date, is unique

publicly traded firms (those listed on the main market), to ensure that the value of each share post stock split must be no less than RM0.50 which was changed to that the par value of the splitting firm's share post-subdivision must be greater than RM0.10 in 2006. To address the changes in regulating stock splits in Bursa Malaysia and also the differences between Bursa Malaysia and the U.S. market we assess in this study the impact of change in stock split regulations on stock return volatility in Bursa Malaysia. We will also examine the impact during each of the sub-periods associated with the regulations changes in the periods in 2004–2006, 2007-2009, and 2010–2014, respectively.

Using event study methodology for 162 stock splits, we found a significantly positive abnormal return on announcement day for the whole study period (2004–2014). The finding also indicates that the market reacts positively, but insignificantly on both circular-day and split Ex-date while the reaction is significantly positive on the Ann-BC day. By comparing three different approaches used in calculating stock return anomaly, we find evidence that the abnormal returns on announcement day are similar in both sign and significance level for the whole period and also among the sub-periods. However, the magnitude of abnormal returns on the announcement day in both the second and third period are greater than that in the first period. In addition, there is a significant abnormal Ex-date return in the third period, while that is insignificant in the first and second period as well as the whole study period. The study also uses various control variables, including the duration of stock split process (interval time between split announcement and Ex-date), split factor, market value, price run-up, and sample purity of other firm's announcements to investigate the impact of stock split announcement on stock return. The results confirm the significantly positive impact on stock return for the sub-samples, implying that investors' viewpoint to the stock splits in Bursa Malaysia is seen as good news.

The rest of this paper is organized as follows. Section 2 provides a brief review of the existing literature on market reaction and financial

compared to U.S. market. This contrasts with the rule related to the split timing for the U.S. capital market: "In the U.S. Market, when a public company seeks to issue a stock split, it must register with the stock exchange it is listed in. Registration of stock splits at U.S. securities exchanges is mandated by the Securities and Exchange Commission Rule 10b-17. Section 10 of the SEC Act of 1934 obliges the applicable regulator to be notified of a stock split at least 10 days before recording the split's eligible stockholders, in addition to the date of stock split itself."

disclosure regulation, and develops several hypotheses. Sections 3 and 4 discuss the analytical framework and datasets employed in this study. In Section 5 we analyze the estimation results. Section 6 concludes.

2 Literature review and hypotheses

Financial economists theoretically consider stock split as a cosmetic accounting change, which has no effect on the proportional ownership of shareholders, as well as future cash flows of a splitting firm. However, stock splits involve stock liquidity (Copeland [9]), abnormal returns (Huang, Liano and Pan [10]), investor sentiment (Kim and Byun [11]), and ownership structure (Dennis and Strickland [12]). The pioneer study of Fama, Fisher, Jensen and Roll [13] reports a significant 30% abnormal returns in a two-month period prior to the month of split execution date. Following this, Desai and Jain [14] found 7.11% abnormal returns in the announcement month for a large sample of 5,596 firms during the period 1976–91.

One might challenge using monthly data because of the impact of other firms' announcements that might occur during a month. The study of Grinblatt et al. [3] highlights a major criticism on the Fama et al. [13]'s study as the effect of other simultaneous announcements in split announcement-month would be neglected. Grinblatt et al. [3] found a significant excess return (3.94%) in a three-day period around split announcement day. The study of Niini [15] also reports a significant abnormal return on split announcements in the Finnish and Swedish stock market over the period 1985–1997. In the case of the Malaysian market, Ghazali et al. [4], using old data, reported an insignificant abnormal return on split announcements for 31 splitting firms listed in the Malaysian market during the period 1980–1993. While other researchers (e.g., Grinblatt et al. [3], Huang et al. [10]) report a significant and positive abnormal return on announcement day. In this regard, to test if there is a market reaction to the initial split proposal on announcement day in Bursa Malaysia, the following hypothesis is proposed:

H1: There is a positive abnormal return on the announcement day.

In addition, Bursa Malaysia mandates splitting firms to dispatch a circular to get approval from shareholders at the extraordinary general meeting (EGM) prior to splits Ex-date. The circular includes information such as split factor, the rationale for the stock split, and date of EGM. The firms get approval on the day of EGM. Meanwhile, investors are informed of the exact date of splits Ex-date on Ann-BC day. Thus, the circular and especially the announcement of book closing date reduce investors' uncertainty concerning whether/when a stock split will be executed in the market. This might lead to a market reaction on the circular-day and Ann-BC days. This conjunction is consistent with the study by Sloan [5], which reports a significant abnormal return in the five-day period immediately prior to splits Ex-date in the Australian market. To investigate the market response to the circular and announcement of book closing date, the following hypotheses are proposed:

H2: There is a positive abnormal return on the circular-day.
H3: There is a positive abnormal return on the announcement of book closing date.

Moreover, Sloan [5] reports a zero-abnormal return on splits Ex-date, which differs from the studies on the U.S. capital market (such as Grinblatt et al. [3], Hardin et al. [7], Maloney and Mulherin [8]) that report a significant abnormal return on splits Ex-date. Grinblatt et al. [3] examined Ex-date effects of stock splits on stock returns and report a 1% excess return on split Ex-date. A similar finding is reported in Niini [15] study for the Stockholm Stock Exchange. Sloan [5] attributes the zero-abnormal return on splits Ex-date to factors including small split sample size, and differences between institutional arrangements between U.S. and Australia. In addition, Krieger and Peterson [6] find that abnormal returns are not associated with anticipated stock splits. This is because investors have already been informed of the Ex-date through either the circular or announcement of book closing date, and hence, abnormal returns are not associated with splits execution. In this regard, we propose the following hypothesis to examine market reaction to the stock splits on Ex-date:

H4: There is no abnormal return on the Ex-date.

Securities regulations aim to improve stock returns and help reduce the risk of investment. If securities regulations can lead to reduction in investment risk, stock price is likely to increase. Since the best way to reduce market uncertainty and risk is through providing information, the market is expected to respond positively to any stock split announcement in line with the securities regulations. The pioneer study by Stigler [16] indicates no significant difference in stock returns behavior in the U.S. capital market before and after the 1933 Securities Act. However, Friend and Herman [17] find a decreasing stock variance after the Act as it signals a low-risk environment for investors. Ingram and Chewning [18] study the financial disclosure regulation effects on stock returns, and report a positive monthly cumulative abnormal return associated with the Securities and Exchange Act of 1933–1934 for the pre-Act period in 1926–1933 and post-Act period in 1935–1940. Given that the market is likely to treat a stock split announcement as good news, especially when they relate to a firm's future performance, we expect that the regulatory framework changes in Bursa Malaysia in 2013, and the implements of the new splits requirements in both 2006 and 2009 would lead to a dynamic and positive impact on the investment environment and stock return over time. This leads us to propose the following hypothesis.

H5: There is a greater amount of abnormal return on the announcement day in the third period compared to the first period.

Related to this and the changes of the par value of post splits from RM0.10 to RM0.5, we expect the par value requirement of stock subdivision on Ex-date in the third period would generate more impact on the market performance than during the first period. Hence, we set the following hypothesis:

H6: There is a greater amount of abnormal return on the Ex-date in the third period compared to the first period.

3 Data

We employ the Company Announcement- Bursa Malaysia website to identify all firms that have stock splits. We also extracted information such as the date of announcement day, circular-day, Ann-BC day, and Ex-date from the Company Announcement. The Ann-BC day and Ex-date are crosschecked with the database of Bloomberg. Other data items including stock price and market value are compiled from the database of Datastream. Our sample consists of 162 stock splits announced during 2004-2014. The sample starts in 2004 because stock splits became more popular after that year. Table 1 presents some summary statistics for the stock splitting firms. Panel A of Table 1 presents the number of stock splits for the whole sample period and each sub-period as well. As can be seen, there is a decrease in the average number of splitting firms per year over time across the three sub-periods. We examine the effect of stock splits on stock return for the sample, and expect a positive effect consistent with the literature. We also test the effect of change in splits regulations on the stock splits impact on stock return among the three sub-samples. If the regulation changes were in line with the stock split effect, there would be a positive market reaction in the sub-periods as well.

To investigate whether or not there is a difference in stock return behavior among the sub-samples, we provide groups of splitting firms based on different control variables. A positive market reaction among all the groups would support the result of the whole study sample. Panel B reports the number of splitting firms based on their split factor. About 66% (107 observations) of the sample have a 2-for-1 stock split; another 34% (55 observations) have a split factor greater than 2. Panel C presents the summary of the number of splitting firms based on other simultaneous announcements. 82 (50.6%) firms had a pure stock split announcement while 80 (49.4%) firms announced stock splits simultaneously with other announcements, including bonus, rights, and warrant issues. Panel D (Table 1) shows a description of stock prices on the split announcement day distributed by a minimum price of RM0.035 to a maximum of RM35.25. Adjusting to the split factor makes a minimum of RM0.009 and a maximum of RM7.6.

The market value and price run-up of the firms are presented in Panel E

(Table 1). The market value is the average of market value over five consecutive trading days prior to the split announcement day, and the price run-up is the rate of return calculated using the price of day 260 and a five-day period prior to the split announcement. On average, market value was RM1281 million, and the firms experienced 78% price run-up. Also, the median of market value was RM274 million, and 47% for price run-up.

Table 1. Description of the sample

Panel A: by period	**No. of firms**	**Ave./year**
First Period: 2004-2006	65	22
Second Period: 2007-2009	50	17
Third Period: 2010-2014	47	9
Total	162	15
Panel B: by split factor	**No. of firms**	**Percentage**
Two-for-one	107	66.05
Five-for-one	24	14.81
Ten-for-one	19	11.73
Four-for-one	6	3.7
Three-for-one	2	1.23
Five-for-two	4	2.47
Panel C: by purity	**No. of firms**	**Percentage**
Pure	82	50.6
Contaminated with other announcements	80	49.4
Panel D: Stock Price (RM)	**Max**	**Min**
Unadjusted to split factor	4.67	3.06
Adjusted to split factor	1.71	1.08
Panel E:	**Mean**	**Median**
Market Value (million)	1281	274
Price Run-up (%)	78	47

This table presents stock splits during 2004 to 20014. The contaminated subsample includes firms that had a simultaneous announcement with the stock split. The market value is an average of market value over five consecutive trading days prior to the split announcement day. The run-up is the rate of return calculated using the price of day 260 and the five-day period prior to the split announcement.

Source: The Company Announcement-Bursa Malaysia Website. Stock prices and market value are compiled from the database of Datastream.

Table 2 presents stock price immediately prior to the Ex-date, and duration of the stock split process as well. The mean stock prices increased from RM0.96 in the first period to RM1.71 in the third period. This might be due to changes to the SC rules in regard to the value of each share post stock splits. Moreover, as shown in Table 2, the duration of stock splits process on average decreased from 114 days in the first period to 68 days in the third period, indicating the strengthening of disclosure deadlines by the SC in the third period.

Table 2. Price and Duration: By Period

	Period 1	Period 3
Stock Price (RM):		
Prior to Ex-date	0.96	1.71
Duration (days):		
Announcement to Ex-date	114	68

Source: Extracted from the Bursa Malaysia's website and the database of Datastream

4 Methodology

If stock splits are good news from the investors' viewpoint, then stock return changes would be positive on a split event day. To investigate the stock return changes on and around split event days, we use event study methodology. In Bursa Malaysia, firms repeatedly inform investors of each step of the stock split process, specifically on four days including announcement day, circular-day, Ann-BC day, and Ex-date. This study following Huang et al. [10] defines an event window as a five-day period, from the day (-2) to the day (+2), for each stock split day, (day 0). This covers the effect of telephone calling by the expert's analysts to the managers before split day, and the delay on informing the market after split day as well. To find a better explanation for stock return behavior, we examine the change of stock return over a two-year window surrounding the announcement day and Ex-date. Considering the four split days, a period from the day 260 prior to announcement day (estimation window) to the

day 260 after splits Ex-date provides nine intervals as follows:

Interval 1, the pre- announcement period: 1 – 260 (includes 260 days)
Interval 2, the announcement period: 261 – 265 (includes 5 days)
Interval 3, the announcement to circular period: 266 – 498 (includes 234 days)
Interval 4, the circular period: 499 – 503 (includes 5 days)
Interval 5, the circular to Ann-BC period: 504 – 648 (includes 145 days)
Interval 6, the Ann-BC period: 649 – 653 (includes 5 days)
Interval 7, the Ann-BC to Ex-date period: 654 – 678 (includes 25 days)
Interval 8, the Ex-date period: 679 – 683 (includes 5 days)
Interval 9, the post Ex-date period: 684 – 943 (includes 260 days)

The stock return change for an interval is deviation of the return average between the interval and pre-announcement window[3]. In order to calculate stock return changes, this study uses three approaches, including abnormal returns (AR), comparison period returns approach (CPRA), and market adjusted excess return. It provides evidence if there is/not any difference using different approaches. Following Fama et al. [13], and Chern, Tandon, Yu and Webb [19], the abnormal returns (AR) are predicted residuals from a regression of stock returns against market index returns in the pre-announcement window as follows:

$$AR_{i,t} = R_{\mathrm{i,t}} - \alpha_0 - \alpha_1 R_{m,t} \quad (1)$$

where: $AR_{i,t}$ is the abnormal returns; $R_{i,t}$ stands for the return of stock i on day t; $R_{m,t}$ is the market return on day t; α_0 is the intercept and α_1 is the slope coefficient.

The average of abnormal returns on the days in an interval represents the abnormal return in the event window, and the null hypothesis is defined as a zero-abnormal return on an event window. To test stock return movement during stock splits, this study uses the comparison

[3] Since each split day interval includes several days, the abnormal return in an interval is an average of abnormal returns on the days that an interval includes. For simplification, this study uses the expression 'abnormal return on a split day' instead of 'average abnormal returns in a split day interval, for instance, 'abnormal return on announcement day' instead of 'average abnormal returns on the announcement day interval.

period return approach (CPRA) used by Grinblatt et al. [3]. In this approach, the null hypothesis is defined as a zero mean daily returns computed in the event window. Following Grinblatt et al. [3], we use stock return deviation from market return as the market adjusted excess return, and the difference between excess return for each interval and that for the pre-announcement window as the Excess Returns. We compare the mean value of stock return for each interval to the pre-announcement window to test whether or not the stock return positively changes on and following a stock split event day.

This study aims to examine the interaction relationship between the control variables to identify if there is a significant difference in market reaction to the stock splits among the various subsamples. Since the control variables in this study are categorical variables and they are not independent variable, a regression is simply a tool to calculate the P-value on the constant term that identifies the significance of abnormal returns. When we use STATA command, a subsample will be considered as a base level, so, the coefficients of the regressions are the difference in abnormal returns between other groups and the base level. We propose the following specifications to investigate the impacts of stock splits decision on a firm's abnormal returns,

$$AR_{(it)} = \alpha_0 + \alpha_1 \text{Period}_{(it)} . \alpha_2 \text{Split Factor}_{(it)} + \varepsilon_{(it)}$$

$$AR_{(it)} = \beta_0 + \beta_1 \text{Period}_{(it)} . \beta_2 \text{Purity}_{(it)} + \varepsilon_{(it)}$$

$$AR_{(it)} = \gamma_0 + \gamma_1 \text{Period}_{(it)} . \gamma_2 \text{Split Factor}_{(it)} . \gamma_3 \text{Purity}_{(it)} + \varepsilon_{(it)} .$$

where the dot "·" is a sign of the interaction relationship between the categorical variables.

5 Results

In this section, we present the results of the stock split effect on stock return in three parts. First, we evaluate the stock return changes on and around the four split days. Then, we assess how changes to the securities regulations on stock split affect stock returns. Finally, we investigate if

there is any difference in abnormal returns among the groups categorized based on various control variables, including the duration of the stock split process, split factor, market value, and price run-up, and sample's purity of other firms' announcements as well.

5.1 Stock return

According to Fama [20], stock return anomalies are chance results and can be due to the approach used by a researcher. To examine if there is a difference between the methods, we use three different approaches to determine stock return changes on and around a split event day. Table 3 reports stock return changes among the intervals compared to the pre-announcement window (interval 1). As it shows, the results of two approaches, CPRA and Excess Return, are consistent with the abnormal returns in both sign and significance level. For instance, there is a positive and significant abnormal return (0.96%), and CPRA (0.91%), as well as Excess Return (0.96%) on split announcement day (Interval 2). This seems to suggest that stock return anomalies on and around split event days are not sensitive to the approaches used in this study. Thus, our focus will be on the abnormal returns.

In Bursa Malaysia, stock splitting firms need to first of all release news on the proposal of subdivision on Bursa Malaysia's website on the split announcement day. As can be seen in Table 3, there is a significantly positive abnormal return (0.96%) on split announcement day (Interval 2), indicating that investors take stock splits as good news. This result is consistent with that in Li, Stork and Zou [21], who report a significant positive abnormal return (AR) on split announcement day for the US sample during 2000–2009. On the other hand, the finding of significant AR on the announcement day contradicts with the result in Ghazali et al. [4] that no significant AR on announcement day was reported over the period 1980–1993. However, they found a significant cumulative AR prior to the announcement day, and conclude that there are possibilities of information leakage in the market.

Table 3. Stock return changes (%) among the intervals - Using three approaches

Interval	AR	CPRA	Excess Return
2	0.96	0.91	0.96
	(9.652)***	(-9.031)***	(-9.744)***
3	-0.16	-0.22	-0.15
	(4.893)***	(6.425)***	(4.463)***
4	0.11	0.05	0.11
	(-1.025)	(-0.461)	(-1.162)
5	-0.09	-0.12	-0.08
	(1.934)**	(2.493)**	(1.782)**
6	0.34	0.3	0.34
	(3.443)***	(-3.0231)**	(-3.532)***
7	0.09	0.06	0.09
	(-0.951)	(-0.662)	(-1.022)
8	0.08	0	0.09
	(-0.72)	(-0.022)	(-0.871)
9	-0.17	-0.25	-0.16
	(8.822)***	(11.923)***	(7.941)***

The abnormal return (AR) in an interval is the predicted residuals based on a regression of stock returns against market index returns in the pre-announcement window (Interval1). The difference between mean daily return for an interval and mean daily return in the pre-announcement are calculated for CPRA approach. The excess return is the difference between stock return and market return, and the difference between excess return for an interval and excess return in the pre-announcement window is presented in the Excess Return. ***, ** represent significant at 1%, and 5% levels, respectively. The t-value for t-test is shown in parenthesis.

The results in Table 3 also indicate the market reaction (0.11%) on the circular-day (Interval 4). In the circular, a firm encloses the date of the extraordinary general meeting (EGM), and a proxy form to seek shareholders' approval for the resolutions pertaining to the proposal to be tabled at the forthcoming EGM. Although there is a positive market response, it is insignificant on the circular-day implying that the circulars could not grab the attention of investors. The result also indicates a positive market reaction on the announcement day as well as circular-day, while AR decreased to a significant negative point of (-0.16%) and (-0.09%) in the Intervals 3 and 5, respectively.

As Table 3 indicates, there is a significantly positive AR (0.34%) on the Ann-BC day (Interval 6). One possible explanation is that the announcement of book closing date leads to a market reaction to the stock splits on the Ann-BC day. This result is consistent with the finding in Sloan [5] that there is a significant abnormal return prior to the splits Ex-date. Table 3 also shows an insignificant positive AR (0.08%) on the Ex-date (Interval 8). This can be explained by the fact that investors are already aware of Ex-date on Ann-BC day. The result is consistent with the finding by Krieger and Peterson [6] that AR is not associated with the anticipated stock splits. Although there is no significant AR (0.09%) in the post Ann-BC (Interval 7), it is a significant negative point (-0.17%) in the post Ex-date (Interval 9). Consistent with the finding of the study by Huang et al. [10], market reaction is found significantly negative in the post-split days (except Interval 7), while it is positive in the intervals of split days. There is a positive but insignificant AR in the interval between Ann-BC day and Ex-date (Interval 7).

5.2 The role of securities regulation

In this section, we examine the impact of stock split on stock return behavior during securities regulations changes. If the new split requirements in both 2006 and 2009 were in line with investors' viewpoint to stock split as good news, the market would react positively to the split announcements. Table 4 presents the empirical results on the impacts of security regulation and stock split announcement. The result shows that there are positive abnormal returns associated with stock splits on announcement day for the three sub-periods similar both in sign and level to the result of the whole study period (0.96%). The magnitude of abnormal announcement return (Interval 2) in both the second (1.17%) and third periods (1.12%) is more than that in the first period (0.68%). This result indicates investors are informed more effectively in both the second and third period compared to the first period which could be inferred as improvement in the securities regulation. This result is consistent with the finding of Ingram and Chewning [18] that shows a positive abnormal return in the post-Act of 1933-34 compared to the period prior to the Act.

Similar to the whole period of the study, the abnormal returns on Ann-BC day (Interval 6) are significantly positive in the first (0.31%),

second (0.46%), and third (0.26%) period. Also, the result for the circular-day (Interval 4) is insignificant for the three sub-periods consistent with the whole study period. However, as Table 4 shows the abnormal returns on the Ex-date (Interval 8) in the first (-0.18%) and second (0.18%) periods are insignificant while they are significantly positive in the third period (0.33%). The result for the third period is also inconsistent with the result for the whole study period, which is an insignificant abnormal Ex-date return (0.08). The first reason could be the change of the rule for the minimum stock price in the post stock split. With regard to the split rule changes in 2009, which requires a greater stock price in the post stock split, the firms with higher price could propose a stock split. As Table 2 shows, the stock prices prior to the Ex-date in the third period (RM1.71) is greater than that in the first period (RM0.96). According to the previous studies (Grinblatt et al. [3], Lamoureux and Poon [22]), the subdivision of stock price to a lower price on split Ex-date attracts investors to the stock split. If the prices are already low, a stock split could not grab the investors' attention while they would be interested in the subdivision of higher prices. Since the firms in the third period have higher stock prices, the investors' reaction on Ex-date is significant in the third period compared to the first and second period. This could be interpreted as a positive effect of the change in split requirements by the SC in Bursa Malaysia.

Table 4. Abnormal return (%) - By Sub-period

Interval	Period 1	Period 2	Period 3
2	0.68	1.17	1.12
	(-4.255)***	(-5.947)***	(-7.307)***
4	0.15	0.23	-0.09
	(-0.988)	(-1.174)	-0.603
6	(0.31)	(0.46)	(0.26)
	(-1.961)**	(-2.367)**	(-1.699)**
8	-0.18	0.18	0.33
	(-1.14)	(-0.908)	(-2.084)**

The abnormal return (%) for the intervals, including the announcement (2), the circular-day (4) and the Ann-BC (6), as well as the Ex-date (8) among the three sub-periods are presented. ***, ** represent significant at 1%, and 5% levels, respectively. The t-value is shown in parenthesis.

This study also tests the portion of each interval in relation to the abnormal returns. As Table 5 shows, the result is strongly consistent with the t-test result, in both sign and significance level. Abnormal returns are significant on split announcements (Interval 2) and Ann-BC day (Interval 6) but insignificant on circular-day (Interval 4) and Ex-date (Interval 8) for the whole sample as well as the sub-samples. There is an exception, a significant AR on Ex-date (Interval 8) in the third period, which is consistent with that for the t-test result.

Table 5. Relation between AR and Intervals: By the periods

Interval	Study Period	Period1	Period2	Period3
2	0.95	0.67	1.16	1.11
	(9.24)***	(4.21)***	(5.41)***	(7.08)***
4	0.1	0.15	0.21	-0.09
	(-0.97)	(-0.96)	(-0.98)	(-0.57)
6	0.34	0.3	0.46	0.26
	(3.25)**	(1.88)*	(2.12)**	(1.62)*
8	0.07	-0.17	0.16	0.31
	(-0.67)	(-1.09)	(-0.73)	(2.00)**

The results are the portion of each interval in relation to abnormal returns:
Abnormal Return (AR) = $\alpha_0 + \alpha_1$Interval + ε(it)

***, **, * represent significant at 1%, 5%, and 10% levels, respectively. The t-value for t-test is shown in parenthesis.

5.3 Control variables

In this section, we categorize firms based on various control variables and examine the effect of stock splits on stock return to identify whether or not the abnormal returns are positive. The control variables consist of split factor, sample purity of other firm's announcements, market value, and price run-up as well as duration of stock split process. We also test if there is a significant difference in abnormal returns between the groups to identify if there is a subsample with either insignificant or negative abnormal announcement return. We hypothesize there is no significant difference in abnormal returns among the subsamples except between the group of firms which had other simultaneous announcements (i.e. bonus, rights, and warrant issues) with stock splits.

To examine if there is a difference in the market reaction for the firms with different split factors, we subdivided the sample into two groups, firms with a split factor equal to 2 and those with a split factor greater than 2. The result of Panel A (Table 6) shows that the abnormal announcement return (AAR) for the firms with a split factor greater than 2 (1.16%) is insignificantly more than that for the firms with split factor equal to two (0.97%) in the overall period of study. This result is inconsistent with the finding of previous studies (e.g., Brennan and Copeland [23], Hausman, West and Largay [24], Huang et al. [10], Johnson [25], Mcnichols and Dravid [26]) that report there is a stronger market reaction to the splits with higher split factor. Nevertheless, our finding supports positive market reaction to the two sub-samples.

Moreover, the market reaction to a pure split sample might differ from the stock split announcements that are contaminated by other simultaneous announcements such as bonus, and rights and warrant issue. As the result of Panel B (Table 6) shows, the stock splits contaminated by other events (1.29%) significantly experience greater AAR than the pure sample (0.62%). This is consistent with the finding of the study by Grinblatt et al. [3], which presents stock split simultaneously announced with stock dividends experienced a greater excess return. Nonetheless, the AAR is significant and positive for the two groups.

Table 6. Abnormal announcement return (AAR)-Control variables: Split Factor, Purity

	AAR(%)	Difference	F (ANOVA)
Panel A:			
Split Factor =2	0.97		
Split Factor ≠2	1.16	0.21	0.4
Panel B:			
Pure	0.62		
Contaminated	1.29	0.67	4.86**

The firms are subdivided into two groups based on their split factor/purity. Abnormal announcement return (AAR) for each group are presented in the Panel A and Panel B. The one-way ANOVA is used to test the difference in AARs between the groups. ** represents significant at 5% level.

To test if there is a difference in the AAR for the firms with different market values, the splitting firms are categorized based on their market value on five days prior to the split-announcement window. To categorize price run-ups, the firms were subdivided based on the percentage changes of the average price on the five days to the price on the day 260 prior to the announcement window. The results of three categories of firms based on their market value and price run-up (Panel A, Table 7) indicate that AARs are positive while its difference among the groups is insignificant.

This study also tests if abnormal returns on announcement day (AAR) and Ex-date (AER) are sensitive to the duration of the stock split process (interval time between announcement day and split Ex-date). The result of Panel B (Table 7) shows that the AARs do not significantly differ among the groups of splitting firms categorized based on the duration. However, the result of AER (Panel B) indicates splitting firms that have a low duration (0.61%) experience significant greater abnormal returns compared to medium (-0.13%) and high (0.15%) duration. This could be interpreted as Ex-date for the group with a low duration of the stock split process grabs more investors' attention. Moreover, as Table 2 shows, there is a decrease in stock split process duration (announcement to Ex-date) from 116 to 68 days between two subsamples in the first and third period. The results (Panel B, Table 7) for the three categories including low, medium and high duration of stock split process support this conjunction that a lower duration in the third period results in a significantly positive AER.

Table 7. Control variables: Market Value, Price Run-up, Duration

	Low	**Medium**	**High**	**F(ANOVA)**
Panel A: AAR (%)				
Market Value (million)	1.28	0.68	1.17	1.61
Price Run-up (%)	0.74	0.99	1.08	0.33
Panel B: Duration				
AAR (%)	1.02	0.89	0.99	0.07
AER (%)	0.61	-0.13	0.15	4.41**

The firms are categorized into the three groups (low, medium, and high duration) based on their market value, and price run-up as well as duration of stock split process. The abnormal announcement return (AAR) for the groups categorized based on the firm's market value and price run-up are presented in Panel A. The abnormal return on the announcement day (AAR) as well as Ex-date (AER) for the groups categorized based on stock split duration process (announcement day to Ex-date) are presented in Panel B. The one-way ANOVA is used to test difference in AR between the groups. ** represent significant at 5% level.

In order to identify if there is significant difference in abnormal return between the subsamples, we investigate the interaction between the control variables. Table 8 presents the difference in AARs among the groups categorized based on a pair (Interaction No. 1) of control variables as either (period x split factor) or (period x purity). The result of Table 8 indicates there is no significant (5% level) difference in abnormal returns on the split announcements between the sub-samples and sample in the first row (Split Factor≠ 2 x Period 1 / Contaminated x Period 1).

Table 8. Difference in Abnormal announcement returns (AAR) -Interaction No. 1

	Difference (%)	t- statistic
Panel A:		
Split Factor≠ 2		
Period 1	0	
Period 2	-0.2	-0.32
Period 3	-0.5	-0.69
Split Factor= 2		
Period 1	-1	-1.88
Period 2	0	-0.04
Period 3	0	-0.06
Panel B:		
Contaminated		
Period 1	0	
Period 2	0.51	-1.02
Period 3	0.52	-0.91
Pure		
Period 1	-0.72	-1.49
Period 2	-0.11	-0.23
Period 3	-0.11	-0.28

The sample is categorized based on the two control variables. Panel A presents AARs result for interaction between split factor (SF) and period, and Panel B shows that between purity and period. Differences in AARs between a sub-sample and the sub-sample in the first row (base level) are presented. (The "." in the following formula is a sign of the interaction relationship between the variables.

$AR_{(it)} = \alpha_0 + \alpha_1 Period_{(it)} . \alpha_2 Split\ Factor_{(it)} + \varepsilon_{(it)}$

$AR_{(it)} = \beta_0 + \beta_1 Period_{(it)} . \beta_2 Purity_{(it)} + \varepsilon_{(it)}$

We also test the interaction between three control variables (Interaction No.2). Table 9 shows the difference in AARs between the groups categorized based on three control variables (period x purity x split factor) and contaminated sample in period 1 with SF≠2. The result indicates a significant difference between two groups of the firms in the first period; the category of a pure sample with split factor equal to two experiences significantly less abnormal returns (-2.2%) compared to the category of a contaminated by other events that have a split factor greater than two.

Table 9. Difference in Abnormal announcement return (AAR)-Interaction No. 2

	Difference (%)	**t-statistic**
Period 1, Contaminated, SF≠2	0	
Period 1, Contaminated, SF=2	-1.4	-1.74
Period 1, Pure, SF≠2	-1.2	-1.4
Period 1, Pure, SF=2	-2.2	2.64**
Period 2, Contaminated, SF≠2	-0.61	-0.47
Period 2, Contaminated, SF=2	-0.51	-0.61
Period 2, Pure, SF≠2	-0.12	-1.23
Period 2, Pure, SF=2	-1.51	-1.48
Period 3, Contaminated, SF≠2	0.31	-0.18
Period 3, Contaminated, SF=2	-0.61	-0.78
Period 3, Pure, SF≠2	-1.51	-1.67
Period 3, Pure, SF=2	-0.91	-1.04

The sample is categorized based on the three control variables, including split factor (SF), purity, and period. Differences in AARs between a sub-sample and the sub-sample in the first row are presented: (The "." in the following formula is a sign for the interaction relationship between the variables.

$AR_{(it)} = \gamma_0 + \gamma_1 Period_{(it)} . \gamma_2 Split\ Factor_{(it)} . \gamma_3 Purity_{(it)} + \varepsilon_{(it)}$

** represents significant at 5% level.

6 Conclusion

In this study, we first test the stock return behavior on and around stock split event days. Then, we examine the impact of changes in the regulatory framework in Bursa Malaysia and split requirement on the stock split effects on stock return. Our sample consists of 162 stock splits over the period 2004–2014. The significantly positive abnormal returns on split announcements for the whole sample as well as the sub-samples provided based on control variables imply that investors considered stock splits as good news in Bursa Malaysia. The finding also indicates the market reacts positively, but insignificantly on both circular-day and split Ex-date while there is a significantly positive abnormal return on the announcement day and announcement of book closing date. The finding implies that the announcement of book closing date can catch investors' attention, and reduce their uncertainty concerning whether/when a stock split will be executed. This finding provides additional evidence on the impact of stock splits on the stock return, and helps explain the insignificant/zero abnormal Ex-date return reported in some of the existing studies.

The results show that, even though there is an insignificant abnormal Ex-date return in the whole period as well as first and second periods, the abnormal Ex-date return is found significantly positive in the third period. The main reason could be due to the change for the minimum stock price requirement in the post stock split from RM0.10 to RM0.50 by the Securities Commission (SC). In regard to the change in rules, firms with higher stock prices are found more inclined to implement stock split in the third period. The subdivision of higher stock prices during the third period attracts more investors than the lower prices on Ex-date. The results also indicate that the magnitude of abnormal returns on announcement day in both the second and third period are higher than that in the first period. This could be inferred as that investors are more effectively informed in the second and third period compared to the first period, which might be considered a positive outcome for the new securities regulations.

In addition to the role of securities regulations, another contribution of this study is that we test the role of duration of the stock split process as a control variable. Tightening the disclosure deadlines by the SC leads to a decrease in the duration of the stock split process through the study period

especially in the third period. The results show that firms with a low duration of stock split process increase significantly the amount of abnormal Ex-date returns compared to the medium/high duration. This could be interpreted as that the stock splits categorized in a low duration process can capture more investors' attention than in the medium/high duration process. This may also be considered a positive outcome for tightening the disclosure deadlines by the SC. These findings have important implications for other capital markets implementing similar changes to the rules and regulations on stock splits, and also for firms in handling stock splits process.

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Appendix A

Speeds Activity Timeline