

The Effects of Stock Split Announcements on the Stock Returns in Bursa Malaysia (Kesan Pengumuman Pembahagian Saham terhadap Pulangan Saham di Bursa Malaysia)

Chin Chun How
Jesselton College

Wong Hock Tsen
Universiti Malaysia Sabah

ABSTRACT

This study investigated the presence of abnormal returns surrounding stock split announcements and the determinants of cumulative abnormal return and the split factor. This study utilized the financial data of 45 corporations that had exercised stock splits on Bursa Malaysia from the years 2011 to 2015. The dependent variables were cumulative abnormal return for 40 days, cumulative abnormal return for 60 days, and the split factor. The independent variables, dividends per share and earnings per share, represent the signalling hypothesis for the stocks in Malaysia, while the bid-ask spread and the trading volume represent the liquidity hypothesis and the market capitalization, respectively. The significance of abnormal returns surrounding stock split announcements was tested using standardized t-statistics. The determinants of cumulative abnormal return and the split factor were determined based on Ordinary Least-Squares (OLS) multivariate regression and Stepwise Least-Squares. The empirical results show that there was a statistically significant positive abnormal return on day 1 [+1] after the stock split announcements. Dividend per share was found to have a statistically significant relationship with the cumulative abnormal return; thus supporting the signalling hypothesis. Bid-ask spread and trading volume were the main determinants of cumulative abnormal return, supporting the liquidity hypothesis under a different estimation window. Bid-ask spread was the only important determinant for the split factor. The results of this study could help investors and policymakers to design policies to improve the overall market efficiency in Malaysia, particularly to increase the effectiveness of information disclosure regarding Malaysian stocks.

Keywords: Stock split announcement; abnormal return; Malaysia

ABSTRAK

Kajian ini bertujuan untuk menentukan kewujudan ketidaklaziman dalam pengumuman pembahagian pasaran saham dan juga penentu untuk ketidaklaziman setiap pulangan kumulatif atau terkumpul. Kajian ini menggunakan data dari tahun 2011 sehingga 2015 bagi setiap organisasi yang menjalankan pembahagian saham di Bursa Malaysia. Terdapat sejumlah 45 buah syarikat yang telah dijadikan sampel dalam kajian ini. Pemoles boleh ubah bersandar bagi kajian ini merujuk kepada pulangan kumulatif atau terkumpul secara ketidaklaziman selama 40 hari dan juga anggaran selama 60 hari daripada aspek faktor pembahagian. Dalam kajian ini juga, pemoles boleh ubah bebas dapat diklasifikasikan sebagai saham dividen, perolehan setiap saham, penyebaran setiap tawaran dan juga jumlah dagangan yang turut merujuk sebagai hipotesis isyarat dan hipotesis kecairan bagi setiap saham di Malaysia. Kepentingan ketidaklaziman pulangan dalam pembahagian saham ini juga telah diuji melalui beberapa ujian seperti t-test, regresi multivariat kaedah kuasa kecil terkecil (OLS) dan juga Stepwise Least Squares. Penemuan kajian mendapati terdapat statistik yang signifikan dan positif selepas pengumuman pembahagian saham. Jumlah dagangan dalam kajian ini juga adalah penentu utama untuk pulangan kembali normal dan ini menyokong hipotesis kecairan walaupun dalam anggaran yang berbeza. Selain itu, faktor bida dan tawar turut berfungsi sebagai penentu dalam faktor pembahagian. Keputusan kajian ini dapat membantu para pelabur dan pembuat dasar untuk merangka strategi bagi meningkatkan keseluruhan kecekapan pasaran di Malaysia, terutamanya untuk meningkatkan keberkesanan pendedahan maklumat mengenai saham Malaysia.

Kata kunci: Pengumuman pembahagian pasaran saham; pulangan ketidaklaziman; Malaysia

INTRODUCTION

Stock splitting of ordinary shares has long been a normal practice among public-listed corporations in

developed countries. As Malaysia is moving towards developed country status under Vision 2020, the capital market activities in Malaysia, specifically some important corporate actions such as stock



splits should be analysed. The stock split exercise in Malaysia has faced its fair share of ups and downs, as it was once terminated in 1993 before resuming in 2000 due to the implementation of the First Capital Market Masterplan for Bursa Malaysia. In 2015, 14 corporations exercised stock splits in Bursa Malaysia whereas only 2 corporations in the Singapore Stock Exchange opted to exercise stock splits. Singapore is selected as a comparison because it is a developed country. Besides, the comparison shows that stock split exercises in Bursa Malaysia are more common and significant than the stock markets in other developed countries such as Singapore, which is also part of South East Asia. Hence, a study on the stock splits in Malaysia could contribute to a better understanding of Malaysia's capital market, therefore assisting policymakers to expedite Malaysia's aim of becoming a high-income nation by the year 2020. Additionally, it is important to note that research on stock splits in Malaysia is still scarce despite a growing number of corporations exercising stock splits each year. As such, only Annuar and Shamsher (1992), Baharuddin et al. (2010), Tabiban (2013), and Zahiruddin et al. (2014) had reviewed the stock splits in Bursa Malaysia. However, the findings are inconclusive; Annuar and Shamsher (1992) found that stock splits produced positive abnormal returns for investors whereas Zahiruddin et al. (2014) revealed insignificant abnormal returns for corporations between 1980 and 1993. In other South East Asian countries such as Indonesia, Lasmanah and Bagja (2014) examined the differences in abnormal return and trading volume before and after a stock split event for companies listed on the Indonesian Stock Exchange. The examined period totalled up to 4 years; from 2010 to 2013. The study found that there was no significant abnormal return or trading volume of the stocks that had been stock split in the Indonesian Stock Exchange. On the other hand, Leemakdej (2007) evaluated abnormal return within an uncertain event window in Thailand. They found that stock splits lowered the systematic risk of the stocks but had no effect on the liquidity of the stocks. Furthermore, the stock split could act as a signal before the issuance of the stocks; therefore, minimizing the negative effect of the split date.

Earlier studies in Malaysia, namely Annuar and Shamsher (1992) and Zahiruddin et al. (2014), found inconclusive results; hence it is not possible to generalize the effect of stock splits on the Malaysian stock market, leaving a gap in research. Therefore, this study examines the effect of corporations' stock split announcement on the stock earnings and stock liquidity in Malaysia. Also, the perception of investors toward corporations' stock split announcements should be tested based on the abnormal return pattern before and after the stock split announcements in Malaysia. Generally, a stock split occurs when a corporation multiplies the number of outstanding shares by a certain ratio, leading to share

price shrinkage but unchanged market capitalization. According to Fama et al. (1969), stock split resembles an exchange of shares, in which at least five shares are distributed for every four formerly outstanding. Stockholders will obtain extra shares for every share previously held when the corporation exercises the stock split. Stock splits can appear in any kind of ratio, but the most common are 2:1; 3:2; 5:4; 4:3, etc. (Dhar & Chhaochharia 2008). For instance, if a corporate performs a 2-for-1 stock split, every shareholder will receive 2 unit of shares given that they are holding 1 unit of pre-split shares; therefore, directly increasing the total outstanding shares of the corporation while the total market capitalization remains the same as before the stock split.

This important corporation exercise has attracted the attention of many academicians and practitioners such as corporation managers, who have found that stock split is an essential tool for corporations to market themselves at a lower cost. Moreover, an understanding of stock split engenders effective investment strategies whereby new prices after the split are undeniably more affordable and attractive to newly interested retail investors. Besides, this exercise fulfils the demand of existing shareholders by providing a sense of greater wealth through the enhancement of total held shares (Groover 2001). As for academicians and professionals, such a study is crucial for examining the credible reasons for corporations to split their shares, which are associated with the abnormal changes in stock price and return, particularly due to the phenomenon of the corporation share price increase while retaining the underlying value of the corporation after the announcements. For example, share splits are normally explained using the signalling hypothesis (Ikenberry et al. 1996) and the optimal trading range hypothesis (Copeland 1979).

Fama et al. (1969) conducted a fundamental empirical study on stock split as an indication of stock returns. The study suggested that managers should utilize stock splits to send indications of stock returns to investors, who usually do not have sufficient information regarding the stock. The study implied that stock split announcements are usually interpreted as an increased probability that the market will increase its future dividends. According to the signalling model of Spence (1973), Ross (1977), Leland and Pyle (1977), Bhattacharya (1979), and Ikenberry et al. (1996), it is the management's financial decisions to relay data regarding a corporation's value. Hence, the signalling hypothesis assumes that investors have asymmetric information, so the managers have to signal good information about the corporation through stock split exercises. In doing so, the financial managers are seen to be optimistic of the corporate's future earnings; eventually leading to an increase in stock price. Copeland (1979) pioneered the study on the trading range hypothesis, arguing that corporations are more willing to maintain the prices of

their stocks within a specific range. To be precise, the rationale of maintaining a specific price range is to be able to induce a certain kind of clientele or to dissolve the share possession of the corporations, which falls to a lower price range following the stock split. This lower price usually attracts uninformed or small investors. The study found evidence to prove that lower share prices would attract the attention of investors and then improve the possession base, leading to the majority of the financial managers in the corporation affirming that the stock split is an essential tool to guide the stock price towards an optimal trading range.

Extensive studies on stock splits provide important findings for all investors, as investors will be able to identify the market reaction towards the stock split announcements on Bursa Malaysia. From the investors' point of view, this study can provide guidelines regarding the extent to which the stock split announcement affects the Malaysian stock market, which in turn provides direct benefits for portfolio managers as well as individual stock investors, owing to the better stock return prediction and the creation of investment opportunities arising from the stock splits of the mentioned investors. Furthermore, this event will increase the confidence of international investors to invest in the Malaysian stock market, provided that the market is efficient. For instance, provided that the firms produce good positive correlation price or return reactions to the stock split announcements, investors should buy their shares after the events or sell off the shares when the prices or returns start to decline. Moreover, Securities Commission Malaysia (SC) could require listed companies desiring to exercise stock splits in the Malaysian stock market to disclose information and only resume it after the implementation of the First Capital Market Masterplan. SC is a policymaker to consider underlining the added information disclosure during the stock split events as mandatory, as the investors might experience a loss in the long term when they hold on to their shares for more than one year if the stock splits only aim to follow the market optimism, but for no other valid reasons such as excessive earnings or reserves (Massa et al. 2007).

LITERATURE REVIEW

The unique impact of stock split announcements on a corporation's share price, while leaving the total book value unchanged, has attracted vast interest from academicians and professionals. In the short run, the market reaction towards stock split announcements is normally positive. For instance, Grinblatt et al. (1984) reviewed the split of stocks in the US market from 1967 to 1976 and found that the stocks experienced 3.3 percent abnormal returns over a two-day event window around the split announcement. In the Asian market, Wu and Chan (1997) discovered abnormal returns in the

Hong Kong Stock Exchange for 67 stock splits sampled from the period 1986 to 1992. The findings showed a positive significant excess return of 18.2 percent around three days before and after the split announcement. Tabiban (2013) investigated the stock split effect of 22 corporations on Bursa Malaysia during the period 2010 to 2011 and found positive and significant 1.38 percent abnormal returns on the announcement day as well as 1.13 percent excess return on the Ex-date. In the case of the signalling hypothesis, Grinblatt et al. (1984) examined the valuation effects of stock splits and stock dividends and found that partial data related to the stock split and stock dividend was likely linked with the corporation's future cash flows, future earnings, or share values. Doran (1994) investigated 164 stock splits from 1971 to 1982 by revising analyst forecasts of stock-splitting corporations. He found that the stock-splitting corporations gained higher profits than that forecasted by the analysts. The analysts were therefore signalled to raise the forecasts on the earnings of corporations executing stock splits. However, it was found that a firm's utilization of stock splits to mislead could not be sustained or continued for long. Joshipura (2013) carried out a study on how the Indian Stock Market reacted to the splitting of large and liquid stocks from the period of 2001 to 2012 and found positive abnormal return on the ex-split date that reversed almost immediately, which led the author to conclude that the liquidity, signalling, and optimal trading range hypotheses were not supported.

On the other hand, Lamoureux and Poon (1987) also found that the daily frequency of transactions together with the raw trading volume of shares increased after the exercise of stock splits among corporations, supporting the liquidity hypothesis. Moreover, Kryzanowski and Hao (1996) utilized trading value to measure both minor and larger investors and discovered that minor investors engaged in trading more frequently following the stock splits following which the trade direction would switch heavily from sell orders to buy orders. Michayluk and Kofman (2001) investigated the stock splits of corporations listed on NASDAQ, by examining the impact of the stock splits on liquidity, and observed a decline in most measures of liquidity following the stock split and a greater decline in the liquidity for large rather than small corporations, which did not continue for long after the split. Leung et al. (2006) studied the effect of stock splits using intraday and insider trading data from the Hong Kong Stock Market spanning 1980 to 2000. The study used regression analysis and found evidence that supported the possible signalling role of split announcements under increasing liquidity. Abnormally high amounts of insider trading activities 3 to 4 months before the announcement of stock splits and in the post-announcement period were found. Increases in the price after the stock splits were also observed, believed to be due to the improved liquidity and

favourable signals. Aduda and Caroline (2010) studied the effect of stock splits on the Nairobi Stock Exchange. The sample of the study consisted of 9 corporations that had exercised stock splits from 2002 to 2008. They determined whether the stock splits caused any reaction in the Kenyan Market using trading activity ratio. The study also used daily-adjusted prices for the sample stock over an event window of 101 days, i.e. 50 days before and after the stock split. Abnormal returns were calculated using the market model and significance was tested using t-statistics. The Kenyan Stock Market was found to have a positive reaction to the stock splits, with increased trading activity being recorded.

Some studies proved the announcement of stock splits to be a neutral event. For instance, Byun and Rozeff (2003) studied 12, 747 stock split cases for the period of 1927 to 1996 and found that the stock splits were, in effect, just a value-neutral economic event. Furthermore, Hossain (2017) examined 117 stock splits in Bangladesh in 2011 and found that there was an equal distribution of positive and negative excess return, suggesting that mandatory stock splits in Bangladesh were neutral events.

As for the split factor, Ohlson and Penman (1985) had obtained a significant increase in the return volatility in US-based equities after the announcement of stock splits with split factors larger than 5-for-4 and lasted for one year after the stock splits. A mean increase of 30% in the standard deviations of returns was observed. Moreover, McNichols and Dravid (1990) mentioned that the corporation, by choosing their respective split factor, in effect signified private information about the corporations' future performance. Besides that, Reboredo (2003) studied the Spanish Stock Market and found that 2-for-1 stock splits and larger stock split led to increased volatility in returns for 1998 and 1999. In more recent literature, Ansary and Hussien (2017) found that the positive impact of the stock split events improved for split factors of 4-for-1 or higher.

In Malaysia, Zahiruddin et al. (2014) found that although there was a sudden increase in cumulative abnormal return between 1980 and 1993 in the Kuala Lumpur Stock Exchange, the increase was insignificant for the firms involved. Before that, Annuar and Shamsher (1992) conducted a study to investigate the effects of stock splits and rights issues announcements on the share prices in Malaysia. In particular, they discovered that these announcements created movements in the market and the reactions eventually produced positive abnormal returns to the investor. The study was done on the Malaysian Stock Market and focused on the stock split announcements, but it was not as comprehensive as the developed market, so there is still a need to carry out the further examination in this area. Furthermore, it is not possible to generalize the Malaysian Stock Market's reaction to stock splits, leaving a gap in this area of research.

DATA AND METHODOLOGY

This study used data from 45 selected corporations listed on Bursa Malaysia. Only corporations that had announced its forward stock splits between 1st January 2011 and 31st December 2015 were selected. Financial Data such as stock prices, split factor, and stock split frequency was gathered and compiled from Bursa Malaysia. Besides that, bid and ask price, trading volume, market capitalization, dividend per share, and earnings per share were extracted from Thompson's Financial Data, KLSE Daily Diary, and press releases and financial reports from related companies.

The split factor is the number of new stocks in exchange with existing stocks. The sampling period was between 1st January 2011 and 31st December 2015. All split factor information was gathered from Bursa Malaysia official announcements. Stocks with a split factor of less than 1.5 were not included, as a split factor of less than 1.5 is similar to stock dividends, which is beyond the scope of this study.

TABLE 1. A Summary of the Stock Split Factor of Malaysian Stocks, 2011–2015

Year	Factor					Total
	2	2.5	4	5	10	
2011	5			1	1	7
2012	1		1			2
2013	4			4		8
2014	13	1		1		15
2015	10	1	1	2		14
Total	33	2	2	8	1	46*

Source: Bursa Malaysia.

*Luster Ind. Bhd was removed from the study due to its incomplete dataset

The first step in measuring the performance of an event study is to separate the estimation windows into several different windows. For a typical event study, the pre-event period is normally determined before the announcement day whereas the post-event period starts immediately, on the announcement day. The event date, namely the split announcement date, is normally defined as $t = 0$. For this particular study, the pre-split window was set to $[-70, -11]$ trading days before the split announcement to prevent disturbances on the stock split from other corporate actions such as stock dividends, bonus issue, and mergers (Conroy et al. 1990). Hence, T_0 represents 70 days before the announcement day and T_1 represents 11 days before the announcement day. In total, these days make up a 60-day pre-split estimation window. Similarly, the post-split period was set to $[11, 70]$ trading days after the announcement day. As such, T_2 indicates 11 days after the announcement date and T_3 indicates 70 days after the stock split announcement,

which was then categorized into the post-event window. Most importantly, in total, a 21-day event window [-10, 10] was included in the estimation for abnormal returns. On the other hand, the pre-split window was referred to as [-50, -11] days in the 40-day estimation window, correlating to a shorter duration from the announcement date as compared to the 60-day estimation window. Also, the post-split period comprised a total of 40 days from [11, 50] whereas the event window remained the same as [-10, 10], a total of 21 days. The 40-day and 60-day estimation windows apply to all of the 45 corporations that had exercised stock splits within the year 2011 to 2015. The selection of the event window is crucial for observing the effects before or after the announcement day, which will enable the researcher to determine the efficiency of Malaysia's stock market during the announcement. Baharuddin et al. (2010) had utilized a similar event window when conducting their research. Under normal circumstances, the OLS is a useful procedure to estimate constant mean model parameters. To get the respective individual normalized returns, equation (1) is used:

$$R_{i,t} = \frac{P_t - P_{t-1}}{P_{t-1}} \times 100 \quad (1)$$

where $R_{i,t}$ is the daily return security i at day t ; p_t is the daily price at day t , and p_{t-1} is the daily price at day $t - 1$.

The mean adjusted model utilizes the average daily returns of an individual stock as the benchmark for computing abnormal returns. Under the mean-adjusted mode, it is assumed that the mean return of the security will be constant over time, which is also often regarded as the Constant-Mean-Return model. Although the mean-adjusted model appears to be non-complicated, Brown and Warner (1985) mentioned that the mean-adjusted model could produce similar results compared to other more complicated models. This is because the variance in the excess return will not be minimized although more complicated models are utilized (Mackinlay 1997). Hence, the mean-adjusted model was used in this study to calculate the abnormal return, as determined using the OLS equation provided by equation (2):

$$R_{i,t} = \mu_i + \varepsilon_{i,t} \quad (2)$$

where μ_i is the mean for security i and $\varepsilon_{i,t}$ is the error term for security i at day t with an expectation of zero mean and constant variance.

According to the constant mean model, the predicted return can be obtained by averaging the non-split period return of stock i , as per equation (3):

$$ER_{i,t} = \mu_i \quad (3)$$

where $ER_{i,t}$ is the expected return of corporation, i at day, t and μ_i is the mean for security i .

The main purpose of an event study is to examine the effects of an observed event, in this case, the stock

split announcement. To examine the announcement effect of stock splits, the abnormal return was calculated. Abnormal return can be defined as the mathematical difference between observed returns and the returns predicted for the day. This study used mean return for prediction purposes, so these returns were generally referred to as mean-adjusted returns. Furthermore, the abnormal returns were grouped together to obtain inferences about the overall event.

Thus, the abnormal return was obtained using equation (4):

$$AR_{i,t} = R_{i,t} - ER_{i,t} \quad (4)$$

where $AR_{i,t}$ is the abnormal return of corporation i at day t , $ER_{i,t}$ is the expected return of corporation i at day t and $R_{i,t}$ is the normalized return of corporation i at day t .

Abnormal return is seldom beneficial in drawing general inferences about the effect of any event; hence it is more suitable to transform abnormal returns into cumulative abnormal returns (CARs). Aharony & Swary (1980) mentioned that the cumulative abnormal return (CAR) behavior for the days surrounding corporate event announcements ($t = 0$) could be obtained via the summation of $AR_{i,t}$ over the event window. For each event date t , the cross-sectional average abnormal return for all splitting corporations could be obtained using equation (5):

$$AR_t = \frac{1}{n} \sum_{i=1}^n AR_{i,t} \quad (5)$$

The cumulative abnormal return (CAR_t) for all corporations is calculated using equation (6):

$$CAR_t = \sum_{i=1}^n AR_{i,t} \quad (6)$$

A standardized cumulative abnormal return ($\widehat{SCAR}_{i,t}$) could be generated by dividing the cumulative abnormal return by its respective non-split period standard deviation as per equation (7):

$$\widehat{SCAR}_{i,t} = \frac{\widehat{CAR}_{i,t}}{\sigma_{i,t}} \quad (7)$$

where $\widehat{SCAR}_{i,t}$ is the standardized cumulative abnormal return of corporation i at day t , $\widehat{CAR}_{i,t}$ is the cumulative abnormal return of corporation i at day t , and is the non-split period standard deviation of corporation i at day t .

The standardized t-statistic was used as the significance test to test the null hypothesis of this study, which states that the portfolio abnormal return on each day is zero. Due to the nature of daily data, Brown & Warner (1985) mentioned that the testing of significance using standard parametric tests is well specified under different types of conditions. Moreover, Berry et al. (1990) studied the significance of parametric tests and non-parametric tests, which solely focused on daily data. Their results showed that parametric t-statistics worked well under numerous conditions but non-parametric t-statistics did not work well, as the sampling distributions

were not normally distributed. Hence, the hypotheses for the standardized t-statistics are given by equation (8):

$$\begin{aligned}
 H_0 : CAR_{i,t} &= 0 \\
 H_1 : CAR_{i,t} &\neq 0
 \end{aligned}
 \tag{8}$$

In many cases, the financial data extracted in time-series or cross-sectional studies sometimes contain some form of autocorrelation or heteroscedasticity. Bernard (1986) stressed that the usual OLS standard errors of the coefficient estimates are normally biased in the presence of contemporaneous correlations in most of the financial data that will lead to misleading and increments in biases in the study. This is because, when the error terms are heteroscedastic, the OLS estimator will become inefficient; therefore leading to the rejection of the ordinary procedures for hypothesis testing. The financial data may also contain conditional heteroscedasticity, in which the variance during an event may be different from a non-event period.

On the other hand, one of the measurements for liquidity is the bid-ask spread, which has been widely used in numerous past studies, such as Conroy et al. (1990), Muscarella and Vetsuypens (1996) and Guo et al. (2008). These studies examined the changes after stock split announcements, including the absolute bid-ask spread, which serves as one of the parameters to indicate the liquidity in this study. According to these studies, a decrease in the absolute bid-ask spread symbolizes a boost in liquidity for the specific security or market. In the present study, the pre-split mean (median) bid-ask spread ratio was estimated from the daily difference between bid price and ask price in the period of -70 to -11 event days prior to the announcement day whereas the post-split mean (median) was predicted from the daily range of bid and ask price in the period of +11 to +70 event days after the announcement day. The absolute bid-ask spread can be defined as the difference between the quoted bid price and the quoted ask price, as per equation (9):

$$\text{Absolute bid - ask spread} = |\text{Bid} - \text{Ask}| \tag{9}$$

where |Bid| is the highest price that a buyer is willing to pay for a stock and |Ask| is the lowest price that a seller is willing to accept to sell the stock.

Also, the trading volume serves as another proxy for liquidity whereby trading volume refers to the total volume of the trading of a specific security in a trading day. The pre-split mean (median) trading volume ratio is estimated from the daily trading volume in the period of -70 to -11 event days before the announcement day. The post-split mean (median) is predicted from the daily trading volume in the period of +11 to +70 event days after the announcement day. Copeland (1979) and Elfakhani and Lung (2003) also used the same proxy in their works. According to these studies, increased trading volume signified an increase in the depth of the security.

Dividends represent the profit distribution of a particular corporation, where the dividends received

will be solely dependent on the number of shares that the individual holds. According to Modigliani and Miller (1961), dividends may contain a signalling effect on investors, in which the information may reflect the strategies that the firm is adopting in the short run or long run. In the current study, the pre-split mean (median) dividends per share ratio were estimated from the daily dividends per share in the period of -70 to -11 event days before the announcement day. The post-split mean (median) was predicted from the daily dividends per share in the period of +11 to +70 event days after the announcement day. This proxy was also used in previous works such as Bozos et. al (2011) and Elfakhani and Lung (2003). Moreover, earnings per share can be interpreted as the net profits or earnings made by a corporation divided by the total shares outstanding. Theoretically, a forward stock split will lead to an increase in the shares outstanding while the profit for the corporations remains unchanged. Hence, the earnings per stock should be reduced after the splits have been executed. For instance, a 2-for-1 splitting of shares will reduce half of the earnings per share as compared to pre-split earnings per share. The pre-split mean (median) earnings per share ratio are estimated from the daily earnings per share in the period of -70 to -11 event days before the announcement day. The post-split mean (median) is predicted from the daily earnings per share in the period of +11 to +70 event days after the announcement day. This proxy was also used in previous works such as Bozos et al. (2011) and Elfakhani and Lung (2003). To maintain the robustness of a study, a control variable is usually added. Market capitalization was chosen as the control variable for this study. Market capitalization can be defined as the product of stock price and the respective outstanding number of stocks. Market capitalization was added as a control variable in the research model because it affects the management's split factor. Numerous research has included market capitalization as a control variable, namely McNichols and Dravid (1990) and Huang et al. (2006) together with the signalling hypothesis. In this particular study, market capitalization can be defined as equation (10):

$$\text{Market capitalization} = \frac{\text{Stock price}}{\text{Number of shares outstanding}} \tag{10}$$

Based on Elfakhani and Lung (2003), the OLS multivariate regression to prove the signalling hypothesis and the liquidity hypothesis, and to observe the factors that will affect cumulative abnormal return is given by equation (11):

$$\begin{aligned}
 CAR_{i,t} = \beta_0 &+ \beta_1 \text{DPS}_{i,t} + \beta_2 \text{EPS}_{i,t} + \beta_3 \text{BIDASK}_{i,t} + \\
 &\beta_4 \text{VOLUME}_{i,t} + \beta_5 \text{MKTCAP}_{i,t} + \varepsilon_{i,t}
 \end{aligned}
 \tag{11}$$

where $CAR_{i,t}$ is the cumulative abnormal return for each corporation i at day t , $DPS_{i,t}$ is the ratio of pre-split

dividends per share to post-split dividends per share for each corporation i at day t , $EPS_{i,t}$ is the ratio of pre-split earnings per share to post-split earnings per share for each corporation i at day t , $BIDASK_{i,t}$ is the ratio of pre-split bid-ask spread to post-split bid-ask spread for each corporation i at day t , $VOLUME_{i,t}$ is the ratio of pre-split trading volume to post-split trading volume for each corporation i at day t , $MKTCAP_{i,t}$ is the ratio of pre-split market capitalization to post-split capitalization for each corporation i at day t , β_0 is the intercept or constant, β_i is the estimated coefficient of variables ($i = 1, 2, 3$), and $\varepsilon_{i,t}$ is the error term for each corporation i at day t . The relationship between the split factor and cumulative abnormal return, dividends per share, earnings per share, bid-ask spread, and trading volume are shown in equation (12):

$$\begin{aligned}
 SPLITFACTOR_{i,t} = & \beta_0 + \underset{(+)}{\beta_1}CAR_{i,t} + \underset{(+)}{\beta_1}DPS_{i,t} + \\
 & \underset{(+)}{\beta_2}EPS_{i,t} + \underset{(-)}{\beta_3}BIDASK_{i,t} + \\
 & \underset{(+)}{\beta_4}VOLUME_{i,t} + \underset{(+)}{\beta_5}MKTCAP_{i,t} \\
 & + \varepsilon_{i,t} \tag{12}
 \end{aligned}$$

where $SPLITFACTOR_{i,t}$ is the split factor of each corporation i at day t and $\varepsilon_{i,t}$ is the error term of each corporation i at day t .

Homoscedasticity is one of the vital assumptions in Ordinary Least-Squares (OLS) regression. To be precise, homoscedasticity states that the variance in errors does not have any relationship with any predictor or predictive variable. If the assumption of homoscedasticity is breached, the parameters could become biased and inconsistent under the heteroscedasticity. According to White (1980), when the assumption of homoscedasticity is violated, even if the magnitude of the error variances is not reflected in any of the parameters in the regression model, an unknown form of heteroscedasticity will appear.

Hence, White’s heteroscedasticity-consistent covariance matrix estimates were applied to rectify the estimates of any “unknown form” of heteroscedasticity in the regression analysis of this study. Schwert and Seguin (1990) were the first to suggest this method, as they found that stock returns are generally heteroscedastic. Furthermore, this method also solves other issues such as wrongly interpreted means and autocorrelation problems (Elfakhani & Lung 2003). The first step to rectify the issue of heteroscedasticity and the autocorrelation problem is to run all of the variables in a full multivariate regression model. Following that, stepwise regression analysis is done to obtain the variables based on the highest R-squared value of the regression. This step could help remove any redundant variables, which will enhance the prediction capability of the model. Furthermore, the issue of multi collinearity among the variables could also

be eliminated in the process, further strengthening the ability of the regression model to predict the relationship between the dependent and independent variables.

The rationale for using Stepwise regression on top of Ordinary Least-Squares regression is that the former can better manage large amounts of potential explanatory variables compared to the former. Therefore, the model can be better fine-tuned and the best explanatory variables could be selected. In short, this method provides valuable information regarding the quality of the explanatory variable. Elfakhani and Lung (2003) also adopted the same approach.

EMPIRICAL RESULTS

The empirical evidence discussed earlier in the literature review section showed that the market reaction towards the announcement of stock splits will be significantly different for different groups of samples. Differences in returns might appear, as the information transmitted to the public might be partly reduced or simplified, such that the investors are unable to obtain the same equivalent information. Furthermore, the stock split announcement may cause different types of information to surface that varies with the different characteristics of companies (Grinblatt et al. 1984).

To interpret an event study, it is important to detect the presence of non-zero abnormal return throughout an event window. Hence, it is essential to search for the event study that rejects the null hypothesis stated earlier [$CAR_{i,t} = 0$]. In this study, a two-sided t-test was adopted to test daily abnormal return and the whole-event abnormal return. It is important to note that this study assumed uncorrelated abnormal return across all the securities.

From Table 2, it is clear that statistical differences between the abnormal returns would result in a change in the estimation windows. Firstly, the estimation window of 60 days, which represents 3 months’ before the split announcements, showed relatively less statistically significant abnormal returns than the 40-day estimation window. The positive abnormal return of 40.398 percent, which was statistically significant at the 1 percent level, was found on Day 1 after the split announcements. This finding is consistent with Tabiban (2013) who investigated Malaysia’s stock market and found abnormal return one day after the announcement day. Furthermore, positive abnormal return was also found to be statistically significant at the 10 percent level eight and nine days after the split announcement. This result implies that some investors reacted only to the stock split announcement after some delay, as the positive abnormal return was relatively weaker than the abnormal return that was seen on Day 1 after the announcement day.

The abnormal return shown in the 40-day estimation window shows more statistically significant abnormal returns than the 60-day estimation window, which

TABLE 2. The AR of the Overall Sample for each Day of the Event Period (40- and 60-Day Estimation Windows) (N = 45 corporations)

	AR (%) (60-day Estimation Window)	(60-day Estimation Window)	AR (%) (40-day Estimation Window)	(40-day Estimation Window)
-10	8.094	1.292	-20.195	-2.629**
-9	10.914	1.672	-26.218	-3.135**
-8	-2.206	-0.422	-26.929	-4.413***
-7	1.419	0.294	-29.932	-4.626***
-6	0.534	0.098	-31.876	-2.384**
-5	-6.320	-0.901	-36.893	4.976***
-4	-5.013	-1.014	-32.636	-3.701**
-3	5.312	0.795	-14.261	-1.634
-2	-2.328	-0.372	-19.292	-1.381
-1	3.654	0.589	-29.103	3.770***
0	5.368	0.742	-27.432	-3.578***
1	40.398	3.410***	37.847	1.919*
2	6.734	0.637	-23.397	-2.106**
3	3.547	0.482	-19.049	-2.384**
4	11.127	1.644	-12.877	-1.431
5	-3.775	-0.458	-26.524	-2.389**
6	-17.718	-1.187	-48.252	-2.996***
7	21.750	1.387	-6.264	-0.350
8	25.572	1.934*	-2.402	-0.170
9	22.914	1.715*	-20.927	-1.358
10	-2.819	-0.306	-37.210	-3.258***

Note: *, **, *** denote significance at the 10 percent, 5 percent, and 1 percent levels, respectively.

comprised both positive and negative abnormal returns. To be precise, negative abnormal returns were seen 10 days to 6 days before the split announcement. All of the negative abnormal returns were statistically significant between 5 percent and 1 percent. Positive abnormal returns were observed on Day 5 and Day 1 before the split announcement.

However, a negative abnormal return of -27.432 percent was found statistically significant at the 1 percent level, which implies that investors or players had not reacted to the new market information regarding the stock-split announcements. The investors would only react a day after the announcement. A 37.847 percent statistically significant positive abnormal return at the 10 percent level was observed on Day 1 after the stock split announcements. This finding confirms the findings on the previous 60-day estimation window, i.e. statistically significant positive abnormal return was found on Day 1. This result shows that investors will only react to market information a day after the stock split announcement has been made. Statistically significant negative abnormal returns were also observed on Days 2, 3, 5, 6, and 10 after the stock split announcement, indicating that the chances of investors obtaining excess returns diminish after the first day of the stock split announcement. In other words, investors will react to the new information within a day of the stock announcement in the Malaysian Stock Market.

As shown in Table 3, the cumulative abnormal return (CAR) for the 60-day estimation window was regressed

TABLE 3. Regression on CAR (60-Day Estimation Window) on Post/Pre-Announcement Independent Variables (N = 45 corporations)

Regressor	Coefficient	t-statistic
Constant	12.028	1.533
DPS	13.539	1.866*
EPS	-7.224	-1.159
BIDASK	-14.616	-2.253**
VOLUME	0.584	0.750
MKTCAP	28.254	3.409***
Adjusted R-squared value = 0.517		
F-statistics = 5.283		
Probability (F-statistics) = 0.005		

Note: CAR (60-Day Estimation Window) is the dependent variable; is the independent variable, i.e. the ratio of pre-split dividends per share to post-split dividends per share, is the ratio of pre-split earnings per share to post-split earnings per share; is the ratio of pre-split bid-ask spread to post-split bid-ask spread, is the ratio of pre-split trading volume to post-split trading volume, and is the ratio of pre-split market capitalization to post-split capitalization. White's Heteroskedasticity-consistent standard errors and covariance are reported. *, **, *** denote significance at the 10 percent, 5 percent, and 1 percent levels, respectively.

against the independent variables, namely dividends per share (DPS), earnings per share (EPS), bid-ask spread (BIDASK), and trading volume (VOLUME). Market capitalization (MKTCAP) served as the control variable in this study. The coefficient for DPS showed a positive coefficient value of 13.539, significant at the 10 percent

level. This result indicates that the dividend per share increased after the stock split action, signifying that the stock split will cause a favourable increase in the dividend per share. This finding supports the signalling hypothesis. However, the other variable symbolizing the signalling hypothesis i.e. Earnings per Share showed a negative coefficient value of -7.224 but it was not statistically significant. Hence, this result proves that there is a signalling effect arising from stock split announcements, evident from the statistically significant variable, DPS. The variable was found valid, as the F-statistic of the overall regression was significant at the 1 percent level, implying that DPS is a non-zero coefficient and is a core determinant of cumulative abnormal return (CAR). The bid-ask spread yielded a coefficient value of -14.616 , which signifies liquidity improvement due to the shrinking in the bid-ask spread. This result shows that cumulative abnormal return was significant at the 5 percent level. In other words, the liquidity after the stock split increased due to the increase in trading among the investors, which led to a narrower bid-ask spread. However, it is important to note that trading volume did not show a statistically significant relationship with cumulative abnormal return even at the 10 percent level. The coefficient for the trading volume was 0.584 , which indicates that the trading volume increased after the stock split announcements. In other words, this result also indicates that the improvement in liquidity persisted even with an estimation window of up to 60 days (3 months). This increase in total trading volume was accompanied by a decrease in bid-ask spread, further supporting the liquidity hypothesis. Also, this variable is valid, as the F-statistic of the overall regression was significant at the 1 percent level, implying that the bid-ask spread is a non-zero coefficient and is a core determinant of cumulative abnormal return (CAR).

It is important to note that the control variable in this study i.e. market capitalization was statistically significant at the 1 percent level. Although the control variable neither contributed to the signalling hypothesis nor the liquidity hypothesis, market capitalization positively correlated to cumulative abnormal return. In other words, the Malaysian Stock Market experienced improved market capitalization, as the investors were able to achieve abnormal returns in the market due to the stock split action taken by corporations in Malaysia. To be precise, this result may indicate that market capitalization increased due to increased shares outstanding or increased price after the stock split announcement. Elfakhani and Lung (2003) stressed that this observation may prove that stock-split corporations will grow and possess more comprehensive equity-based financing after exercising the stock split.

As shown in Table 4, the cumulative abnormal return for the 40-day estimation window was regressed against the independent variables, namely dividends per share, earnings per share, bid-ask spread, and trading volume, whereas market capitalization served as the control

TABLE 4. Regression on CAR (40-Day Estimation Window) on Post/Pre-Announcement Independent Variables (N = 45 corporations)

Regressor	Coefficient	t-statistic
Constant	1.721	0.431
DPS	1.781	0.499
EPS	-0.826	-0.266
BIDASK	-0.538	-0.196
VALUME	0.272	7.002***
MATCAP	2.933	0.722

Adjusted R-squared value = 0.116
 F-statistic = 2.154
 Probability (F-statistic) = 0.079

Note: CAR (60-Day Estimation Window) is the dependent variable, is the independent variable i.e. the ratio of pre-split dividends per share to post-split dividends per share, is the ratio of pre-split earnings per share to post-split earnings per share; is the ratio of pre-split bid-ask spread to post-split bid-ask spread, is the ratio of pre-split trading volume to post-split trading volume, and is the ratio of pre-split market capitalization to post-split capitalization. White's Heteroskedasticity-consistent standard errors and covariance are reported. *, **, *** denote significance at the 10 percent, 5 percent, and 1 percent levels, respectively.

variable for the study. Although DPS showed a positive coefficient of 1.781 , unfortunately, this parameter, which signifies the signalling hypothesis, was not statistically significant at the 10 percent level. However, the coefficient of EPS showed a negative sign with a value of -0.826 but was insignificant at the 10 percent level, thus the signalling hypothesis is not supported. This result contradicts the above study based on the 60-day estimation period, as there was no signalling effect arising from stock split announcements in 40 days. Hence, it can be concluded that investors would need a longer time horizon to perceive the signals from stock split announcements from corporations in Malaysia.

Although the bid-ask spread yielded a coefficient of -0.538 , which signifies liquidity improvement due to the shrinking of the bid-ask spread, it did not have a significant effect on the cumulative abnormal return. The trading volume showed a statistically significant relationship with the cumulative abnormal return at the 1 percent level, which is an improvement from the estimation window of 60 days. The coefficient of trading volume was 0.272 , indicating that the trading volume improved after the stock split announcements, owing to its positive sign. Stock split announcements encouraged the investors to improve trading volume, which ultimately strengthened the liquidity of the Malaysian Stock Market. The effect was statistically significant, as compared to the 60-day estimation window, indicating that the investors had a stronger reaction to the stock split action by corporations based on the increment in trading volume within a shorter time. This finding on the increased trading volume is consistent with the findings of Elfakhani and Lung (2003), Mishra (2007) and Pooja

(2013). Therefore, the significant relationship between trading volume and cumulative abnormal return at the 1 percent level further strengthens the liquidity hypothesis, which was also observed earlier in the 60-day estimation window via the narrowing of the bid-ask spread.

From Table 5, Stepwise Least-Squares regression was performed to obtain the best-fit predictive model, which can be used to determine the important factors affecting abnormal returns. For the 40-day estimation window, the Stepwise method showed better outcomes or predictions compared to the OLS method, based on an improvement in the F-statistic. In other words, the explanatory variable is a non-zero constant and has a significant effect on cumulative abnormal return.

TABLE 5. Stepwise Regression on CAR (40-Day Estimation Window) on Post/Pre-Announcement Independent Variables (N = 45 corporations)

Regressor	Coefficient	t-statistic
Constant	2.314	2.073**
VOLUME	0.265	3.321***

Adjusted R-squared value = 0.186
F-statistic = 11.027
Probability (F-statistic) = 0.002

Note: CAR (40-Day Estimation Window) is the dependent variable; is the independent variable, i.e. the ratio of pre-split trading volume to post-split trading volume *, **, *** denote significance at the 10 percent, 5 percent and 1 percent levels, respectively.

The regression shows that the post/pre-split announcement total trading volume was a significant explanatory variable for cumulative abnormal return. The sign for the explanatory variables was also correct with a positive sign and a coefficient value of 0.265. The variable volume was also statistically significant at the 1 percent level. Furthermore, the constant term was also significant at 5 percent with a coefficient value of 2.314, meaning that cumulative abnormal return was positive in the presence of other explanatory variables in the model throughout the event window. This finding is consistent with the results of Elfakhani and Lung (2003), in which they mentioned that the significant constant term implies that the CAR during the event period is positive no matter the variables involved. Thus, this result further confirms that the liquidity hypothesis is applicable for Malaysian stocks in the 40-day event window through an increase in trading volume whereby the investors may trade more frequently for the split stocks.

Another regression was done with the split factor as the dependent variable against cumulative abnormal return (CAR), dividends per share (DPS), bid-ask spread (BIDASK), earnings per share (EPS), and trading volume (VOLUME) as the independent variables and market capitalization (MKTCAP) as the control variable. In the previous section, CAR was treated as the dependent

variable. In this section, CAR is treated as the independent variable and only CAR in the 40-day estimation window was selected, as there were more significant variables that were obtained throughout this event period.

Based on the regression shown in Table 6, the bid-ask spread had a significant impact on the split factor. However, the bid-ask spread had an incorrect sign, denoting its effect on the split factor. In other words, the higher the split factor, which is executed by the management of a corporation, the larger the bid-ask spread. This result indicates that there is lesser liquidity available in the market. This finding is similar to that of Copeland (1979), who found that liquidity decreased when the bid-ask spread widened. Gray et al. (2003) also

TABLE 6. Regression on Split Factor (40-Day Estimation Window) on Post/Pre-Announcement Independent Variables (N = 45 corporations)

Regressor	Coefficient	t-Statistic
Constant	0.948	1.247
CAR	0.034	1.022
DPS	-0.113	-0.165
EPS	0.083	0.125
BIDASK	1.187	2.583**
VOLUME	-0.001	-0.032
MAKTCAP	0.517	0.441

Adjusted R-squared value = 0.065
F-statistic = 1.508
Probability (F-statistic) = 0.202

Note: The split factor (40-Day Estimation Window) is the dependent variable; CAR (40-Day Estimation Window) is the independent variable; is the ratio of pre-split dividends per share to post-split dividends per share, is the ratio of pre-split earnings per share to post-split earnings per share, is the ratio of pre-split bid-ask spread to post-split bid-ask spread, is the ratio of pre-split trading volume to post-split trading volume, and is the ratio of pre-split market capitalization to post-split capitalization. White's Heteroskedasticity-consistent standard errors and covariance are reported. *, **, *** denote significance at the 10 percent, 5 percent, and 1 percent levels, respectively.

found similar results, noting that absolute bid-ask spread increased along with the split factor.

The other variables remained statistically insignificant, as all the other variables including the constant term, cumulative abnormal return, dividends per share, earnings per share, and trading volume showed no significant impact on the split factor. Based on the F-statistic of 1.508 and the probability of the F-statistic of 0.202 shown in Table 6, the F-statistic was unable to reject the null hypothesis testing even at the 10 percent level, indicating that the variables may be a zero coefficient for this particular part of the study. Hence, another Stepwise Least-Squares regression must be conducted to identify the significant variables that explain the changes in the split factor for corporations in Malaysia.

TABLE 7. Stepwise Regression on Split Factor (40-Day Estimation Window) on Post/Pre-Announcement Independent Variables (N = 45 corporations)

Regressor	Coefficient	t-statistic
Constant	0.974	1.557
CAR	0.033	1.149
BIDASK	1.199	3.008***

Adjusted R-squared value = 0.146
 F-statistic = 4.776
 Probability (F-statistic) = 0.014

Note: the split factor (40-Day Estimation Window) is the dependent variable; CAR (40-Day Estimation Window) is the independent variable, is the ratio of pre-split bid-ask spread to post-split bid-ask spread. *, **, *** denote significance at the 10 percent, 5 percent, and 1 percent levels, respectively.

Table 7 shows the Stepwise Least-Squares regression results used to obtain the best fit predictive model, which, in turn, will be used to determine the important factors affecting the split factor. In the case of the 40-day estimation window, the Stepwise method showed better outcomes or predictions, based on an increase in the F-statistic. This result implies that the variables in the regression are non-zero and they provide explanatory power to the study. The F-statistic of 4.776 and the probability of F-statistic of 0.014 shown in Table 7 prove that the F-statistic can reject the null hypothesis testing at the 5 percent level, indicating that, in this particular part of the study, the variables are non-zero coefficients. Hence, these variables will help confirm the findings found earlier regarding the OLS regression.

The regression shows that the post/pre-split announcement bid-ask spread is a significant explanatory variable for the split factor. The explanatory variable had a positive sign with a coefficient value of 1.199, showing that the liquidity decreased with an improvement in the split factor. The 'cumulative abnormal return' variable was not statistically significant even at the 10 percent level. Furthermore, the constant term was insignificant at the 10 percent level with a coefficient value of 0.974, meaning that the split factor was positive in the presence of other explanatory variables in the model throughout the event window. This finding is consistent with that of Elfakhani and Lung (2003), which mentioned that a significant constant term implies that the CAR during the event period is positive no matter the variables involved. This finding is similar to that of Copeland (1979) and Gray et al. (2003), which indicated that the higher the incentive for the management to increase the split factor, the more dispersed the bid-ask spread, and therefore the lesser the market liquidity.

CONCLUSION

Investors in Malaysia have been able to obtain positive abnormal returns on the day after stock split announcements

are made. Through two different estimation windows—60 days and 40 days—it was found that dividends per share, bid-ask spread, and trading volume were the most important determinants for explaining the relationship between abnormal returns and the stock split exercise in Malaysia. Thus, stock split announcements in Malaysia indeed have an impact on shareholders, and generate a positive market reaction in terms of abnormal returns and stock liquidity. Based on the empirical results obtained in this study, information disclosure via the Internet should be more open to improve the capital market in Malaysia and achieve the country's target to become a high-income nation by the year 2020. Jiao (2011) suggested that better information disclosure from corporations will improve the performance of the share. Moreover, the share market will respond positively and become more efficient as a result, which will attract more international investors and corporations, provided that the specific corporation has disclosed the information properly (Gul & Leung 2004).

Investors could analyse the extent to which the stock split announcement affects the Malaysian Stock Market. The results could also provide direct benefits for portfolio managers as well as individual stock investors, through better stock return prediction and the creation of investment opportunities arising from the stock splits of the mentioned investors, especially on Day 1, after the stock split announcement. Besides, SC could improve the effectiveness of information disclosure of listed companies on the Malaysian Stock Market that wish to exercise stock splits. In particular, SC should consider making information disclosure a requirement during stock split events.

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Chin Chun How
Jesselton College
S-1-3 Block A, City Mall
Jalan Lintas, 88300
Kota Kinabalu, Sabah
Malaysia
E-mail address: chunhow@jesselton.edu.my

Wong Hock Tsen*
Faculty of Business, Economics and Accountancy
Universiti Malaysia, Sabah
Jalan UMS 88400
Kota Kinabalu Sabah
MALAYSIA
E-mail address: ht Wong@ums.edu.my

*Corresponding author