International Journal of Business and Society, Vol. 20 No 2, 2019, 709-729

IMPACT OF ADDITIONS AND DELETIONS FROM STOCK INDEX IN MALAYSIA: THE ROLE OF OPINION DIVERGENCE THEORY

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ABSTRACT

This study analyzes the impacts of stock additions to and deletions from FTSE Bursa Malaysia Kuala Lumpur Composite Index (FBM KLCI) over the period 2001-2014 using 49 cases of addition and 38 cases of deletion. Using an event study methodology, this study reveals surprising findings, inconsistent with many previous studies. When companies are added into the FBM KLCI, their stock prices and trading volumes decrease after the announcement day and lead to a high returns volatility. However, when companies are deleted from the index, their prices increase, and their returns were less volatile compared to those of added stocks. This is supported by the result of firms' long term performance using Tobin's *q* model that deleted stocks perform better than added stocks. One potential explanation to describe these surprising results comes from behavior finance perspective. This study uses opinion divergence theory to explain investor's behavior following the announcement of additions and deletions. This study demonstrates that investors' opinions about added stocks diverge upon the arrival of the announcement of Malaysian main stock index revision, but not so for the deleted stocks. One of the direct implications of this study is that regulators should ensure that information regarding potential stocks to be delisted and added, be made known early, so that investor opinions regarding the affected stocks, are not diverged. This will also help to make market more efficient.

Keywords: Additions; Deletions; FBM KLCI; Index changes; Opinion divergence theory

Received: 15 August 2018
Accepted: 14 February 2019

1. INTRODUCTION

Examining the impacts of being added into and deleted from market index for stocks is important because it may signal good or bad news to the firms involved. This can have significant impacts to the companies, such as their prices, volume, volatility and demand. In addition, since the announcement of the deletion and addition is made public, the announcement is considered as public information. It would be interesting to see if the announcement signifies important event which can move the companies' stock prices.

The earliest studies that examined the impacts of index changes were done by Harris and Gurel (1986), Shleifer (1986) and Jain (1987). It was thereafter extensively studied with a majority of the research documented that additions of stocks into stock indices experienced significant increase in

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returns and deletions from stock indices significantly depress the returns. However, there are some studies documenting contradictory effect of index changes, whereby there were negative abnormal return for added stocks and positive abnormal return for deleted stocks (Beneish and Whaley 1996; Siegel and Schwartz, 2006; Cai and Houge 2008 and Chan, Huang and Tang 2013).

Furthermore, it would be important to trace the performance of these added and deleted stocks in the long-run. According to Jain (1987), inclusion and exclusion of stocks in an index would indicate investment appeal of those stocks. Not only that, since some funds only focus on index component stocks, such inclusion and exclusion can affect the demand for those stocks. Nevertheless, the empirical analysis of the index effects and its firm performance consequences is scarce.

Past studies have shown mixed results on the index composition changes. Researchers are differing in their interpretation, and have used many different theories to explain. This shows that the impact of index composition changes is still not resolved. This study attempts to further investigate the market responses on index changes from the perspective of behavioral finance, through the Opinion Divergence Theory, and will propose an alternative explanation to the phenomenon.

2. LITERATURE REVIEW

2.1. Impacts of Index Changes

i. Share Price Effect

Many researches have investigated the share price reactions to stock additions to and deletions from indices. Most evidence shows that share price of stocks being added increases significantly and share price of stocks being deleted decreases significantly in most developed markets (Harris and Gurel 1986; Shleifer 1986; Elayan, Li and Pinfold 2001; Pullen and Gannon 2007). According to Lin and Kensinger (2007), stock added into a major market index such as S&P 500 becomes a new potential source of trading pressure as arbitrageurs trade index derivatives against stocks that are added into the index. Hence, added stock experienced a significant increase in stock return. Meanwhile, the arbitrage trading pressure is removed when a stock is deleted from the index, causing the deleted stock to experience significant decreases in stock return.

On the other hand, there are some studies that documented a contradictory share price effect of index changes. For example, studies in developed markets by Beneish and Whaley (1996) and Siegel and Schwartz (2006) found that following an addition to the index, the added stock experienced a negative average abnormal return. They argued that this is due to arbitrageur activity as S&P announced the index components changes five days before effective change date. Hence, traders enter the market and buy added stocks on the announcement date and sell higher to fund managers on the effective change date. This caused added stocks to experience negative price effect. This is consistent with studies in developing market such as Miller and Ward (2015) who studied JSE indices and found that abnormal returns for added stocks diminished soon after they are added into the index and the share price decreases steadily. Azevedo, Karim, Gregorious and Rhodes (2014) explained that the news of index revisions from FTSE Bursa Malaysia KLCI for additions and deletions significantly lead to changes in the affected stock's liquidity.

ii. Trading Volume Effect

The findings were mixed for developed and developing markets. Some researchers found a positive trading volume effect for stocks added into index and a negative trading volume effect for deleted stocks. For example, Harris and Gurel (1986) documented that there is a large increase in trading volume of the stock on the first trading day after S&P announced the index additions. Besides that, for developing markets, Parthasarathy (2010) discovered a high significant trading volume increase on announcement and effective change date following the announcement of addition in Indian market. Ahmed and Bassiouny (2018) found that added stocks of EGX30 experienced a permanent increase in trading volume while deleted stocks experienced significant volume after the effective change date which reflect the trading of portfolio rebalancing activity of institutional managers. This is consistent with studies such as Deininger, Kaserer and Roos (2000).

Meanwhile, some studies found a different trading volume effects. For example, Beneish and Gardner (1995) found no effects of trading volume for stocks added into the index and ascribed this finding to less index fund rebalancing activities according to the DJIA's components. On the other hand, Beneish and Whaley (1996) found that after the stock is added into the index, the trading volume declined dramatically and it did not reverse to preannouncemnet levels. They argued that the buy and hold of index fund caused a lower average trading volume after additions.

However, Brooks, Kappou, Stevenson and Ward (2013) reported that both additions and deletions experienced positive abnormal trading volume before and after index revision. Moreover, the volume did not reverse to the original level as before the index revision. This effects continued for several months afterward.

iii. Volatility Effect

Although many past studies that investigate the index changes effects have focused on the share price and trading volume effects, there is small number of studies which examined the volatility to measure the risk of the affected stocks.

Studies in developed markets such as Amihud and Mendelson (1986), De Long, Shleifer, Summers and Waldmann (1990) argued that a high demand of stocks by index funds, speculation of arbitrageurs and noise traders may cause a temporary increase in volatility. In addition, Vijh (1994) and Barberis, Shleifer and Wurgler (2002) claimed that stocks added into the S&P index experience a significant increase in their beta and stocks deleted from the index experience a decrease in beta. This is consistent with studies such as Coakley and Kougoulis (2005).

On the other hand, Yun and Kim (2010) documented an opposite results for developing market from previous studies. They found stocks added into KOSPI experienced significant decrease in their volatility while stocks deleted from index experienced significant increase in volatility. The stocks added into index become less risky and stocks deleted from index become more risky.

2.2. Firm's Long-term Performance

Stocks being added into the index could have a positive long-term effect on the stock returns. This is because being added into an index may signal that the company is representative and may have

bright prospects. According to Denis, McConnell, Ovtchinnikov and Yu (2003), this increases investors' interest in added stocks and lead to better operating performance of a stock as investors and analysts monitor the stocks more closely. The opposite is true for stocks deleted from the index.

A study by Morck and Yang (2001) documented that Tobin's *q* of S&P 500 firms were larger than other firms with similar characteristic. Therefore, this evidenced that membership in the S&P 500 results in excess value of the firm. Mase (2007) found a positive buy-and-hold abnormal return for the period of one and three year after addition into the FTSE 100. This reflects that index revisions have long-term impact on investor's interest. It increased investor's interest following additions while decreased following the deletions from the index.

However, there are some studies that documented different long-term performance of index changes effects. For example, Cai and Houge (2008) found that a buy-and-hold index portfolio significantly performs better than the annually rebalanced Russell 2000. They explained that this is due to the strong momentum effects that dominated the short term performance for firms deleted from the index and the poor return of new issues added into the index and caused lower long-term abnormal return of the portfolio.

2.3. Theoretical Explanation of Index Changes

There are five hypotheses proposed by previous researchers to explain this index changes effect, namely imperfect substitute hypothesis, price pressure hypothesis, information signaling hypothesis, investor awareness hypothesis and liquidity hypothesis.

The imperfect substitute hypothesis was first examined by Sheilfer (1986), and later tested by Beneish and Whaley (1996), Deininger et al. (2000), Wurgler and Zhuravskaya (2002), and Lin and Kensinger (2007). Under this hypothesis, securities are not perfect substitutes for each other; hence long run demand curve is less than perfectly elastic. Demand curves shift to eliminate excess demand. Price reversals are not expected as the new price reflects a new equilibrium distribution of security holders.

According to the price pressure hypothesis, the excess demand of index revision creates price pressure and reverses once the temporary excess demand is satisfied. It posits a short term downward sloping demand curve. This is due to the portfolio rebalancing activity, typically in the period between announcement day and the effective change day. Harris and Gurel (1986) documented that index changes should not convey any new information about the stock's fundamental value because they are based only on publicly available information. Index fund frequently adjust their portfolio within a few days of the announcement. Thus, the effects on prices and trading volumes establish price pressure. Findings of studies by Chen, Noronha and Singal (2006) and Azevedo et al. (2014) are consistent with this hypothesis.

The information signaling hypothesis suggests that index additions and deletions have information on firm specific factors that will affect their prices. Addition (deletion) of a stock into index sends a positive (negative) signal to the market and increases (decrease) the visibility of the stock. Both events have impact on the stocks' level of scrutiny and analyst coverage. Jain (1987) reported that as only stable firms are eligible to be a member of S&P, investors perceive that addition (deletion) of a firm reduce (increase) the riskiness of the firm's securities. Since companies in the indexes are

monitored closely by S&P, addition (deletion) reflects a perceived increase (decrease) in the quality of management. Therefore, he concludes that index component revision does convey new information. This is consistent with findings in studies such as Baran, Li, Liu, Liu and Pu (2015).

Investor awareness hypothesis postulates that investors change the expectation of added stocks' future cash flow. Chen, Noronha and Singal (2004) found that stocks added into an index would increase investor recognition. The enhancement of scrutiny and market analyst, in turn forced the firm to operate more efficiently. Hence, added stocks experience a permanent price increase. Studies by Docking and Dowen (2006), Parthasarathy (2010) and Ahmed and Bassiouny (2018) found evidences in support of investor awareness hypothesis.

Similarly, liquidity hypothesis also suggests a permanent effect for added and deleted stocks. A newly added stock gets more attention from the market. Hence, more firm information is available in the market and its stock trade more actively resulting in a decrease in the bid-ask spread. Similarly, a deleted stock experiences scarce public information, lower liquidity and increased bid-ask spread. This phenomenon reflects the perceived value of liquidity to investors. This hypothesis is consistent with the results found in Amihud and Mendelson (1986), Brooks et al. (2013) and Biktimirov and Li (2014).

2.4. Opinion Divergence Theory – A Behavioral View

As evidenced in the review of literature above, the findings of index change effects were quite mixed. Many analysts such as Ibrahim and Abdul Rahman (2003), Grinblatt and Keloharju (2000) and Ahmad and Tjan (2004) believe that Malaysian stock market is dominated by many irrational "noise traders" who respond to emotions and fads. They are less sophisticated than investors in developed markets. Wong & Lai (2009) showed that the psychological factors do influenced Malaysian stock market investor in the decision making. Malaysian stock market is dominated by investors who are not fully rational.

Besides that, most of the studies focus on permanency of the index effects and the five hypothesis testing above. There are less studies explained what caused the contradictory findings of index effects. This study, hence, proposes that the phenomenon could be explained by the alternative explanation based on the theory from behavioral finance. Behavioral finance considers psychological factors as an essential component to financial analysis and decisions. Investors are not always optimal decision makers, and their psychological processes affect their financial investing decision making.

This study uses opinion divergence theory to investigate further investors' behavior in reacting to the news of additions and deletions from Malaysian main stock index. Originally proposed by Miller (1977), it argues that investors differ in their beliefs about asset values. Even when investors have common information, they may interpret and use this information in different ways and construct different investing strategies, which in turn may affect stock returns.

As predicted by Miller (1977), proxy for opinion divergence is negatively related to stock's returns on the announcement day and the effective change day of index composition changes. He contends that stocks with a large opinion divergence as to their intrinsic value are probably overpriced if short sales are constrained since less optimistic investors cannot participate in the price setting

process. This is supported by Doukas, Kim and Pantzalis (2004) and Gharghori, See and Veeraraghavan (2011).

Furthermore, Yu and Zhou (2013) also reported a consistent result. They documented that S&P does not disclose the process of how to identify the candidate to be added into the index; hence, investors are confronted with ambiguity in information quality and incomplete information for additions. However, the reasons for stocks being deleted from S&P index are usually explained by S&P Corporation and are known to the public; hence, investors face less ambiguity in information quality for stocks being deleted. Thus, this increases the opinion divergence among investors for added stocks. It creates uncertainty on the part of investors.

3. METHODOLOGY

3.1. Data Sources and Sample Selection

This study is conducted on firms listed on the FBM KLCI[1]. The market data such as daily stock price, daily trading volume and data of annual financial statement for the affected stocks and indices are collected for the period between 2001 and 2014. The data is collected from *DataStream*. Besides that, the data for the announcement day and effective change day of stocks added and deleted are obtained from Bursa Malaysia website (http://www.bursamalaysia.com/). The original sample consist a total of 146 additions and deletions from the index. After filtering for the merger and acquisitions, spin-offs and the data unavailability, the sample reduced to 87 changes, with 49 additions and 38 deletions.

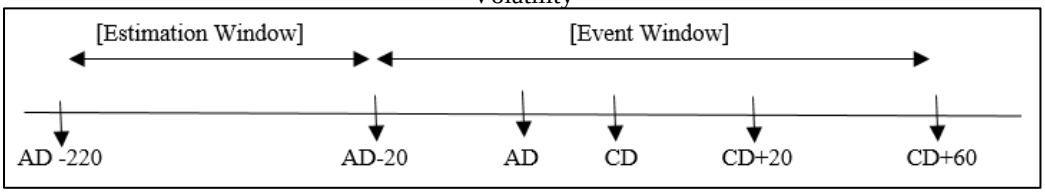
3.2. Event Date Specification

An event study is employed to investigate the impacts of Malaysian stock index components revision on the stock price, trading volume and stock return volatility of the firm. The two event dates of interest are the announcement date (AD) and the effective change date (CD). AD is when the index revision is publicly announced while CD is when the actual index revision takes place, which varies but normally takes place on average about two weeks from the AD.

All the stock price, trading volume and stock return volatility effects are examined using similar event windows. The chosen windows are adopted from previous studies, due to the fact that there is no theoretical agreement on the exact days that an estimation or event windows should be.

[1] The main stock market index in Malaysia is FBM KLCI which consists of 30 largest stocks. The regular review of the FBM KLCI components is conducted semi-annually in June and December. The index committee reviews the index components by using data from the close of business on the last trading day in May and November. Any index components changes will then take effect after the close of business on the third Friday in June and December. In addition, the irregular review of the FBM KLCI components may also occur throughout a year. The committee also takes into consideration criteria such as market capitalization, business activities and trading volume to reflect development and changes in the business sectors of the national economy represented on the Exchange.

Figure 1: Time Line to Examine the Effects for Stock Price, Trading Volume and Stock Return Volatility



As for the long-term performance of a firm that is added into and deleted from Malaysian main stock index, Tobin's *q* value will be used. The Tobin's *q* is measured by looking at several different observation windows that are examined over effective change year to two years after (0,+2), three years after (0,+3), four years after (0,+4), and five years after the event (0,+5). This allows for a more robust analysis of results.

Moreover, the investigation of the effects from the opinion divergence theory on stock added into and deleted from index is based on a regression model. The dependent variable namely the cumulative average abnormal return ($CAAR_{it}$) is calculated for the three-days around announcement date (*t*-3, *t*+3). Whereas, the independent variable of the study, the proxies of opinion divergence – namely stock return volatility (STVOL) and the stock turnover (STURN), are calculated over 50-days [*t*-53, *t*-4] before announcement day of index composition changes to the Malaysian main stock index as conducted by Yu and Zhou (2013). Besides that, the reason to utilize announcement day is because announcements are among the firm-specific information events originated independently of a firm (Jain, 1987; Dhillon and Johnson, 1991; Chen et al,. 2004; and Yu and Zhou, 2013).

Additionally, there are three control variables in the study, namely market-to-book ratio, firm size and leverage. They are included as they are widely believed to influence performance. Market-to-book ratio (MTBV) is used to control the effects of growth factor. Firm size is measured by market capitalization (MV) while financial leverage (LEV) is proxied by debt ratio. These control variables are measured at the end of the fiscal year prior to the announcement of change to Malaysian main stock index.

3.3. Model Specification for Stock Price Effect

This study uses market model to measure stock price effect. For any stock *i* the normal return is computed as:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \quad (1)$$

$\mathrm{E}(\varepsilon_{it} = 0)$; $\mathrm{var}(\varepsilon_{it}) = \sigma_{\varepsilon_t}^2$

Where,

R_{it} = the rate of return of the stock of company *i* on day t

R_{mt} = the rate of return of the KLCI index (market index on day t)

ε_{it} = a random variable, that must have an expected value of zero and is assumed to be uncorrelated with R_{mt}

α_i = a constant;
β_i = measures the sensitivity of R_{it} to market index.

Abnormal return is used to analyze the impact of an event. For any stock *i* the abnormal return is computed as:

$$AR_{it} = R_{it} - (\widehat{\alpha_i} + \widehat{\beta_i} R_{mt}) \quad (2)$$

This study uses 200 trading days prior to the event window as an estimation period to estimate the market model parameter coefficients alpha ($\widehat{\alpha_i}$) and beta ($\widehat{\beta_i}$). Next, the average abnormal return (AAR), which is the average of the abnormal return for all event stocks against the total number of stocks in the observed sample, is calculated:

$$AAR_{it} = \frac{1}{N}\sum_{i=1}^{N} AR_{it} \quad (3)$$

The AAR is then used to calculate the cumulative average abnormal return (CAAR) for the event windows. $CAAR_i\ (\tau_1, \tau_2)$ is defined as the cumulative average abnormal return (CAAR) of stock *i* from τ_1 to τ_2. For any interval in the event window, the cumulative average abnormal return is as follows:

$$CAAR\ (\tau_1, \tau_2) = \sum_{i=1}^{N} AAR_{it}\ (\tau_1, \tau_2) \quad (4)$$

3.4. Model Specification for Trading Volume Effect

This study uses method suggested by Campbell and Wasley (1996) to analyze the abnormal trading volume. Additionally, this study applies the log function to transform non-normal distribution to normal distribution as discussed by Ajinkya and Jain (1989) and Cready and Ramanan (1995). The log raw volume data ($V_{i,t}$) is calculated as follow:

$$V_{i,t} = \log(0.00000255 + \frac{TV_{i,t}}{SHO_{i,t}}) \quad (5)$$

where,

$TV_{i,t}$ = the trading volume of stock *i* on day *t* in the event period
$SHO_{i,t}$ = number of share outstanding of stock *i* on day *t* in the event period

The constant 0.0000025 is added into the equation for a day with zero trading volume to avoid the natural log of zero as discussed by Cready and Ramanan (1995). The abnormal trading volume ($ATV_{i,t}$) of market model is computed as below:

$$ATV_{i,t} = \quad V_{i,t} - (\widehat{\alpha_i} + \widehat{\beta_i} V_{mt}) \quad (6)$$

An estimation period of 200 trading days prior to the event window is used to estimates the market model parameter coefficients alpha ($\widehat{\alpha_i}$) and beta ($\widehat{\beta_i}$). V_{mt} is the market volume of the FBM KLCI index (market index on day *t*).

3.5. Model Specification for Stock Return Volatility Effect

In this research, the methodology applied by Deininger et al. (2000) is adopted. The standard deviation of each stock return will be used to represent volatility. The annual volatility of stock *i* (σ_i^T) is calculated on the basis of daily stock return as below:

$$\sigma_i^T = \sqrt{250 \frac{1}{T-1}\sum_{t=1}^{T}(R_{it} - E(R_{it}))^2} \quad (7)$$

On the other hand, the annual volatility of market (σ_m^T) is calculated as below:

$$\sigma_m^T = \sqrt{250 \frac{1}{T-1}\sum_{t=1}^{T}(R_{mt} - E(R_{mt}))^2} \quad (8)$$

The abnormal volatility (AV) of stock *i* is the differences between the annual volatility of stock *i* (σ_i^T) to the annual volatility of market (σ_m^T) as in equation below:

$$AV = \frac{1}{N}\sum_{i=1}^{1}(\sigma_i^T - \sigma_m^T) \quad (9)$$

3.6. Model Specification for Firm's Long-Term Performance

This study runs the regression analysis of Tobin's *q* on added and deleted firms with control for the effects of market-to-book ratio, firm size and financial leverage to measure firm's long-term performance. Tobin's *q is* computed as:

$$Tobin's\ q = \frac{Market\ Value\ of\ the\ Company}{Replacement\ Cost\ of\ the\ book\ equity}$$

$$= \frac{Market\ capitalization\ of\ a\ firm + Total\ Liabilities}{Common\ stock + Total\ Liabilities} \quad (10)$$

Barberis, Shleifer and Vishny (1998) predicted that growth firms react more aggressively to bad news and react more weakly to good news than value firms. Thus, to control the effects of growth factor, this study includes market-to-book ratio (MTBV) in the analysis. MTBV is transformed to natural logarithm form in the regression analysis.

$$Market - to - Book\ ratio = \frac{Market\ value\ of\ common\ stocks}{Book\ value\ of\ common\ stocks} \quad (11)$$

Vural, Ahmed and Cetanak (2012) found that higher level of leverage will have lower profitability of the firm and the value of the firm. Hence, to control this effect, leverage is included in the analysis.

$$Financial\ Leverage\ (Lev) = \frac{Total\ debt_{i,t}}{total\ assets_{i,t}} \quad (12)$$

Firm size is measured by market value (MV) in this study. MV is defined as the market value of common stocks. MV is transformed to natural logarithm form in the regression analysis.

$$Market\ value = \frac{Market\ value\ of\ common\ stocks}{number\ of\ share\ outstanding} \quad (13)$$

Two separate dummy variable regressions are run on both the added (DA) and deleted stocks (DD). The dummy (DA) will take a value of one when firms are added into the index in year *t*, and zero otherwise. The dummy (DD) will take a value of one when firms are deleted from the index in year *t*, and zero otherwise. The regressions are shown as below.

$$Tobin's\ q_{it} = a_{it} + \beta_1\,(MTBV_{it}) + \beta_2 LEV_{it} + \beta_3 \ln(MV_{it}) + \beta_4 DA + \beta_5 DD \quad (14)$$

3.7. Model Specification for Opinion Divergence

The first proxy of opinion divergence is the stock return volatility (STVOL) as used by Boehme, Danielsen and Sorescu (2006). The STVOL would be low (high) if most investors agreed (disagreed) on the value of a stock. STVOL is adopted from Garfinkel (2009) and measured as:

$$\text{STVOL} = \sqrt{\frac{1}{T-1}\sum_{t=1}^{T}(R_{it} - E(R_{it}))^2} \quad (15)$$

The second proxy of opinion divergence is daily stock turnover (STURN). Stock turnover is suggested to be a proxy for heterogeneous beliefs by many previous researchers (Hong and Stein, 2003; Garfinkel and Sokobin, 2006; Gharghori et al., 2011 and Yu and Zhou, 2013). STURN can be computed as below:

$$STURN = \left(\sum_{t=-4}^{t=-53} \frac{Vol_{it}}{SHO_{it}}\right) \quad (16)$$

where Vol_{it} is the firm's trading volume on day *t* (*t*=0 is the announcement day) and SHO_{it} is firm *i*'s shares outstanding on day *t.* A set of control variables namely market-to-book ratio (MTBV), financial leverage (LEV) and firm size (MV) effect as described in the model specification for firm's long-term performance are also included in the regression.

Short-sale constraints, as pointed out by Miller (1977) are not applicable in this study. These variables and assumptions cannot be operationalized in Malaysian setting because short-selling activities are not allowed under the Malaysian regulatory framework. For both samples of additions and deletions, the study estimates the following model for stock *i*, using opinion divergence (OD) proxies (i.e., STVOL and STURN) one at a time:

$$CAAR_{it} = a_{it} + \beta_1 OD_{it} + \beta_2 \ln(MTBV_{it}) + \beta_3 LEV_{it} + \beta_4 \ln(MV_{it}) + \varepsilon_{it} \quad (17)$$

If the predictions of opinion divergence are valid, one can observe a negative (positive) relationship between cumulative average abnormal return and opinion divergence for stocks that are added into (deleted from) the index.

4. FINDINGS AND DISCUSSION

4.1. Abnormal Return, Trading Volume and Stock Return Volatility for Additions

Table 1 reports the results for cumulative average abnormal returns (CAAR), cumulative average abnormal trading volume (CATV) and cumulative average abnormal volatility (CAAV) for the stocks being added into the Malaysian main stock index.

Table 1: Test of Significance of CAARs, CATV and CAAV for Stocks Added into the Malaysian Main Stock Index

Event Days	CAARs	t-stat	CATV	t-stat	CAAV	t-stat
AD-20 to CD+60	-5.81%	-1.4859	-21.00%	-1.5074	18.69%	6.2779***
AD-20 to AD-1	1.27%	0.7068	-9.33%	-3.1209***	3.56%	6.6949***
AD	-0.55%	-1.8096*	-2.03%	-1.038	0.18%	3.2826***
AD+1 to CD-1	-0.01%	0.7975	0.26%	0.4363	2.65%	3.2090***
CD	-0.81%	-3.3628***	-2.08%	-0.4915	0.24%	5.5909***
CD+1 to CD+20	-3.62%	-2.1120**	0.92%	0.1539	3.97%	5.7904***
CD+1 to CD+60	-5.69%	-1.6668	-4.49%	-0.4692	12.47%	6.1023***

Notes: Asterisk (*), (**) and (***) indicate significant that the observed mean is significantly different from zero at 10%, 5% and 1% level respectively.

The results show that the CAAR is statistically significant on the announcement day (AD) at -0.55 percent (t-stat=-1.8096), effective change day (CD) at -0.81 percent (t-stat= -3.3628) and 20 days after additions (CD+1 to CD+20) at -3.62 percent (t-stat= -2.1120). For the remaining event windows, the CAAR experienced negative values except for the anticipation period (AD-20 to CD-1), but not significant in all cases.

Furthermore, the results show that CATV is only statistically significant for the anticipation period at -9.33 percent (t-stat= -3.1209). For the remaining event windows, CATV fluctuates between positive and negative values, but not significant in all cases. This implies that there is no abnormal trading volume for these event windows.

Besides that, CAAV for stocks added into the Malaysian main stock index is positive and statistically significant at 1 percent for all cases. The results indicate that stock added into Malaysian main stock index experienced significant increase in volatility.

Figure 2: CAARs, CATV and CAAV for Stocks Added into the Malaysian Main Stock Index

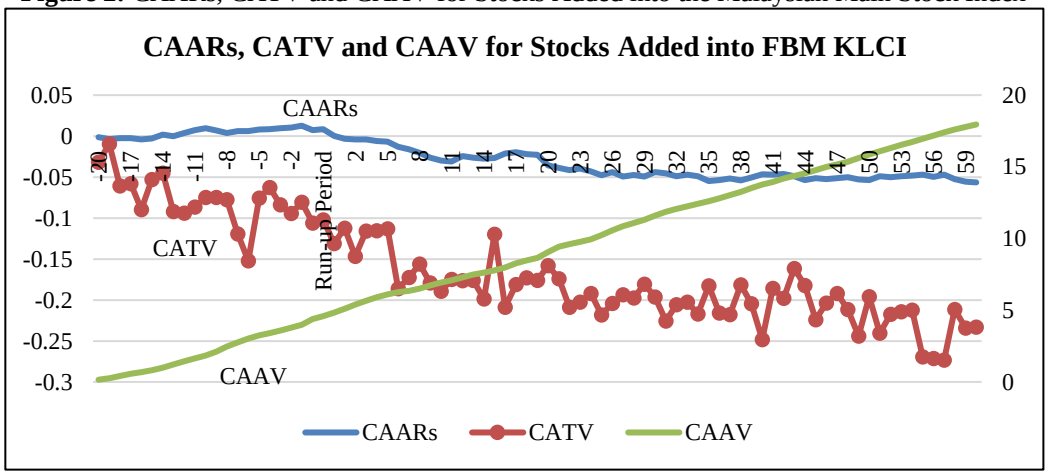


Figure 2 provides a graphical illustration of the CAARs, CATV and CAAV for stocks that are added into Malaysian main stock index. This study found contradictory results from many previous studies. This study demonstrated that added stock experienced a negative downward trend of stock price and trading volume reactions. This leads to higher stock return volatility over the examined event windows.

The result showed a negative and downward trend of CAAR after the announcement day by -5.81 percent (t-stat= -1.4859) for index-additions, though not significant. However, studies such as Beneish and Whaley (1996), and Azevedo et al. (2014) have discovered negative CAARs for added stocks.

The result also showed a downward trend of CATV by -21.00 percent (t-stat= -1.5074) over the event windows, albeit insignificant. The downward trend of price effect over the event window was corroborated by the associated decrease in trading volume. Low trading volume also indicates that there are not many buyers and sellers involved in the stocks. This means the stock is illiquid, which increases the bid-ask spread and hence the volatility of a stock. Beneish and Whaley (1996) also reported that trading volume declined dramatically after addition.

This is supported by an upward trend of CAAV by 18.69 percent (t-stat 6.2779) over the event windows. The downward and negative abnormal trading volume is accompanied by a high stock return volatility. This is consistent with study of Amihud and Mendelson (1986), where the illiquidity of the stock increases the bid-ask spread of the stock.

A downward trend of stock price reaction for stocks added into FBM KLCI in this study may indicate that investors were not always rational in Malaysian stock market as documented by Wong and Lai (2009) and Ali, Ahmad and Anusakumar (2011). A plausible reason may be that the Malaysian stock market is dominated by arbitrage traders who wish to profit from inefficient market on the index revision effect. They buy the stocks that are to be added into the index and hold them until after the index revision takes effect. This is because the eligibility criteria being added into and deleted from the index are known in the FTSE Bursa Malaysia Index Ground Rules.

Investors can predict the index components changes in advance. Hence, investors have enough time to adjust their portfolio before the effective change day of the index components.

This finding is consistent with Duque and Madeira (2004) who found the same surprising results for index addition and argued that this is a signal of an overreaction when the announcements of addition were made. De Bondt and Thaler (1987) and Chan et al. (2013) evidenced that stocks that have performed poorly in the past performed better than the stocks that have performed well in the past. They concluded that stock prices may temporarily deviate from their fundamental values as a result of investor overreaction to company's announcements.

4.2. Abnormal Return, Trading Volume and Stock Return Volatility for Deletions

Table 2 reports the results for cumulative average abnormal returns (CAAR), cumulative average abnormal trading volume (CATV) and cumulative average abnormal volatility (CAAV) for the stocks being deleted from the Malaysian main stock index.

Table 2: Test of Significance of CAARs, CATV and CAAV for Stocks Deleted from the Malaysian Main Stock Index

Event Days	CAARs	t-stat	CATV	t-stat	CAAV	t-stat
AD-20 to CD+60	6.43%	2.2228	-2.46%	-0.4781	16.35%	5.1999***
AD-20 to AD-1	0.40%	0.2924	-1.84%	-0.6389	3.57%	5.3320***
AD	-0.29%	-0.932	-0.55%	-0.2038	0.18%	2.6116**
AD+1 to CD-1	-1.23%	-1.1783	-0.75%	-2.2903**	3.26%	3.7475***
CD	0.22%	0.5963	0.36%	0.1792	0.19%	3.2010***
CD+1 to CD+20	3.87%	2.8038***	3.96%	1.2253	4.02%	4.0636***
CD+1 to CD+60	6.30%	3.0885***	2.56%	0.6835	12.21%	5.0584***

Notes: Asterisk (**) and (***) indicate significant that the observed mean is significantly different from zero at 5% and 1% level respectively.

The results show that the CAAR for the event windows of post change periods (CD+1 to CD+20 and CD+1 to CD+60) is significantly different from zero, while the rests are not. CAAR of index-deletions increased after the effective change day. The CAAR was 3.87 percent (t-stat 2.8038) for 20 days after deletions and 6.30 percent (t-stat 3.0885) for 60 days after deletions.

Besides that, it shows that only the run-up period (AD+1 to CD-1) experienced significant CATV at -0.75 percent (t-stat -2..2903). Although, this study showed evidence that CATV of index-deletion was positive for the event windows after the effective change day, it is statistically insignificant. This may imply that trading volume was back to relatively normal levels.

Similar to index-additions, for all the event windows of index-deletion, the results of CAAV are positive and statistically significant for all cases. The results indicate that stocks deleted from Malaysian main stock index experienced significant increase in stock return volatility.

Figure 3: CAARs, CATV and CAAV for Stocks Deleted from the Malaysian Main Stock Index

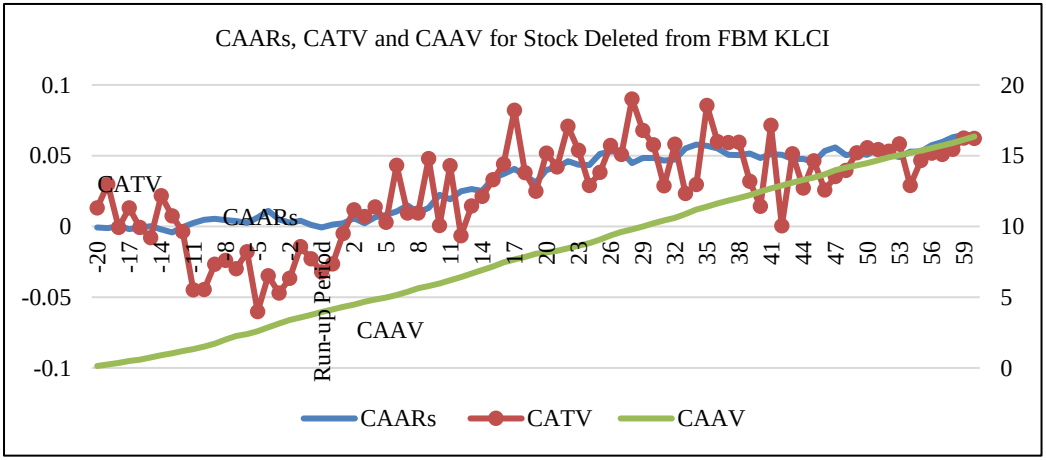


Figure 3 provides a graphical illustration of the CAAR, CATV and CAAV for stocks that are deleted from Malaysian main stock index. This study found surprising empirical findings for deleted stocks. This study showed an upward trend of stock price. This is accompanied by low cumulative average abnormal trading volume that fluctuates around zero and positive cumulative average abnormal volatility over the examined event windows.

As opposed to the index-additions, the study observed a positive upward trend for CAAR over the event window of 6.43 percent (t-stat 2.2228) for stocks deleted from the Malaysian main stock index. This is consistent with Siegel & Schwartz (2006) and Azevedo et al. (2014). One possible explanation for this observation is that speculative investors are selling the stocks before they are deleted from index and buy them back after index deletions. This is supported by investor awareness hypothesis of Chen et al. (2004) that there is only a temporary decrease of stock price following index deletions and completely reversed after the effective change day. Docking and Dowen (2006) explained that investors' recognition on stocks deleted from an index does not immediately disappear. The temporary decrease of stock price may be due to the portfolio rebalancing activity by the fund managers. This also supports the price pressure hypothesis of Harris and Gurel (1986) where stock prices go back to pre-announcement period level.

Besides that, the CATV of stocks deleted from Malaysian main stock index is moving in sideway trend around zero throughout the chosen windows by -2.46 percent (t-stat -0.4781). This low cumulative average abnormal trading volume may indicate that the portfolio balancing activity would have little or no impact on the volume of these stocks.

The findings of stock return volatility for stock deleted from FBM KLCI showed a similar behavior with addition into the index. The stock return volatility increased steadily after the effective change day, albeit less volatile.

4.3. Analysis of Firm's Long-Term Performance

Table 3: Regression Analysis of Tobin's q for Stocks Added into and Deleted from the Malaysian Main Stock Index

Examined Windows		Dependent variables	Control Variables			Dummy	
		Tobin's *q*	**MTBV**	**LEV**	**MV**	**DA**	**DD**
0 to +2	Coefficient	1.3964	2.8654	-0.4281	-1.53E-07	-0.2056	-0.2263
	t-Stat	28.5934***	40.1232***	-2.6620***	-0.4998	-2.2954**	-2.3016**
	p value	0.0000	0.0000	0.0079	0.6173	0.0219	0.0216
0 to +3	Coefficient	1.4020	2.8655	-0.4261	-1.55E-07	-0.2004	-0.1664
	t-Stat	28.0322***	40.0905***	-2.6466*	-0.5064	-2.4815**	-1.8644*
	p value	0.0000	0.0000	0.0083	0.6127	0.0132	0.0626
0 to +4	Coefficient	1.3900	2.8594	-0.4279	-1.50E-07	-0.1416	-0.0857
	t-Stat	26.9784***	39.9056***	-2.6505***	-0.4896	-1.8709*	-1.0254
	p value	0.0000	0.0000	0.0082	0.6245	0.0616	0.3054
0 to +5	Coefficient	1.3753	2.8560	-0.4283	-1.40E-07	-0.0997	-0.0222
	t-Stat	25.8467***	39.8042***	-2.6506***	-0.4722	-1.3697	-0.2777
	p value	0.0000	0.0000	0.0082	0.6369	0.1711	0.7813

Notes: (*), (**) and (***) indicate significant that the observed mean is significantly different from zero at 10%, 5% and 1% level respectively.

Table 3 above shows the regression result of Tobin's *q* of firms over effective change year to 2-, 3-, 4-, and 5-year after the event.

This study finds a statistically significant positive coefficient on MTBV, but a statistically significant negative coefficient on LEV. However, there is a statistically insignificant coefficient on MV. The positive and statistically significant of MTBV suggests that there is a potential of future growth for affected firms. Meanwhile, the negative and statistically significant of LEV might show a threat to common shareholders and potential financial distress of the firm.

The coefficients of interests in Table 3 are the dummy of addition (DA) and dummy of deletion (DD). For additions, over a period of (0,+2) years, (0,+3) years and (0,+4) years, the Tobin's *q* are negative and statistically significant at -20.56 percent (t-stat= -2.2954), -20.04 percent (t-stat= -2.4815) and -14.16 percent (t-stat= -1.8709), respectively. However, Tobin's *q* is negative and statistically insignificant over period 0 to +5 years.

Furthermore, for deletions, there are negative and statistically significant coefficients over window (0,+2) years and (0,+3) years that are -22.63 percent (t-stat= -2.3016) and -16.64 percent (t-stat= -1.8644), respectively. However, Tobin's *q* is negative and statistically insignificant over period (0,+4) years and period (0,+5) years. This indicates that the impacts of deletions on firm's long-term performance are only up to 3 years after deletion.

Figure 4: Tobin's *q* Valuation for Additions and Deletions for Malaysian Main Stock Index

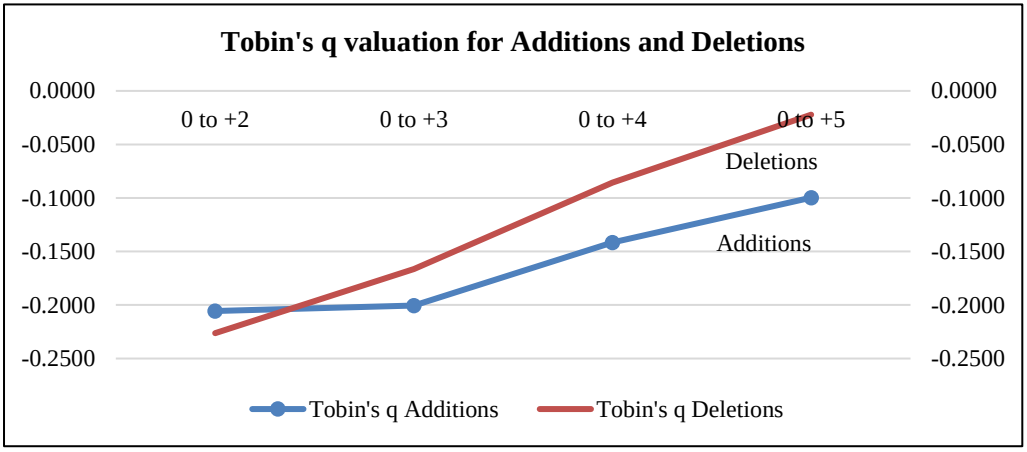


Figure 4 shows Tobin's *q* values for additions and deletions for Malaysian main stock index. As observed, although the Tobin's *q* for both additions and deletions are negative, they are improving at an increasing rate. In other word, the longer the period after the stocks were added or deleted, the better the performance becomes.

However, the results showed that stocks deleted from FBM KLCI performed better than stocks added into the index after index revisions. Stock deleted from the index reversed faster than stock added into the index. This may be due to poor lower short-term returns of the added stocks as evidenced in previous section.

The result in this study is inconsistent with previous studies (Morck and Yang 2001; Denis et al. 2003; and Mase 2007) who found positive valuation for firms added into the index and negative valuation for deleted firms.

However, this result is consistent with Cai and Houge (2008) and Chan et al. (2013) who found deleted stocks outperformed added stocks in the long term. They argued that deletion from an index may signal a bad news for the company. This create pressure to the management to improve the performance of company. Hence, this enhanced performance of deleted stocks subsequently.

4.4. Analysis of Opinion Divergence

Table 4 reports the results of regression analysis of opinion divergence for stocks being added into and deleted from the Malaysian main stock index.

Table 4: Regression Analysis of Opinion Divergence for Stocks Added into and Deleted from the Malaysian Main Stock Index

Model	STVOL		STURN	
	Additions	**Deletions**	**Additions**	**Deletions**
OD	-0.5642	0.3247	-5.4534	-2.5347
t-Stat	-1.4769	0.6536	-2.1237**	-0.6405
p value	0.1498	0.5180	0.0418	0.5264
Ln (MTBV)	0.0049	-0.0094	0.0045	-0.0142
t-Stat	0.7172	-0.7187	0.7027	-1.2011
p value	0.4786	0.4775	0.4875	0.2385
LEV	0.0057	-0.01865	0.0141	-0.0095
t-Stat	0.3138	-0.8428	0.7687	-0.4987
p value	0.7557	0.4056	0.4479	0.6214
Ln(MV)	-0.0104	-0.0295	0.0390	-0.0298
t-Stat	-1.9921*	-4.5526***	-1.5964	-4.6660***
p value	0.0552	0.0001	0.1206	0.0001
Intercept	0.0948	0.1258	0.0738	0.1349
t-Stat	2.8042***	3.0788***	2.4414**	3.7080***
p value	0.0086	0.0042	0.0205	0.0008

Note: Asterisk (*), (**) and (***) indicate significant that the observed mean is significantly different from zero at 10%, 5% and 1% level respectively.

The first column of Table 4 demonstrates the regression results of using STVOL as proxy of opinion divergence in investors' beliefs around announcement day. For both addition and deletion, the estimated coefficients on STVOL are -0.5642 and 0.3247, respectively and statistically insignificant.

In the second column, when using STURN as proxy of opinion divergence among investors' beliefs, the estimated coefficient for addition is negative and statistically significant at -5.4534. This indicates that there is a disagreement among investors about added stocks upon the arrival of the announcement of index revision. On the other hand, the estimated coefficient of deletion is negative and statistically insignificant at -2.5347.

The negative relationship of excess return and proxy of opinion divergence for stocks added into the index suggests that added stocks with high opinion divergence experienced lower cumulative average abnormal return around the announcement of additions into Malaysian main stock index. This is supported by Miller's theory that there is a negative relationship between cumulative abnormal returns and proxies of opinion divergence for stocks with high opinion divergence. This is also consistent with studies such as Diether, Malloy and Scherbina (2002).

After investors pick up the information about the additions into index, different investors might have different beliefs. Investors may respond differently to the news of index composition changes. Investors with different expectations would construct different trading strategies that may cause asymmetric effects of index composition changes.

5. CONCLUSION

This study shows new evidence on the impacts of index components changes in Malaysian main stock index around the announcement and the effective change events. The findings of this study suggest that index additions carry more negative impacts to the stocks than index deletions. Deleted stocks perform better than added stocks. This is strongly supported by the findings of firm's long-term performance of Tobin's *q* model where deletions perform better than additions. Though seems surprising, the results could be explained using the Opinion Divergence Theory. This study ascribes that the opinion divergence among investors influences the investor's trading strategies which affects the stock price, trading volume, stock return volatility and ultimately the firm's long-term performance. The empirical findings of this study contribute to the existing body of knowledge. This is one of few studies that found contradictory results of impacts of index component changes especially for FBM KLCI index from past literature.

A psychological effect of investor also may be one of the possible reasons behind these findings. The ability of investor to access to the investing information and the availability of information are important variable that will determine how investor reacts to the news of index composition changes. This present study evidenced that opinion among investors are diverge for index-additions. This may imply that investors in Malaysian stock market are not always rational. Theoretically, an answer to this issue can throw some light on the efficiency of the Malaysian stock market. Practically, evidence from this study would help market participants to be aware and understand the possible impact of investor psychology in the market place.

As reported in this study, index deletions perform better than index additions. This evidences the investor's belief that these stocks have potential and liquidity even though they are not in the list of FBM KLCI. Besides that, the awareness for deleted stocks does not easily disappear. Moreover, the reason for them being deleted from the FBM KLCI may be due to their lack of representative in the index, as these stocks are smaller firms in FBM KLCI in terms of market capitalization. However, these stocks may not necessarily be neglected following their deletion. In addition, the eligibility criteria for being added into and deleted from the index are known in the FTSE Bursa Malaysia Index Ground Rules. Investors can thus predict the index components changes in advance. Hence, investors have enough time to adjust their portfolio before the effective change day of the index components. The findings of this study will help to serve as a source of information to stakeholders regarding the strength and weaknesses of being added or deleted from Malaysian main stock index. It would be interesting from an investor's point of view to know whether a long-term buy and hold strategy based on index revision can be reliably profitable or even beat the market.

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