Do Changes in Index Composition Affect the Stock Prices and Trading Volume? The Case of a Shariah-Compliant Index in Malaysia

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Abstract: We investigate the effects of index revision on (i) stock performance as measured by stock prices movement and, (ii) stocks trading volume based on FTSE Bursa Malaysia EMAS Shariah Index. Based on the sample size of stock additions and deletions from 2007 to 2014, our findings indicate that the effects are significant on both the prices and trading volume. However, the effects on stock prices become insignificant in the long term in our sub-sample of stock additions with all newly added stocks without duplicated firms, firms that are added in or deleted from the same index more than once. This could be due to the reason that investors may not be familiar with these newly added stocks and as such would remain hesitant to purchase them despite the inclusions of the stocks to the index. Our findings also show that both the stock additions and deletions have a positive effect on trading volume in both the short and long runs. This is in contrary to the prediction of liquidity cost hypothesis that deletions could result in lower liquidity which leads to diminished trading volume in the long run. It is likely that investors in general have pessimistic expectations toward the deleted stocks; they were scrambling to sell those shares even a long time after the "change day". Overall, our results imply that investors who are concerned with Shariah-compliant investments should monitor and be aware of the stock additions and deletions in the Shariah-compliant index to rebalance their investment portfolios from time to time to improve their investment returns, both in the short run and long run.

Keywords: Index Revision, FTSE Bursa Malaysia EMAS Shariah Index, Abnormal Returns, Abnormal Trading Volume.
JEL classification: G10, G12, G14

1. Introduction

In the past few decades, studies on index changes effects are popular regarding the U.S stock market, e.g., Standard & Poor's 500 Index (S&P 500) (Shleifer,1986; Harris & Gurel, 1986; Elliott *et al*., 2006). There are also numerous research works that inspect the relationship between index revision and stock price changes for the European market, such as the Danish blue-chip KFX Index (Bechmann, 2004). Similar studies for the Asian market remain inadequate. They are primarily dedicated to the Japanese stock market (Liu, 2000; Liu 2006; Liu, 2011). A recent study of index revision effects has been performed for Bursa Malaysia KLCI by Azevedo *et al.* (2014) but with a rather small sample size of only fifteen additions and thirteen deletions of the existing stocks. The small number of observations could result in volatile results. Our study fills the gap by being among the first to deliver a comprehensive analysis of the effects of the changes in index composition in the context of Malaysia with a larger dataset to produce more reliable results.

Shleifer (1986) is among the pioneers who perceives that the inclusion of stocks in the index could encourage closer scrutiny of the firm by investors and analysts, and in turn, may result in larger trading volume and greater interest from institutional investors (Hegde & McDermott, 2003). In practice, a number of institutional investors make investments based

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on investment guidelines which encourage them to invest in the companies that are included in the index. When there are adjustments in the index composition, institutional investors normally buy the added shares and sell out the deleted shares within several days. Therefore, the possible change in demand could be fairly obvious on the basis of the total capital invested by the institutional investors who regard the index as a standard (Bildik & Gülay, 2008). Hence, trading volume tends to be significantly affected by index revision. Besides, significant price effects occurred due to changes of demand (Cheung & Roca, 2013).

Islamic investments have achieved significant growth within the global market throughout the last decade. With an average growth of approximately 15% per year during this period, Shariah-based finance has developed in both breadth and depth in various aspects, such as the infrastructure and capabilities, number and diversity of stakeholders, range of products and services, and geographical reach (Abidin, 2012). In Malaysia, Islamic finance has witnessed steady and tremendous improvement. The Securities Commission, Malaysia has faith in the sustainable growth of the Islamic financing market. According to the Second Capital Market Plan, the Malaysian Islamic capital market is expected to develop further, at an estimated rate of 10.6% per annum over the ten-year period to 2020. The value is projected to RM 2.9 trillion by the end of 2020 (Abidin, 2012, McGowan & Muhammad, 2010). Shariah-compliant securities took up about 61% of total market capitalization and 74% of total listed securities in Malaysia in Jun 2014 (Securities Commission Malaysia, 2014). In the past few years, Malaysia has played an important role in the worldwide Islamic area; the Malaysian Islamic financial market was known as the symbol of worldwide financial success. According to the estimations of Bursa Malaysia, Malaysia accounts for 36% of the overall Islamic equity funds (Sadeghi, 2008). Therefore, it is worthwhile to conduct further research on Shariah-based securities.

There are two Shariah Indices in Malaysia: the FBM EMAS Shariah Index and the Hijrah Shariah Index. The FBM EMAS Shariah Index is a broad base benchmark index comprised of Shariah-compliant stocks. This index has a larger market capitalization, and covers much more industries than the Hijrah Shariah Index. The FBM EMAS Shariah Index is the Shariah-compliant constituent of the FBM EMAS that meets the screening requirements of the Malaysian Securities Commission's Shariah Advisory Council (SAC). The FBM EMAS Shariah Index should abide by the rules set by the SAC in the design of the index. Shariah-compliant companies must not participate in any of the following core activities: financial services based on *riba*, conventional insurance (*gharar*); gambling (*maisir*); production or sale of non-halal and tobacco-based products, or related products; entertainment activities that are not allowed according to Shariah; as well as other Shariah-restricted activities (FTSE, 2014). All listed companies that comply with the criteria and principles would be added to this index and subject to the evaluation by the SAC semi-annually. Stocks additions to and deletions from the FBM EMAS Shariah Index are based on the stock price reliability, stock trading volume, and market capitalization. For instance, if a stock cannot provide a precise and reliable price, it might be deleted from this index. A non-constituent will not be able to be added to the index if the stock turnover rate is less than 0.05%. As for existing constituents, a stock will be removed from the index if the ratio is below 0.04% (FTSE, 2014).

Our study aims to investigate the effects of changes in the FBM EMAS Shariah Index composition on both stock prices and trading volume. Specifically, we aim to:
1) Investigate the effects of changes in the FBM EMAS Shariah Index composition on stock prices.
2) Investigate the effects of changes in FBM EMAS Shariah Index composition on stock trading volume.

Despite their increasing popularity, there are still lack of studies conducted on index revision involving Shariah compliant indices. In investigating the above objectives, we

contribute to the understanding of the effects of index revision on Shariah-compliant index by providing Malaysian evidence. Such understanding pertaining to the changes in basic investment indicators such as stock prices and trading volume is important not only to the investments needs of Muslim investors but also because of the increasing acceptance of Islamic finance globally that leads to growth of Shariah compliant investments as an alternative to the conventional portfolio. The remaining sections of the paper are organized as follows. Section 2 reviews the theories and literature followed by research hypotheses formation. Section 3 presents the description of data and methods. Section 4 includes the analysis and findings. Section 5 concludes and discusses the study limitations and suggestions for future studies.

2. Review of Theories and Literature
2.1 Theories
The index revisions effects are the phenomenon of abnormal stock returns and trading volume that occur when a company's shares are included in, or excluded from, an index. Various theories have been provided to explain this phenomenon and each of these theories is supported by various studies. The major differences among these theories are the reasons that cause these effects, and whether the index effects are temporary or permanent.

Price Pressure Hypothesis
The Price Pressure Hypothesis (PPH) was initially published by Scholes (1972) and Kraus & Stoll (1972), to explain why the large number of stocks buy (sell) lead to an increase (decrease) of the share price, even without new information related to the transaction. According to the PPH, with increased purchasing (selling) of a stock, there should be a growth (reduce) in the stock price. Assuming that the transaction of the bulk of stocks come with the costs of portfolio rebalancing, sellers' costs must be covered in the buyers' initiating trades as compensation for providing liquidity. Transactions initiated by the sellers should be discounted, while transactions initiated by the buyers should have a premium. This change in price is temporary and will be revised immediately. In other words, an immediate increase in price (price pressure) is necessary to induce passive demanders to offer their shares, while the subsequent decrease allows them to re-establish their position at a new profit. On the basis of this phenomenon, a short-term increase (decrease) is expected in the stock price following an index addition (deletion), because index funds and other market participants imitate the index to re-allocate their portfolios. Moreover, stock trading volumes could be expected to grow near the announcement day or effective day due to the rebalancing of portfolios (Harris and Gurel, 1986).

In essence, PPH expects a temporary increase (decrease) in stock prices with the index additions (deletions). The effects on stock trading volumes are also short term (Table 1). This theory has been supported by Blouin *et al.* (2000), Vespro (2006), Yun & Kim (2010), and Azevedo *et al.* (2014).

Imperfect Substitutes Hypothesis
Imperfect Substitutes Hypothesis (ISH) was originally developed by Scholes (1972), and formalized by Shleifer (1986). In contrast to PPH, ISH predicts a permanent price effect by assuming a downward-sloping demand curve in a short time period. When stocks have close substitutes, their value is not significantly decided by the changes in supply and demand. This means that the demand curve is almost horizontal. ISH, however, assumes that stocks are not close substitutes for each other. In this situation, the long-run demand curve slopes downward, and is not perfectly elastic. When there are abnormal changes of growing (declining) demand for a certain stock, the price has to adjust upward (downward) to a new equilibrium. Applying

this into index change effects, a permanent price increase (decrease) is assumed regarding index inclusions (exclusions), mainly due to the fact that investors re-weigh their portfolios to respond to the index changes. Furthermore, the increased demand of stocks can be reinforced by improving the popularity among foreign investors who tend to invest in major indices to get exposure in different markets (Liu, 2000; Liu, 2006).

On the basis of ISH, the change in stock trading volume is uncertain. This is because it depends on the investors' behaviour. If investors merely buy and sell the stocks, the effects on trading volume would be consistent with that of PPH. The investors will purchase a stock that is added in the index and sell the one deleted from it, according to the announcement of index revision. However, if an index addition leads to amplified popularity in general, e.g., international exposure, the changes of trading volume will continue as long as the stock is still in the index.

Thus, ISH represents a permanent increase (decrease) in stock price with the index inclusion (exclusion). There is a temporary increase in the stock trading volume for both index inclusion and exclusion. However, the trading volume effect in the long run is ambiguous (Table 1). ISH is supported by Bechmann (2004), Mase (2007), Liu (2000), Liu (2006), and Bildik & Gülay (2008).

Information Hypothesis

The Information Hypothesis (IH), also known as Information Signalling Hypothesis, was highlighted by Mikkelson (1981), Harris & Raviv (1985) and Smith and Clifford (1986). They investigated stock price reactions to market information. IH assumes that the stock price changes from information signalling are permanent, while volume changes are temporary.

The addition of a certain stock provides positive information to the market, whereas deletion is perceived negative. There are many factors and occasions that convey signals to the stock market. One positive signal is that the index inclusion and exclusion are decided by a committee that makes judgment based on private information (Jain, 1987). Using S&P 500 as the sample, Jain (1987) proved that the stock prices effect is associated with the information in terms of the prospect of the company. His study was based on a phenomenon in which the S&P Index Committee takes the financial reliability of the company into consideration when making judgment and selecting companies. He stated that valuable information was exposed to the public through selections. In addition, when a stock is included in an index, the encouraging signal can be that this stock is viewed as a blue chip security. Hence, this signal would result in an increase in investors' awareness, which can lead to take-over premiums.

Accordingly, the IH assumes that there is a permanent price reaction, since the inclusion or exclusion of a stock offers valuable information to the market. The effect on stock trading volume is temporary (Table 1). This theory is supported for instance by Beneish & Gardner (1995), Yun & Kim (2010), and Liu (2011).

Liquidity Cost Hypothesis

The Liquidity Cost Hypothesis (LCH) was presented by Amihud & Mendelson (1986) and Beneish & Gardneur (1995). This hypothesis shows that investors require higher returns for investing in those stocks with low liquidity and less accessible information. The reason is that obtaining information before making investment in stocks would be a costly procedure. Besides, stocks with less information generally have a higher systematic risk. Moreover, securities with low liquidity are associated with higher bid-ask spreads which result in an increase in transaction costs. When a stock is added to an index, the coverage of new investors and analysts would be increased. Consequently, this leads to higher liquidity. More useful information and improved stock trading volume would help to reduce both direct trading costs

(bid-ask spread) and indirect costs (information cost), thus, the total transaction costs are decreased.

The LCH assumes that an index inclusion is an event which leads to a long-lasting increase in stock liquidity, whereby both the share price and trading volume would witness a long-term increase (see Table 1). This theory is supported by Hegde and McDermot (2003), Bechmann (2004), and Gregoriou (2011).

Investor Awareness Hypothesis
The Investor Awareness Hypothesis (IAH) was based on Merton (1987) and Polonchek & Krehbiel (1994), who stated that the return rate of investment relies on the degree of investor awareness. Based on their studies, the information which can draw market attention could result in a permanent appreciation of stock price. This leads to the attraction of new potential investors to the company by increasing the recognition of the company's shares. This theory can be applied to the index effect. This is because the changes in index composition commonly involve media exposure. On one hand, the stocks included in an index means that they are stepping onto a new scope for potential investor groups. Hence, this would result in a permanent positive price change. On the other hand, a permanent negative price change is not valid for deleted stocks, as the investors are still familiar with them. Additionally, IAH indicates that addition of stocks that have previously been excluded from a certain index should not cause the same price effect as compared with those totally new stocks.

Thus, according to IAH, the price of newly added stocks would witness a permanent increase. This theory does not predict the effects on stock trading volume (Table 1). IAH has been supported by Chen *et al.* (2004) and Elliott *et al.* (2006).

2.2 Literature Review & Hypothesis Formation

Harris & Gurel (1986) conducted a study on the S&P 500 Index. They found that both share price and trading volume were influenced by the declaration of index changes for a certain stock. The statement of index inclusion or exclusion did not disclose any new information which was specified by the S&P 500. Thus, there must have some other reasons spurring the changes in the stock price and trading volume. They assumed that this was possible due to the price pressure effect brought by shifting in demand. In the first time period, there was no evidence of changes in stock prices and trading volumes. The authors attributed the results to the absence of index funds during this period. However, with the increasing number of index funds, as well as the amount of capital invested in the funds, a growing pattern was formulated. Therefore, they concluded that the stock price and volume effects were not caused by the announcement of index revision itself, but by the increase in demand from the index funds.

Shleifer (1986) also investigated the index effects of the S&P 500 index. His study focused on sloped demand curves. He found that there were significant abnormal stock returns related to the announcement of index inclusion. Besides, his studies have also shown that the perceived abnormal returns were increased with the growing popularity of index funds. However, the results for changes in stock trading volume were not as distinctive as for changes in stock prices. He found that the trading volume had increased for a week since the announcement day. The trading volume would be rebalanced slowly. The results of his studies have shown a significant relationship between price and volume effects, and index funds, which were consistent with the ISH.

Poloncheck & Krebiel (1994) examined the influences of media attention had on stock prices. Their study involved a comparison of securities included in the Dow Jones Industrial Average (DJIA), which gains great media attention, and the Dow Jones Transportation Average (DJTA), which received less media coverage. The study proved that the securities

that received more media attention had more significantly abnormal trading volumes, and positive abnormal returns, through index revisions. The results were in line with the IAH. Beneish & Gardner (1995) investigated the liquidity and information costs effects on changes in the DJIA list. According to their study, the deletions of the stocks from DJIA lead to negative abnormal returns, as well as a great reduction in trading volumes throughout a period of three days. Due to the decrease in stock trading volume, the bid-ask spread of the stock increased, resulting in less analyst coverage and more trading costs. This was consistent with LCH.

Table 1: Expected price and volume effects based on different theories

Theory	Stock Inclusion			Stock Exclusion			Supporters
		Short term	Long term		Short term	Long term	
Price Pressure Hypothesis	Price	+	0	Price	-	0	Scholes (1972); Kraus & Stoll (1972); Harris & Gurel(1986); Blouin *et al* (2000); Vespro (2006); Yun and Kim (2010); Azevedo *et al*, 2014
	Volume	+	0	Volume	+	0	
Imperfect Substitutes Hypothesis	Price	0	+	Price	0	-	Scholes (1972); Shleifer (1986); Bechmann (2004); Mase (2007); Liu (2000); Liu (2006); Bildik and Gülay (2008)
	Volume	+	(+)/(-)	Volume	+	(+)/(-)	
Information Hypothesis	Price	0	+	Price	0	-	Mikkelson (1981); Harris & Raviv (1985); Smith (1986); Jain (1987); Beneish & Gardner (1995); Yun & Kim (2010); Liu (2011)
	Volume	+	0	Volume	+	0	
Liquidity Cost Hypothesis	Price	0	+	Price	0	-	Amihud & Mendelson(1986); Beneish & Gardner (1995); Heflin & Shaw (2000); Hegde & McDermott (2003); Bechmann (2004); Gregoriou (2011)
	Volume	0	+	Volume	0	-	
Investor Awareness Hypothesis	Price	0	+	Price	0	0	Merton (1987); Polonchek & Krehbiel(1994); Chen *et al*. (2004); Elliott *et al*. (2006);
	Volume	NG	NG	Volume	NG	NG	

Notes: 0 no expected effect, + a positive effect, - a negative effect, ( ) theory is ambiguous, NG the theory gives no indication about the expected effect.

Other related researches carried out for the U.S. market are Elliott *et al*. (2006), Becker-Bleas & Paul (2010), Kappou *et al*. (2010), Green & Jame (2011), and Rahman & Rajib

(2013). In general, findings from these studies are more inclined to support the existence of index revisions effects, and that stock additions in most cases are found to be leading to a significant increase in price and volume whereas stock deletions found to be causing significant volume level fluctuations.

Elsewhere in the West, Bechmann (2004) performed a study on the Danish Blue-chip KFX Index. The obvious difference between the KFX Index and the S&P 500 is that KFX has a transparent selection criteria. The selection is based only on a stock's market value and liquidity. It would benefit for predicting the changes in index composition. The study found no evidence of stock prices changes near the announcement day and change day. However, the stocks included in the index had abnormal returns one month after the announcement. The stocks excluded from the index had negative abnormal returns in six months after to the announcement. Consequently, the effects on stock prices were permanent. Besides, his study reported that stock trading volumes were higher near the day of announcement, and these effects were reverted later. The study also demonstrated that the stocks added in the KFX had a higher demand, and lower trading costs than shares outside the index. His results supported the ISH.

Mase (2007) studied the short-term and long-term index revisions effects on the European stock market, FTSE 100. His study found that the abnormal returns for included stocks remained 21 days after the effective date. There were negative abnormal returns for deleted stocks. The result indicated a permanent change in price, which was explained by the ISH. However, the stocks added (deleted) are more possibly performed better (worse) than expected before changes, because the FTSE 100 Index is based on market capitalization. Mase (2007) solved this problem by estimating coefficients of post events and applying the market model. He concluded that cumulative abnormal stock returns existed with a subsequent price reversal. The results for deleted stocks followed the same pattern. Worth investigation was that the stock trading volume began to increase before the announcement date of index revision, which implied that speculation may exist among the investors.

Studies on Index Revisions Effects on Asian Stock Markets
Empirical studies on the relationship between stock price and trading volume with index reshuffles for Asian equity markets are still limited. The studies are primarily dedicated to the stock market in Japan. Liu (2000) examined the index revisions effects of Nikkei 500. He found evidence to support the ISH. However, the Nikkei 225 has higher popularity than the Nikkei 500 among investors in Japan. Therefore, Liu (2006) considered the index effects of Nikkei 225. The changes in the Nikkei 225 composition did not add new valuable information, but did elicit symmetrically long-term price changes. The study revealed that the share prices increase (reduce) significantly for index inclusion (exclusion) around the announcement day and the change day. Although there were temporary price reverses, the changes in price tend to be permanent. According to a study on Nikkei 225 revisions, stock trading volume did not change permanently. It was different from the momentous permanent volume effects for the Nikkei 500 which were stated by Liu (2000). Although the Nikkei 225 index rebalancing did cause more marked impacts on price and volume, it also caused more price reversals, as well as more arbitrage trading, than those in the Nikkei 500; the results were consistent with the ISH.

Yun & Kim (2010) investigated the Korean equity market, specifically, the influence of changes in the Korea Stock Exchange Price Index (KOSPI) 200 Index. This study was conducted from the perspectives of risk, abnormal stock return and trading volume. Their study provided indications of long-lasting price impacts and partial reversal of stock returns. The stock trading volumes were increased during the event period. The changes in trading volumes remained at a relatively high level after the event.

Moreover, the results could be explained by the IH. The KOSPI 200 adopts the company's market capitalization within the same industry as the index selection standards, which implies that the outperformed stocks in the same industry during the previous year would be included, while the underperformed stocks would be excluded, from the index. The reason is that the ranking of the outperformed shares increases, and that of underperformed shares will decrease, based on the market capitalization. Thus, the changes in KOSPI 200 composition conveys beneficial information on included shares, and unbeneficial information on excluded shares.

In addition, Yun & Kim (2010) conducted further analysis by distinguishing the index revisions effects on newly added firms and previous constituents. However, the results proved that abnormal returns were also kept after excluding newly added shares. It meant there was no significant difference that existed between these two sets of stocks. These results were different from Mase (2008), who found that there was a significant difference between companies being added in the FTSE 100 Index for the first time, and companies being added again.

Azevedo & Karim (2014) conducted a study on the Malaysian stock market to sketch out the effects of index changes in the FBM KLCI from the perspectives of stock price, stock trading volume and market liquidity. This study provided evidence of short-term price effects in the KLCI revisions. Their findings supported the PPH. They also explained the PPH by using the market microstructure literature. The liquidity changes significantly as a result of index inclusion and exclusion. The rebalancing in liquidity caused the stock prices and trading volumes back to previous levels before the index revisions took place. Yazi *et al.* (2015) also found the positive impact on stock price when a stock is included in the Shariah-complaint list and vice versa when a stock is excluded from the list after the adoption of the newly revised methodology in screening stocks for Shariah-compliance in 2013.

Differences in stock market structure, regulations, and index revisions rules could be the reasons for some of the differences in findings from past studies on market reactions to index revisions in various countries and indices. Nonetheless, the existence of index revisions effects has mainly been supported by most researches on various indices. Among them were the S&P 500, DJTA, KFX Index, FTSE100, Nikkei 500, Nikkei 225, KOSPI 200, and FBM KLCI, which make it reasonable to assume that the FBM EMAS Shariah Index may also carry the comparable index effects. Furthermore, it should be noted that index revisions effects that would be enhanced with the substantial involvement of institutional investors (Hegde & McDermott, 2003; Bildik & Gülay, 2008) lead us to believe that the events of changes in the index composition of FBM EMAS Shariah Index could present statistically significant influences on stock prices and trading volumes. Therefore, substantiated with our review of the five theories in Section 2 together with the above literature review, we develop the following four hypotheses related to the effects of index revisions on stock prices and trading volume:

H1a. Index inclusions will lead to an increase in stock prices while exclusions will lead to a decrease in stock prices in the short term for the FBM EMAS Shariah Index.

H1b. Index inclusions will lead to an increase in stock prices while exclusions will lead to a decrease in stock prices in the long term for the FBM EMAS Shariah Index.

H2a. Index inclusions and exclusions will lead to an increase in the stock trading volumes in the short term for the FBM EMAS Shariah Index.

H2b. Index inclusions will lead to an increase in stock trading volumes while exclusions will lead to a decrease in stock trading volumes in the long term for the FBM EMAS Shariah Index.

3. Data and Methodology

Our dataset consists of daily stock prices (which are used to compute stock returns), daily trading volumes for the stocks and index, from the year of 2007 to 2014 since the index was implemented in the year of 2007. In order to test the revision effects of BM EMAS Shariah Index, this study observed the added and deleted securities from the perspectives of the daily closing price and trading volume for the securities and index.

3.1 Sample Size

FTSE Bursa Malaysia (FBM) reviews the index series semi-annually. FBM will announce the index revisions report on the second Thursday on June and December every year. There were a total of 350 additions and 331 deletions during the period of 2007 and 2014. However, not all of these observations can be contained in this study. Based on previous researches, firms with the following events during the observation period are removed from the sample as they will cause abnormal trading activities (Denis *et al*., 2003; Chen *et al*., 2004; Bildik & Gulay, 2008; Yun & Kim, 2010; Chen *et al*., 2013; Azevedo *et al*., 2014):

1) Divestures; 2) Rights issues; 3) Stock splits; 4) Initial public offering; 5) M & A; 6) Delisting; 7) Liquidation proceedings; 8) Trading halts; 9) Change of share class; 10) Name change; and 11) Other corporate events (include unusual market activities that are queried or publicly reprimanded by Bursa Malaysia).

After filtering out the above as well as due to unavailability of data at the time of data collection, we are left with a total of 86 additions and 44 deletions. A limited amount of studies considers the effects of duplicated firms on the index effects. A duplicated firm is a company that is added in or deleted from the same index more than once. Some researches revealed that there is a significant difference between the sample of duplicated companies and the sample without these companies (for instance Mase, 2008). Several studies show that there is no difference between these two types of companies (for instance Yun & Kim, 2010). Moreover, in some studies, only the newly added or deleted stocks are taken into consideration (Chen, 2013). In order to present more reasonable insights for the index effects, our study considers samples with duplicated firms, and without duplicate firms, separately. Two panels are therefore set: Panel A (with the original 86 additions and 44 deletions) includes duplicate firms among index inclusions and exclusions separately, whereas these duplicate firms are removed in Panel B (and as a result left with 68 additions and 33 deletions).

Panel A:

Table 2 presents the sample constructions for Panel A. Among the index inclusions, 178 stocks are removed due to corporate events. Among the exclusions, 115 stocks are deleted. In addition, there are 86 and 172 companies excluded from the sample of inclusions and exclusions, respectively, because of the unavailability of data. The sample criteria are shown in Table 3.

Table 2: Sample constructions, Panel A

Event date		Inclusions			Exclusions		
AD	CD	Initial sample	Less:		Initial sample	Less:	
			CE	N/A		CE	N/A
12/6/2007	18/6/2007	5	3	0	5	2	0
18/12/2007	24/12/2007	52	26	14	13	5	6
13/6/2008	23/6/2008	11	8	1	7	6	0
11/12/2008	22/12/2008	22	5	14	48	13	34
11/6/2009	22/6/2009	9	5	3	0	0	0
11/6/2009	3/8/2009	9	4	3	0	0	0
10/12/2009	21/12/2009	36	17	11	35	11	23
10/6/2010	21/6/2010	37	20	12	8	1	6
9/12/2010	20/12/2010	22	10	7	9	5	4
9/6/2011	20/6/2011	21	10	8	9	3	6
8/12/2011	19/12/2011	4	2	0	88	26	56
7/6/2012	18/6/2012	12	7	1	19	9	8
13/12/2012	24/12/2012	17	3	5	23	8	10
13/6/2013	24/6/2013	12	8	3	14	6	7
12/12/2013	23/12/2013	24	15	0	30	13	6
5/6/2014	23/6/2014	30	20	1	11	2	3
4/12/2014	22/12/2014	27	15	3	12	5	3
Total		350	178	86	331	115	172
Final Sample			86			44	

Notes: Corporate Events (CE); Unavailability of Data (N/A).

Table 3: Sample criteria, Panel A

	Inclusions	Exclusions
Initial Sample	350	331
Less: corporate events		
Divestures	25	17
Rights issues	12	3
Stock splits	9	0
Initial public offering/newly listed stocks	8	0
M&A	75	57
Delisting	2	1
Liquidation proceedings	16	19
Trading halts/suspended	17	12
Change of share class	8	4
Name change	3	1
Others	3	1
Total	178	115
Less:		
Unavailability of data	86	172
Final Sample	86	44

Panel B:

Table 4 presents the sample constructions for Panel B. After filtering duplicate firms, 128 stocks are removed due to corporate events in index inclusions. Among the exclusions, 71 stocks are deleted. Moreover, there are 42 and 100 companies excluded from the sample of inclusions and exclusions, respectively, because of the unavailability of data. The refined sample details are shown in Table 5.

Table 4: Sample constructions, Panel B

Event date		Inclusions				Exclusions			
AD	CD	Initial sample	Less			Initial sample	Less		
			DF	CE	N/A		DF	CE	N/A
12/6/2007	18/6/2007	5	1	2	0	5	2	2	0
18/12/2007	24/12/2007	52	20	16	7	13	5	3	5
13/6/2008	23/6/2008	11	2	6	1	7	3	3	0
11/12/2008	22/12/2008	22	7	3	9	48	25	5	17
11/6/2009	22/6/2009	9	4	4	0	0	0	0	0
11/6/2009	3/8/2009	9	1	4	2	0	0	0	0
10/12/2009	21/12/2009	36	13	12	5	35	17	6	11
10/6/2010	21/6/2010	37	13	14	5	8	4	1	3
9/12/2010	20/12/2010	22	5	9	4	9	3	4	2
9/6/2011	20/6/2011	21	7	8	3	9	2	1	6
8/12/2011	19/12/2011	4	1	2	0	88	38	12	34
7/6/2012	18/6/2012	12	4	5	0	19	9	5	4
13/12/2012	24/12/2012	17	4	3	3	23	4	7	8
13/6/2013	24/6/2013	12	4	6	2	14	2	6	5
12/12/2013	23/12/2013	24	8	9	0	30	5	10	5
5/6/2014	23/6/2014	30	10	13	0	11	5	1	0
4/12/2014	22/12/2014	27	8	12	1	12	3	5	0
Total		350	112	128	42	331	127	71	100
Final Sample		68				33			

Notes: Duplicate Firms (DF); Corporate Events (CE); Unavailability of Data (N/A).

Table 5: Sample criteria, Panel B

	Inclusions	Exclusions
Initial Sample	350	331
less: Duplicate firms	112	127
Less: corporate events		
Divestures	17	12
Rights issues	9	1
Stock splits	8	0
Initial public offering/newly listed stocks	8	0
M&A	53	35
Delisting	2	0
Liquidation proceedings	10	10
Trading halts/suspended	13	8
Change of share class	4	3
Name change	2	1
Others	2	1
Total	128	71
Less:		
Unavailability of data	42	100
Final Sample	68	33

Event Window

Every stock inclusion or exclusion is regarded as an event. The change day (CD) is around six trading days following the announcement day (AD) of the inclusion to or exclusion of stocks from the index by FTSE Bursa Malaysia (FBM). According to various hypotheses, both dates, and the period before and after, should be included in the observations (Elliott *et al.*, 2006; Bildik & Gülay, 2008; Liu, 2011; Azevedo *et al.*, 2014). The overall event window

ranges from 20 days before AD (AD-20) to 40 days after CD (CD+40). The estimation period is from 70 days before AD (AD-70) to 40 days before AD (AD-40) (Yun & King, 2011; Azevedo *et al*., 2014). The estimation period is used to measure the abnormal stock trading volume. Abnormal volume ratio is measured by the proportion of actual trading volume against the trading volume benchmark, which is the average volume within the estimation period.

In our analysis, the short-term event window is defined as the period 10 days after CD (CD+10), while the long-term event window as 40 days after CD (CD+40). For the purpose of analysis, the following five event-windows are used:
1) The pre-announcement period ([AD-20, AD-1], [AD-10, AD-1]),
2) Announcement day (AD),
3) Announcement period ([AD+1, CD-1]),
4) Change day (CD),
5) Post-change period ([CD+1, CD+10], [CD+1, CD+20], [CD+1, CD+40]).

Finally, we define the total cumulative effects as ([AD-10, CD+10], [AD-10, CD+20], [AD-10, CD+40], [AD-20, CD+10], [AD-20, CD+20], [AD-20, CD+40])

3.2 The Calculation of Abnormal Stock Return and Trading Volume
Abnormal Return
An important issue in this study is how to measure abnormal stock returns. Abnormal stock returns are defined as the actual stock returns deducted from the normal stock returns of a certain stock. However, normal stock returns is an expected conception. In practice, it is normally measured by factor adjustment methods. Below are the three available models for calculating abnormal returns:
(1) Mean Adjusted Returns
This model assumes different stocks have different expected returns. The expected returns of a stock are the average actual returns in the period before the event. Abnormal Return on stock i at day t (AR_{it}) is calculated as follows:

$$AR_{it} = R_{it} - \overline{R}_{t_1, t_2} \tag{1}$$

where R_{it} is the return on stock i on day t, and $\overline{R}_{t_1, t_2}$ is the average return on stock i in the period of t_1 to t_2.
(2) Market Adjusted Returns
This model assumes that the expected return on different stocks are the same, which equals to the return on the actual market portfolio. AR_{it} is calculated as follows:

$$AR_{it} = R_{it} - R_{mt} \tag{2}$$

where R_{it} is the logarithmic return on stock i on day t, and R_{mt} is the logarithmic return on the market portfolio on day t.
(3) Risk Adjusted Returns
This model is also known as the market model. It assumes that the normal return of a share is based on β and the actual return on the market portfolio. The formula is as follows:

$$AR_{it} = R_{it} - ER_{it} \tag{3}$$

where R_{it} is the return on stock i on day t, and ER_{it} is the expected returns estimated by using the market model.

The selection of a model depends on the correlation between the changes of stock and the changes of market portfolio. If there is a low correlation, the mean adjusted returns model is suitable. If there is a moderate correlation, the risk adjusted returns model is applicable. If there is a high correlation, the market adjusted returns model is more sensible to the price effects of a stock in the event. Based on the relevant studies in the past such as Changqing & Weizhong (2005), Bildik and Gülay (2008), and Azevedo *et al.,* (2014), we are confident that

there is a high correlation between the stock and the market, hence, the market adjusted returns model is applied.

Cumulative Abnormal Return (CAR)
The Average Abnormal Return (AAR_t) is the abnormal return ($AR_{i,t}$) for all event stocks against the total number of firms N for each day t:

$$AAR_t = \frac{1}{N}\sum_{i=1}^{N} AR_{i,t} \tag{4}$$

In order to measure the abnormal return over a specific period (t_1 to t_2), the Cumulative Abnormal Return (CAR) over the period for each company is calculated:

$$CAR_{t_1,t_2=}\sum_{t_1}^{t_2} AR_t \tag{5}$$

The average of CAR over the event window period (from day t_1 to t_2) is known as Cumulative Average Abnormal Return ($CAAR_{t_1,t_2}$). CAAR can be calculated by summing the AAR over the event window for each time period from day t_1 to t_2:

$$CAAR_{t_1,t_2=}\sum_{t_1}^{t_2} AAR_t \tag{6}$$

Abnormal Stock Trading Volume
The model we use to calculate the abnormal stock trading volume is the Volume Ratio Model based on Harris & Gurel (1986) to test whether the stock trading volume is abnormal or not:

$$VR_{i,t} = \frac{V_{i,t}}{V_{m,t}} / \frac{V_i}{V_m} \tag{7}$$

where $V_{i,t}$ represents the trading volume of stock i on day t in the event period; $V_{m,t}$ represents the trading volume of the market on day t in the event period; V_i equals to the average trading volume of stock i during the estimation period; V_m is the average trading volume of the market during the estimation period; and Volume Ratio ($VR_{i,t}$) is a standardized measure of the trading volume of stock i in the time period t, adjusted for the market variation.

The Mean Volume Ratio (MVR) is across over the number of firms N:

$$MVR_t = \frac{1}{N}\sum VR_{i,t} \tag{8}$$

If there is no change in stock trading volume in the event period t relative to the estimation period e, the expected value of MVR is 1. A volume ratio that is more or less than one indicates that the stock trading volume is increased or decreased as a result of being included in or excluded, respectively, from the index.

3.3 T-Test Statistic
(1) Abnormal Stock Return
A two-tailed t-test is applied to check the null hypothesis of zero abnormal stock returns. The t-test model is as follows:

$$t = \frac{CAAR_{t_1,t_2}}{\hat{S}(AAR_t)\sqrt{n}} \tag{9}$$

$$\hat{S}(AAR_t) = \sqrt{\frac{1}{N}\sum_{i=1}^{N}(AAR_t - \overline{AAR_t})^2} \tag{10}$$

where $\hat{S}(AAR_t)$ is the standard deviation of the average abnormal return, $CAAR_{t_1,t_2}$ is the cumulative average abnormal return from day t_1 to t_2, and n is the interval between t_1 and t_2. In the short-term event window, the range of t is [AD-20, CD+10]. In the long-term event window, the range of t is [AD-20, CD+40].

The null hypothesis of CAAR is: $H_0: CAAR_{t_1,t_2} = 0$. If the CAAR is significantly different from zero, the null hypothesis is rejected, which indicates that the changes of index composition have an effect on stock price, and the index revision effect exists, and vice versa.

(2) Abnormal Trading Volume Ratio

The t-test for the abnormal trading volume ratio is similar to the test used for abnormal stock return. The equations are as follows:

$$t = \frac{MVR_t}{\hat{S}(MVR_t)} \tag{11}$$

$$\hat{S}(MVR_t) = \sqrt{\frac{1}{N}\sum_{i=1}^{N}(MVR_t - \overline{MVR_t})^2} \tag{12}$$

where $\hat{S}(MVR_t)$ is the standard deviation of average abnormal volume ratio in the time period t. In the short-term event window, the range of t is [AD-20, CD+10]. In the long-term event window, the range is [AD-20, CD+40].

The null hypothesis is: $H_0: MVR_t = 1$. If MVR_t is significantly different from one, the index revisions have an impact on stock trading volume, and vice versa.

4. Findings
4.1 The Stock Price Effects
The Effects of Index Additions on Stock Price

Table 6 represents the CAAR and t-test value of index *inclusions* from 20 trading days before AD (AD-20) to 40 trading days after CD (CD+40).

In Panel A of Table 6, the stocks that are added in the index generate negative CAAR in the pre-announcement period (see also Figure 1), which indicates that the market does not have expectations on the information of stock additions. As presented in Figure 1, on the AD, the AAR is still negative, which means the market is not very sensitive to the announcement of information on index additions. The AAR starts to rise after AD. It may be because the institutional investors are adjusting their investment portfolios; they are purchasing the added stocks. It may also be caused by other investors who have good anticipations on the added stocks.

The CAAR begins to increase 10 days after AD (Figure 1). The upward trend of CAAR over the period is demonstrated by the linear line in Figure1. Additionally, Table 6 exhibits that, on the CD, the CAAR is 0.1386, which is significant at the 5% level. In the post-change period, the CAAR for the event-windows [CD+1, CD+10], [CD+1, CD+20] and [CD+1, CD+40] is equal to 0.1334, 0.1376 and 0.1380 respectively, with a statistical significance for all values at the 5% level. Although the CAAR is slightly reversed 20 days after the CD, the effects are not obvious.

It may be because the stocks which are included in the index receive more attention and recognition among the institutional investors; many of them choose to add those stocks in their portfolios. Hence, the demand and liquidity of the stocks are increased, whereby it results in a long-term growth of stock returns.

Comparison of Panel A and Panel B

As shown in Figure 2, the CAAR trend of Panel A and Panel B are similar. However, the results in Panel B are not as significant as those in Panel A. The value of CAAR in Panel B becomes positive in the announcement period (Table 6). It shows that the market reacts to the announcement of index additions. In the post-change period, the CAAR in Panel B is only significant in the short term. The difference between Panel A and Panel B may be because the

investors are not familiar with the newly added stocks; they would remain hesitant, so the index effects do not last for a long time.

Table 6: Cumulative average abnormal return of stocks added in Bursa Malaysia EMAS Shariah Index

Event window	Panel A		Panel B	
	CAAR	T-stat.	CAAR	T-stat.
Pre-announcement effects:				
[AD-20,AD-1]	-0.0144	-1.976*	-0.0168	-1.899*
[AD-10,AD-1]	-0.0199	-2.017**	-0.0217	-1.810*
Announcement day effects:				
AD	-0.0222	-1.869*	-0.0224	-1.542
Announcement period effects:				
[AD+1,CD-1]	-0.0193	-2.168**	0.0008	-1.752*
Change day effects:				
CD	0.1386	-2.004**	0.1594	-1.553
Post-change effects:				
Short-term:				
[CD+1,CD+10]	0.1334	-2.289**	0.1536	-1.710*
Long-term:				
[CD+1,CD+20]	0.1376	-2.058**	0.1587	-1.401
[CD+1,CD+40]	0.1380	-1.993**	0.1598	-1.301
Total cumulative effects:				
Short-term:				
[AD-10,CD+10]	0.0096	-2.467**	0.0256	-1.898*
[AD-20,CD+10]	0.0069	-2.448**	0.0201	-1.883*
Long-term:				
[AD-10,CD+20]	0.0290	-2.282**	0.0459	-1.675*
[AD-10,CD+40]	0.0539	-2.163**	0.0721	-1.515
[AD-20,CD+20]	0.0242	-2.289**	0.0385	-1.693*
[AD-20,CD+40]	0.0475	-2.174**	0.0635	-1.537

Notes: *, **, and *** indicate statistical significance at 10%, 5% and 1% levels, respectively, for two-tailed tests.
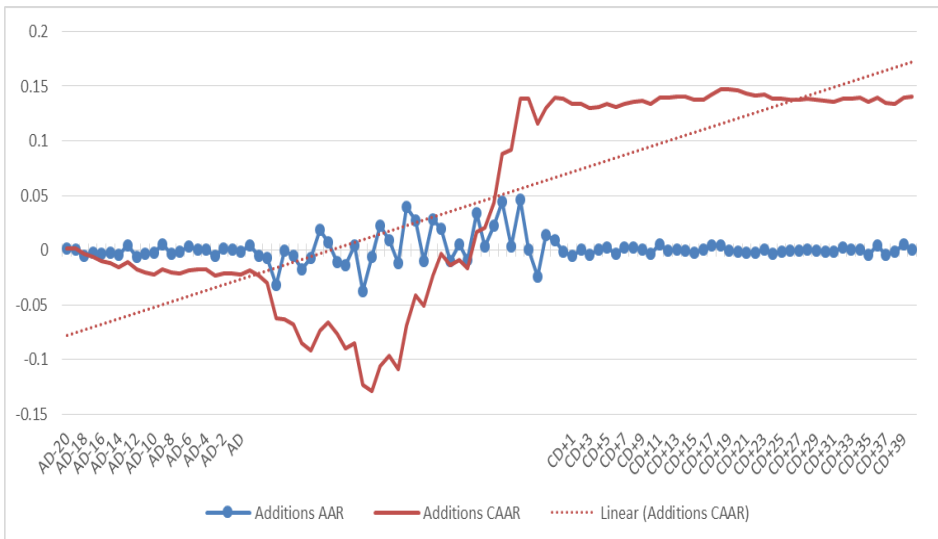

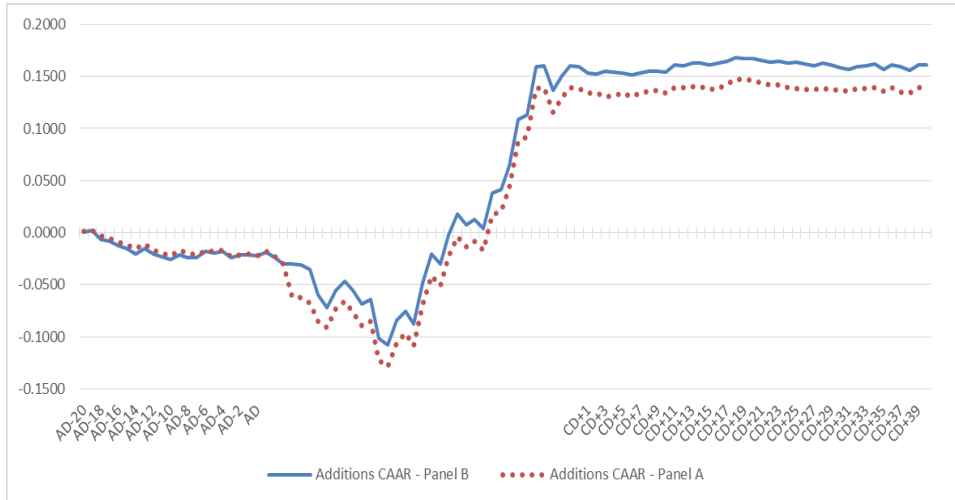**Figure 1:** The AAR and CAAR for stocks added in Index, Panel A

Figure 2: The CAAR comparison of Panel A and Panel B for added stocks

The Effects of Index Deletions on Stock Price

Table 7 shows the CAAR and t-test value of index *exclusions* from 20 trading days before AD (AD-20) to 40 trading days after CD (CD+40). Panel A of Table 7 shows that on the AD, the CAAR is -0.0482, and significant at the 5% level. This indicates that the market reacts to the announcement of index deletions information. The CAAR has been decreased and the downward trend is shown by the linear line in Figure 3. During the announcement period [AD+1, CD-1], the CAAR is -0.0633, with a statistical significance at the 5% level (Table 7).

On the CD, the CAAR is also significantly reduced at the 1% level. In addition, in the post-change period, although there are fluctuations in CAAR, the value is negative (Figure 3). This indicates that the stock price is not reversed in the long term. The CAAR for the event-windows [CD+1, CD+10], [CD+1, CD+20] and [CD+1, CD+40] is equal to -0.0649, -0.0632 and -0.0606 respectively, and all values are significant at the 5% level (Table 7).

There are various possible reasons for the continuous reduction in the CAAR. One of the reasons is that the institutional investors are changing their investment portfolios, and selling out the deleted stocks. Another reason could be that the release of the index adjustment information enabled the investors to have negative expectations toward the deleted stocks. In this scenario, they are selling out the stocks which are deleted from the index.
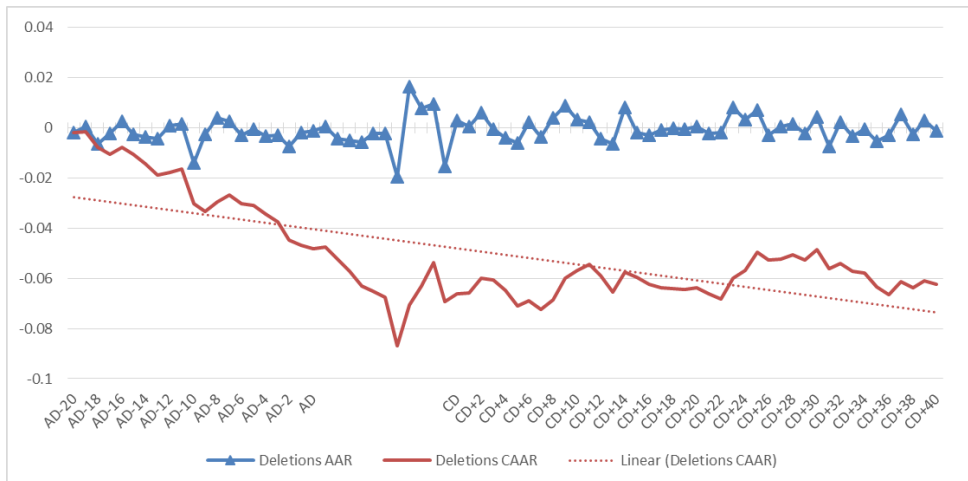
Comparison of Panel A and Panel B

As indicated in Figure 4, the stock prices effects of index exclusions in Panel B are similar to those in Panel A. However, there is a difference in the degree of the effects. The stock price effects in Panel B is smaller than in Panel A. It may be because the investors' expectations on newly deleted stocks are not as pessimistic as the stocks being deleted from the index more than once. Specifically, the repeated inclusion and exclusion of a certain stock indicates instability in the firm's performance. Thus, investors may not be interested in these stocks.

Our findings of the effects on stock prices are therefore consistent with the PPH, ISH, and IH theories which were supported in various past studies such as Harris & Gurel (1986), Rahman & Rajib (2013), Yun & Kim (2010) and Azevedo & Karim (2014).

Table 7: Cumulative average abnormal return of stocks deleted from Bursa Malaysia EMAS Shariah Index

Event window	Panel A		Panel B	
	CAAR	T-stat.	CAAR	T-stat.
Pre-announcement effects:				
[AD-20,AD-1]	-0.0226	-1.834*	-0.0293	-1.966*
[AD-10,AD-1]	-0.0345	-1.905*	-0.0465	-2.129**
Announcement day effects:				
AD	-0.0482	-2.364**	-0.0674	-2.847***
Announcement period effects:				
[AD+1,CD-1]	-0.0633	-2.620**	-0.0850	-3.114***
Change day effects:				
CD	-0.0663	-2.882***	-0.0844	-3.287***
Post-change effects:				
Short-term:				
[CD+1,CD+10]	-0.0649	-2.558**	-0.0847	-3.196***
Long-term:				
[CD+1,CD+20]	-0.0632	-2.418**	-0.0800	-2.936***
[CD+1,CD+40]	-0.0606	-2.183**	-0.0671	-2.296**
Total cumulative effects:				
Short-term:				
[AD-10,CD+10]	-0.0547	-2.475**	-0.0727	-2.919***
[AD-20,CD+10]	-0.0445	-2.444**	-0.0586	-2.821***
Long-term:				
[AD-10,CD+20]	-0.0563	-2.427**	-0.0733	-2.860***
[AD-10,CD+40]	-0.0569	-2.274**	-0.0672	-2.439**
[AD-20,CD+20]	-0.0477	-2.412**	-0.0618	-2.797***
[AD-20,CD+40]	-0.0506	-2.277**	-0.0597	-2.432**

Notes: *, **, and *** indicate statistical significance at 10%, 5% and 1% levels, respectively, for two-tailed tests.

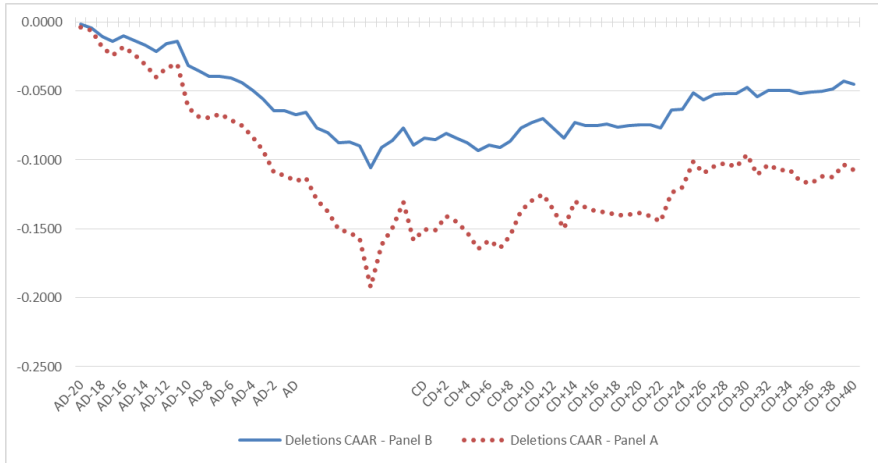**Figure 3:** The AAR and CAAR for stocks deleted from Index, Panel A

Figure 4: The CAAR comparison of Panel A and Panel B for deleted stock

4.2 The Stock Trading Volume Effects

The estimation period of 70 trading days before AD (AD-70) to 40 trading days before AD (AD-40) using the Volume Ratio Model as proposed in Harris & Gurel (1986), Bildik & Gülay (2008) and Azevedo *et al.* (2014) is used to evaluate the stock trading volume effects. If there is no abnormal trading activity in the market, the MVR will not be different from one. Otherwise, the MVR will be more or less than one, which shows that the trading activity of added or deleted stocks increased or decreased abnormally, respectively, as a result of changes in index composition.

The Effects of Index Additions on Stock Trading Volume

The analyses of the effects of index inclusions on stock trading volume in the short-term and long-term event window are carried out according to the data and the model mentioned previously. Table 8 represents the MVR and t-test value of index *inclusions* from 20 trading days before AD (AD-20) to 40 trading days after CD (CD+40).

As exhibited in Panel A of Table 8, in the pre-announcement period, the MVRs of stocks that are added to the index are more than one, but the results are not significant. This means the investors in the stock market do not have significant expectation to the added stocks. On the AD, the MVR is not significantly different from one. In other words, on the AD, the market is not sensitive to the announcement of the index addition information. However, the MVR has been increased rapidly after the AD (see Figure 5).

During the announcement period [AD+1, CD-1], the MVR is significantly more than one at the 1% level. This represents the active trading during this period. On the CD, the MVR of added stocks is 2.2368, which is significantly higher than one (Table 8). Moreover, as can be observed in Figure 5, the trading volumes of included stocks begins to increase after AD and peak around CD. The reason is that the institutional investors will be changing their investment portfolios based on the information of index addition. This tends to attract extensive market attention to those added stocks, and subsequently increases the related information of these stocks. Thus, information costs are reduced, and more investors will be purchasing the added stocks.

The MVR continued to grow after the CD (Figure 5). During the post change period, the MVR is more than one, and significant at the 1% level. In detail, in the period of [CD+1, CD+10], [CD+1, CD+20] and [CD+1, CD+40], the MVR is equal to 2.6938, 2.4788 and 1.9527, respectively, and all values are significant at the 1% level (Table 8). Although there

is a sign of reversal in the MVR, which could observed in Figure 5, abnormal trading activities continue to exist into the long term.

Comparison of Panel A and Panel B
As shown in Figure 6, Panel A and Panel B have similar changing trends in MVR. This shows that the market has a reaction to the added stocks no matter whether the stocks are being added for the first time or not. Slight difference exist in the announcement period. During the announcement period, the MVR in Panel B is higher than in Panel A (Table 8), which indicates the market's reaction to newly added stocks is somewhat more active in this period of time.

Table 8: Mean volume ratio of stocks added in Bursa Malaysia EMAS Shariah Index

	Panel A		Panel B	
Event window	MVR	T-stat.	MVR	T-stat.
Pre-announcement effects:				
[AD-20,AD-1]	1.2281	1.303	1.3731	1.721*
[AD-10,AD-1]	1.0790	0.581	1.1706	1.025
Announcement day effects:				
AD	1.450	1.10	1.683	1.342
Announcement period effects:				
[AD+1,CD-1]	2.4796	2.920***	2.5164	2.562**
Change day effects:				
CD	2.2368	1.900*	2.3152	1.678*
Post-change effects:				
Short-term:				
[CD+1,CD+10]	2.6938	2.777***	2.6069	2.789***
Long-term:				
[CD+1,CD+20]	2.4788	3.222***	2.4560	3.345***
[CD+1,CD+40]	1.9527	2.855***	1.9650	3.066***
Total cumulative effects:				
Short-term:				
[AD-10,CD+10]	1.9251	3.319***	1.9307	3.221***
[AD-20,CD+10]	1.7974	3.388***	1.8502	3.368***
Long-term:				
[AD-10,CD+20]	2.0125	3.613***	2.0281	3.631***
[AD-10,CD+40]	1.8132	3.232***	1.8384	3.385***
[AD-20,CD+20]	1.8916	3.676***	1.9431	3.747***
[AD-20,CD+40]	1.7552	3.320***	1.8050	3.517***

Notes: *, **, and *** indicate statistical significance at 10%, 5% and 1% levels, respectively, for two-tailed tests.

The Effects of Index Deletions on Stock Trading Volume
Table 9 presents the MVR and t-test value of index *deletions* from 20 trading days before AD (AD-20) to 40 trading days after CD (CD+40). Panel A shows that in the pre-announcement period, the MVRs are not significantly more than one. This indicates that the investors do not have significant predication on the deleted stocks. On the AD, the MVR is 2.9628, which significant at the 10% level. During the announcement period [AD+1, CD-1], the MVR is significantly more than one at the 1% level. This represents the initial reaction of the investors to the announcement of index deletion. On the CD, the MVR is significantly more than one. During the post-change period, even though the MVR fluctuated, the MVRs are significantly more than one (Table 9 and Figure 7). Institutional investors will be changing their investment portfolios due to the stock deletions and it is likely that investors in general have pessimistic expectations toward the deleted stocks; they were scrambling to sell those shares

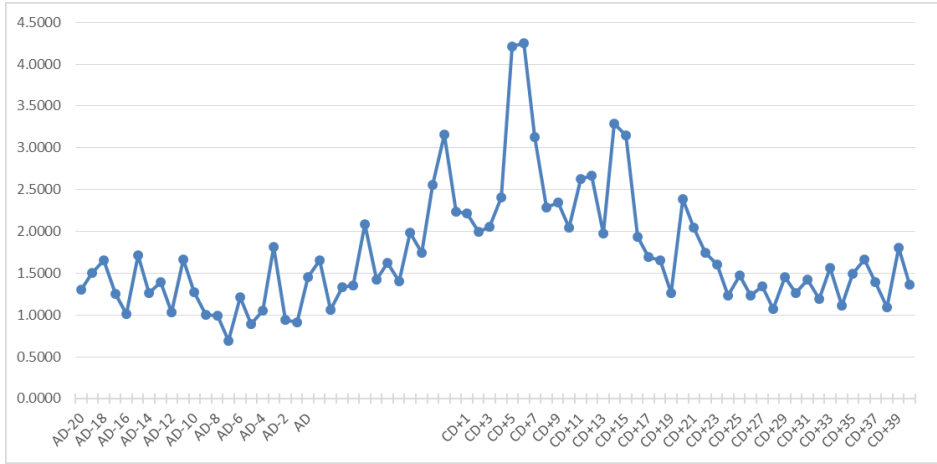even a long time after the CD. This finding is contrary to the outcome as predicted by the LCH.
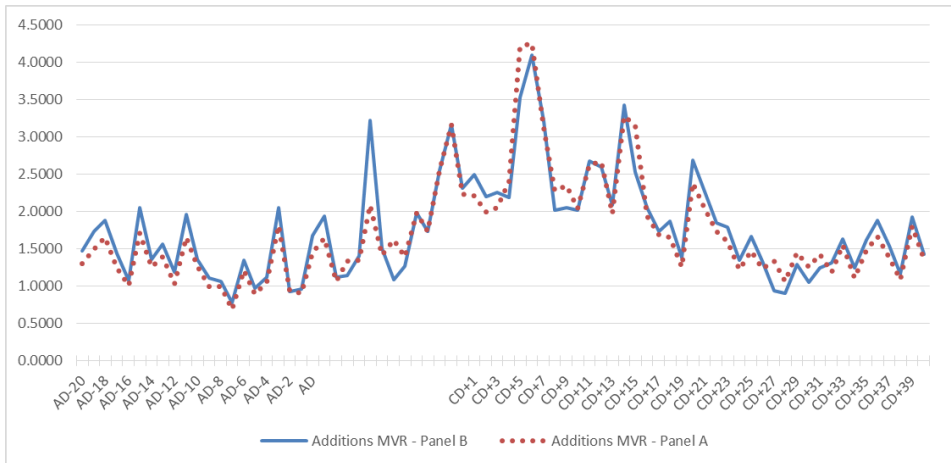

Figure 5: MVR of added stocks, Panel A

Figure 6: The MVR comparison of Panel A and Panel B for added stocks
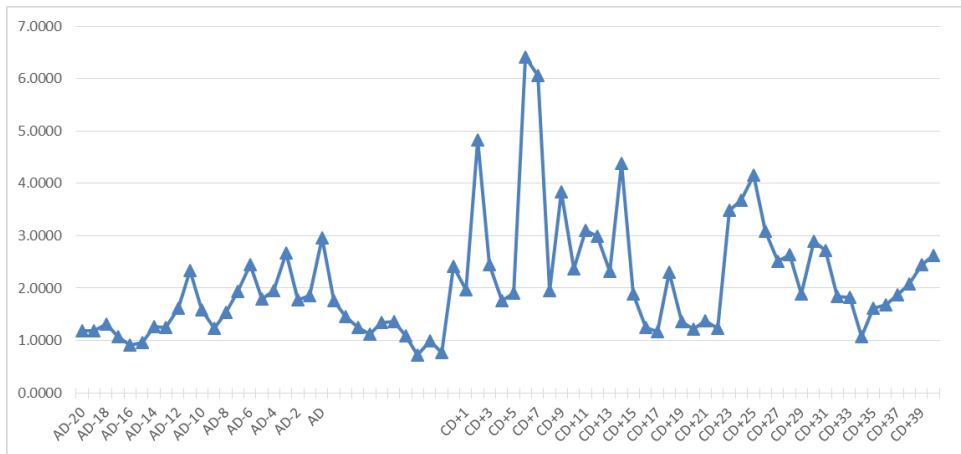
Comparison of Panel A and Panel B

The MVR changes of Panel A and B are almost identical, but there is a difference in the significant level on the CD (Figure 8; Table 9). In specific, the result is not significant in Panel B, while it is significant in Panel A. The reason for this may be because the investors hold more negative prospects to the stocks which are deleted from the index more than once, as these stocks indicate the unsteady development of a company. Thus, the investors scrambled to sell out those stocks.

Overall, our results show that the effects on stock trading volumes are found to be consistent with the PPH, ISH and IH theories which assert that trading volumes tend to increase in short term following stock additions and deletions. Therefore, our findings on the short term effects are also in line with previous evidence found in Harris & Gurel (1986), Bechmann (2004) and Yun & Kim (2010) among others.

Table 9: Mean volume ratio of stocks deleted from Bursa Malaysia EMAS Shariah Index

Event window	Panel A		Panel B	
	MVR	T-stat.	MVR	T-stat.
Pre-announcement effects:				
[AD-20,AD-1]	1.5929	1.620	1.7036	1.465
[AD-10,AD-1]	1.8756	1.567	1.9950	1.355
Announcement day effects:				
AD	2.9628	1.944*	3.6091	1.965*
Announcement period effects:				
[AD+1,CD-1]	1.7746	2.907***	1.8754	2.899***
Change day effects:				
CD	2.4162	1.867*	2.4238	1.451
Post-change effects:				
Short-term:				
[CD+1,CD+10]	3.3535	2.245**	3.4689	1.898*
Long-term:				
[CD+1,CD+20]	2.7752	2.810***	2.9235	2.521**
[CD+1,CD+40]	2.5563	2.803***	2.7338	2.525**
Total cumulative effects:				
Short-term:				
[AD-10,CD+10]	2.3391	2.821***	2.4637	2.494**
[AD-20,CD+10]	2.0998	2.764***	2.2192	2.459**
Long-term:				
[AD-10,CD+20]	2.3060	3.172***	2.4437	2.872***
[AD-10,CD+40]	2.3160	3.160***	2.4756	2.879***
[AD-20,CD+20]	2.1182	3.102***	2.2491	2.818***
[AD-20,CD+40]	2.1782	3.163***	2.3300	2.893***

Notes: *, **, and *** indicate statistical significance at 10%, 5% and 1% levels, respectively, for two-tailed tests.

Figure 7: MVR of deleted stocks, Panel A

4.3 Summary of Findings and Hypotheses

On the basis of the analyses above, a summary of the findings is indicated in Table 10 below followed by the summary of the outcomes of our hypotheses and the theories supporting them in Table 11. All the hypotheses in Table 11 are supported as indicated by the statistical significance level in Table 10 except for Hypothesis H2b. The contradictory result of H2b to the Liquidity Cost Hypothesis (LCH) may imply that institutional investors in general have

pessimistic expectations toward the deleted stocks and scrambled to sell those shares even into the long term, resulting in increases in trading volume instead of decreases.
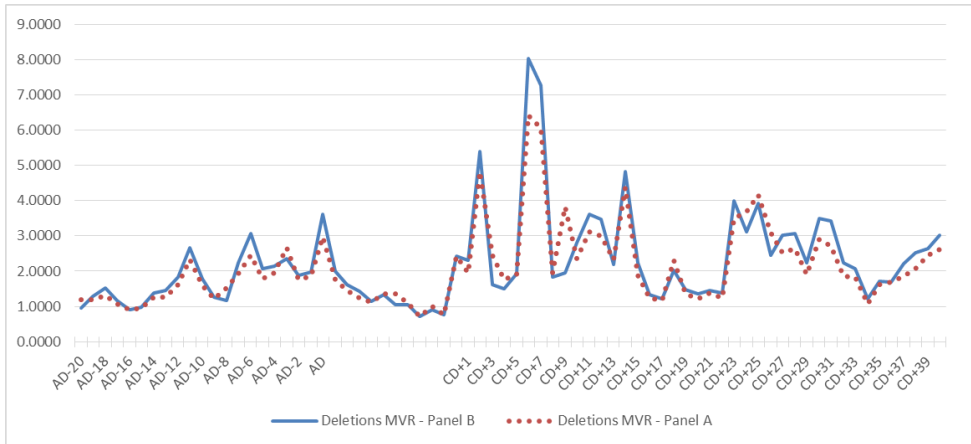

Figure 8: The MVR comparison of Panel A and Panel B for deleted stocks

Table 10: Summary of findings

Time Period	Abnormal Return				Abnormal Trading Volume			
	Additions		Deletions		Additions		Deletions	
	Panel A	Panel B	Panel A	Panel B	Panel A	Panel B	Panel A	Panel B
Pre-announcement	- *	- *	- *	- *	↑	↑	↑	↑
Announcement day	- *	-	- **	- ***	↑	↑	↑*	↑*
Announcement period	- **	+ *	- **	- ***	↑***	↑**	↑***	↑***
Change day	+ **	+	- ***	- ***	↑*	↑*	↑*	↑
Post-change period (Short term)	+ **	+ *	-**	- ***	↑***	↑***	↑**	↑*
Post-change period (Long term)	+ **	+	- **	- **	↑***	↑***	↑***	↑**

Notes: *, **, and *** indicate statistical significance at 10%, 5% and 1% levels, respectively, for two-tailed tests.

Table 11: Summary of hypothesis

NO	Hypothesis	Hypothesis Supported (Yes/No)	Theory Support
H1a	*Index inclusions will lead to an increase in stock prices while exclusions will lead to a decrease in stock prices in the short term for the FBM EMAS Shariah Index.*	Yes	PPH
H1b	*Index inclusions will lead to an increase in stock prices while exclusions will lead to a decrease in stock prices in the long term for the FBM EMAS Shariah Index.*	Yes	ISH, IH
H2a	*Index inclusions and exclusions will lead to an increase in the stock trading volumes in the short term for the FBM EMAS Shariah Index.*	Yes	PPH, ISH
H2b	*Index inclusions will lead to an increase in stock trading volumes while exclusions will lead to a decrease in stock trading volumes in the long term for the FBM EMAS Shariah Index.*	No	LCH (Contradict)

5. Conclusions

Our conclusions can be summarized as follows:

Firstly, index revisions effects exist in the Bursa Malaysia EMAS Shariah Index. In detail, index inclusions lead to an increase in stock prices, while exclusions lead to a decrease in stock prices, both temporarily and permanently. Moreover, index inclusions and exclusions lead to an increase in the stock trading volumes, both in the short term and the long term. Our findings have indicated that most of the theories such as the PPH and ISH are also applicable in an emerging market like Malaysia. It is interesting that our findings are not much different from the many studies performed in the West. Overall, the findings of stock inclusions to and exclusions from the index that tend to have a long term effects on both the stock prices and trading volumes imply that stock inclusions (exclusions) carry favourable (unfavourable) information content that one should be using and analysing in making their investment decisions.

Secondly, there are distinctions in terms of the results between panel A (with duplicated firms) and panel B (without duplicated firms). Generally, we find that the price effects on the sample that only includes newly added (deleted) stocks are less significant than the sample with stocks being added in (deleted from) the index more than once. Specifically, from the perspective of abnormal stock return, the difference is, for the newly added stocks, the abnormal return does not permanently exist. It may be because the investors are not very familiar with the newly added stocks, they would remain hesitant to purchase them despite the inclusions of the stocks to the index. For the deleted stocks, smaller price effects are observed in Panel B (with newly deleted stocks only) than Panel A (with all deleted stocks including stocks deleted more than once). The reason could be that the investors' expectations on newly deleted stocks are not as pessimistic as the stocks being deleted from the index repeatedly, which indicate an unstable performance of the company. Overall, our findings may imply that there is a difference in information content of newly added and deleted stocks compared to stocks that have been added or deleted more than once. Such differentiation should be used by investors to help them in their investment strategies including the arbitrage strategy.

In terms of the stock trading volume, the difference exists for the added stocks. During the announcement period, the MVR in Panel B (with only newly added stocks) is higher than in Panel A. It indicates that the market's reaction to newly added stocks is somewhat more active in this period of time.

5.1 Recommendations for Malaysian and Global Stock Market

Findings from this study show that Shariah-compliance firms should make efforts to have their stocks added on the index as one of the ways to increase their stock performance. When a company is listed on the index, this event delivers positive information to investors, such as promising operating performance of the company. The institutional investors, who play a great role in the Malaysian stock market, will also be attracted by the stocks included in the index. With increased purchasing of a stock, an increase in the share price is expected. Thus, the share performance is likely to be improved.

As one of the world's fastest-growing financial sectors, Islamic finance has become a financial phenomenon and Shariah-compliant investments have become mandatory in many parts of the world. Our findings towards the effects of stock additions and deletions based on a Shariah-Compliant Index in Malaysia suggest not only to the local but also the global investors who are concerned with Shariah-Compliant investments that they should monitor and be aware of the stock additions and deletions in the Shariah-compliant index. They should rebalance their investment portfolios from time to time, and if they could use suitable methods

to obtain the abnormal stock return brought by index adjustment, it would be meaningful for improving the return of investment, both in the short run and long run.

Finally, we believe that there are relations between index effects and market efficiency. The more efficient a market is, the more significant the index effects are. Our findings suggest that the index effects exist in Malaysia. When it comes to the causes of this effect, there are different theories with various explanations. The PPH and ISH state that the index revision effect is caused by the changes of the stocks' demand. The IH assumes the changes of index composition convey signals to the market, which lead to reactions from the investors. However, the IAH and behaviour finance consider the major reasons are the behaviour and psychological factors of the investors. It is apparent that with the development of the studies of index effects, the studies do not only focus on stock supply and demand, but also enter into the field of the market structure and investors. Managers of Bursa Malaysia Securities can use the results of studies on index effects to supervise and manage the stock market in a better manner, which would also be of benefit to the future development of the market.

5.2 Limitations of Study and Recommendations for Future Studies

Among the limitations in this study is that other factors like free float that can also have a significant influence on stock trading volume has not been considered. Free float is commonly defined as the whole number of shares held by investors. However, this does not include the limited stocks held by company insiders, such as employees, managers, officers, and other inside traders. Hence, the free float of the firm can reflect the number of shares outstanding that are available for the public. Moreover, the company's free float is imperative to potential investors, as it provides an insight into the company's stock volatility. Stocks with a small free float would have higher volatility, as there are only a restricted number of stocks that can be traded in the event of key trading information. In contrast, stocks with large floats are normally less volatile. Therefore, future studies are recommended to consider the influences of free float shareholdings factor while studying the stock trading volume effects. Finally, IAH states that changes in the awareness of the investors lead to the occurrence of index effects. Therefore, future studies may apply the factors of investor awareness to test and verify whether there are significant changes of investors' awareness after the adjustment of index composition. Last but not least, our results are limited by the large number of unavailability data due to the incomplete data from the data sources.

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