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Article

Is Shariah Index Membership Risky? The Case of Malaysia Shariah Blue-Chip Index

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ABSTRACT - The study explores the Shariah index membership effect around index revision period especially to the newly added and deleted constituent stocks (termed as event stocks). This study analysed 40 event stocks for Shariah blue-chip index, Dow Jones Islamic Market Titans Malaysia 25 Index (DJIMY25). The analysis was conducted over a period of seven years (2009-2015) using event study methodologies which capture abnormal returns, trading volumes, and return volatility, and discussed the extent of market efficiency. The study divided the event stocks into three groups – additions, deletions due to the index annual rebalancing and deletions due to non-Shariah compliance. The findings of this study provide a new evidence on index additions and deletions contrary to the ones reported in previous studies. Surprisingly, additions to DJIMY25 produces negative results with permanent decrease in stock returns and temporary decrease in trading volumes. The deletions either due to the index annual rebalancing or non-Shariah compliance have shown negative results with the decrease in stock price, temporary decrease in trading volumes and increase in the stock's absolute volatility. The finding of this study implied that index membership in Shariah index can induce Shariah compliant risk for the firms that are unable to maintain their Shariah compliant status in the long-term.

INTRODUCTION

Shariah indexes represent the Shariah compliant investable universe and serve as an appropriate benchmark for Shariah compliance equity portfolio. The user of Shariah indexes are both active and passive Islamic investment funds. Shariah indexes are developed by global Islamic index providers who pre-screen global assets from their set of conventional indices and exclude firms that are not Shariah compliant. Therefore, the entire assets in a Shariah index is a subset of assets in its corresponding conventional parent index. Consequently, the Shariah indexes membership depends on the eligibility requirement of the parent indices and the Shariah screening requirement. The inclusion into Shariah indexes must fulfil the index eligibility criteria of the parent indices before screening for compliance. The deletion from Shariah indexes therefore can be due to either non-compliance or not fulfilling the parent's indices criteria. Specifically, for blue-chip Shariah indexes, the deletion can be also due to ranking downgrade

from the top highest rank in terms of market capitalization to the lower rank. In this case, stocks deleted due to ranking downgrade are still in the broader Shariah index families. However, stocks deleted due to Shariah non-compliance are absolutely excluded from the pool of Shariah assets and disposed of from the portfolio of active and passive funds linked to the index. The worst-case scenario would be the one that is deleted from the parent index, which will be wiped out from the entire index universe.

There are few Shariah indices in Malaysia, namely Financial Times Stock Exchange (FTSE) Bursa Malaysia EMAS Shariah Index, FTSE Bursa Malaysia Hijrah Shariah Index, FTSE Bursa Malaysia Small Cap Shariah and DJIM Malaysia Titans 25 Index (DJIMY25). The FTSE Bursa Malaysia EMAS Shariah Index comprises constituent stocks that passed the Shariah Advisory Council of Security Commission of Malaysia (SAC of SC) Shariah Screening Methodology whereas the eligible stocks for FTSE Bursa Malaysia Hijrah Shariah Index must pass both the SAC and FTSE's Shariah screening methodologies (Kamil et al., 2017). DJIMY25 Index is a Shariah blue-chip index and tracked by MyETF Dow Jones Islamic Market Malaysia Titans 25 (MyETF-DJIM25). The DJIMY25 Index is a subset of the DJIM Malaysia Index which consists of companies domiciled in Malaysia whose stocks are traded on Bursa Malaysia. The constituent of DJIMY25 must pass two different rule-based screens for Shariah compliance, one based on the DJIM Index Methodology and second to the SAC guidelines as the constituents are domiciled in Malaysia. The two-layer Shariah screening for DJIMY25 Index certainly has made the index constituents stricter than the Shariah compliant equity under the SAC list. Wan Zainal et al. (2016) compare the revised SAC screening methodology with international indices like DJIM, MSCI, FTSE and S&P and conclude that the S&P and DJIM are stricter than the other index providers as both strictly exclude companies which are involved in impermissible activities. Meanwhile, MSCI, FTSE and SAC are more lenient in business activity benchmark as long as the core business is permissible.

There are growing number of literatures study the merit of being Shariah compliant equity. The first strands of literature focus on the performance of Shariah compliant equity, Islamic funds or indices in comparison to its conventional counterparts. For instance, Yildiz (2020) compares the performances of Islamic and conventional indices in Turkey using TOPSIS method. Although the study found no statistically significant difference in returns between the two indices, the Islamic indices have lower risks and ranked above the benchmark index based on TOPSIS ranking. In other studies, Islamic equities outperformed their conventional counterparts (Abdullah et al., 2007; Reddy & Fu, 2014; Charles et al., 2015). Some studies reveal that Islamic investment performs better during financial crisis (Al-Khazali et al., 2014; Ho et al., 2014), whereas some studies found no differences in the performance (Albaity & Ahmad, 2008; Dharani & Natarajan, 2011).

The second strands of literature study the impact of being certified as Shariah compliant and the reverse when losing the status. The effect is particularly studied from the index revision events of Shariah index or from the announcement of Shariah compliant list such as the one issued by SAC of SC. In Malaysia, Ng and Zhu (2016) and Kassim et al. (2017) study the inclusion-exclusion exercises in FTSE Bursa Malaysia EMAS Shariah Index for the same period from 2007 and 2014. The study concludes a similar finding where additions to the index portrays significant positive excess returns and the reverse for deletions. The results differ in terms of the persistency of the impact due to different framework used in the study.

The list of Shariah compliant securities provided by SAC's SC also subject to many investigations on the impact to the listed and delisted stocks. The impacts from the revision in SAC Shariah screening methodology which take effect on 29 November 2013 have been studied by Sakti and Barom (2014), Yazi et al. (2015) and Mat Nor et al. (2019). The three studies conclude that endorsement of Shariah compliance has brought positive values to the companies. Before the revision in Shariah screening methodology by the SAC, Abdullah and Bacha (2001) also study the impact of changes in SAC list which is pioneering the index effect studies in

Malaysia. Others studied the index effects of Kuala Lumpur Shariah Index (KLSI) which was deactivated in 1 Nov 2007 (Muhamad et al. 2009; Sadeghi, 2008). Jamil et al. (2020) investigate the effects of Shariah compliance announcement by the SAC from 2007 to 2015, which covered both the previous screening methodology and the revised one.

In global avenue, there are a few exclusive studies that investigate how reconstitution of the Shariah index due to continuous Shariah screening affects the underlying stocks, particularly the addition and deletion stocks. The studies focused on large index particularly the DJIM and DJIM World (Chen & Ngo, 2017; Jaballah et al., 2018; Mazouz et al., 2016a, 2016b). On the other hand, Sadeghi (2011a, 2011b, 2012, 2014) focused on the impact of Dow Jones Islamic Market Index (DJIMI) addition and deletion components at the country level i.e. at Kuwait, Oman, Qatar, UAE, Jordan, Egypt and Australia.

This study is motivated to investigate the merits of being Shariah compliant and the cost of losing the certification from the revision of Shariah tradable index in Malaysia. Shariah index are based on Shariah screening that excludes exposure to certain industries and embeds strict financial soundness requirements for index membership. Therefore, the Shariah screening practice has implication on the nature of stocks added and deleted from the index.

This study investigated abnormal return, trading volume and return volatility around index composition changes of DJIM Titans Malaysia 25 Index (DJIMY25). The choice of DJIMY25 Index helps to gauge the reactions of Malaysian investors to index additions and deletions and explores the index effect of blue-chip Shariah index, a subset of the Dow Jones Islamic Market World Index (DJIM World). The DJIMY25 Index was also chosen to test the implication of Shariah screening practice to index membership since the index is subject to dual layer Shariah screening methodologies by different entity. The choice of Shariah blue-chip index in this study also enabled the researchers to gauge the impact of deletions due to different reasons (ranking downgrade, failing the Shariah screening requirement and exclusion from the parent index) which have different implications on the event stocks. This study attempts to distinguish the impact of index membership changes on the underlying constituent stocks under three categories; additions to the index, deletions due to non-Shariah compliance and deletions due to annual rebalanced. This study hypothesises that different reasons for deletions from Shariah index may create different investor reactions.

The study also will provide discussion on the extent of market efficiency in Malaysia. Index composition change and the lag between announcement date and effective date of index change provide material information in understanding how stock valuations are affected by the index change. Efficient Market Hypothesis (EMH) states that in efficient market, stock prices always fully reflect all available information. In this study, the impact of index changes on the affected constituent stocks give indication on the level of market efficiency. This is because, the rules governing the DJIM indices were kept constant during the period under study and were publicly available. The MyETF-DJIM25 linked with the index also aided to the index transparency as any changes to the index are announced earlier. From the findings, the level of market efficiency can be inferred by looking at the significance of abnormal return before and after the announcement of index changes being released to the public. Any abnormal returns on a persistent basis from the changes would imply that the market is semi-strong inefficient. However, if the market becomes more efficient, the index effects become less significant and the arbitrage opportunities that exist during index changes will likely fall.

LITERATURE REVIEW

Previous studies on the effect of the index revision to constituent stocks are mostly conducted on conventional tradable indices in many capital markets. Evidence from New Zealand (Elayan et al. 2000), Japan (Liu, 2006) and other economies like Turkey (Bildik & Gülay, 2008) and the U.S. (Asem & Alam, 2012) conclude that stocks added to an index experience positive abnormal returns and increase in trading volumes especially from the announcement date (AD) to the

effective date (ED) of index changes and the opposite effect for index deletions; the findings were inconclusive with respect to whether the stock price changes were permanent (long-term) or temporary (short-term).

In the case of Shariah index, the index revisions impact on the share prices and trading volume of the event stocks is inconclusive in terms of the market reaction with the additions to Shariah index could have both positive and negative effects to the stock price. The positive (negative) effect of inclusion (exclusion) to (from) Shariah index is observed in Muslim dominated countries like Malaysia (Abdullah & Bacha, 2001) and GCC countries (Sadeghi, 2008, 2011a, 2011b). However, the negative reaction to Shariah index inclusions is also observed in other capital markets like in the U.S., Australia and Turkey (Jaballah et al., 2018; Sadeghi, 2014; Yildiz & Dia-eddine, 2016). The inconclusive and competing evidence of index effect in Shariah index probably lies in the information content of the newly added firms and deleted firms and different perceptions and risk appetite of investors towards the news[1]. This section will provide some explanations on the effect observed for Shariah index revision based on past literature. The first part offers the explanation on the positive effects observed from the previous studies, while the latter on the reasons for negative effects.

Firstly, the positive effect is due to Shariah index revision conveys information about the firm's ethical image, mission, and economic prospects. This private information could affect the firm's expected cash flow and required rate of return (Sadeghi, 2014). Once the firm is included in the Shariah index, it has a higher chance to attract more capital inflows from Islamic mutual funds, treasury department of Islamic institutions, Muslim retail investors and other ethical investors. The additional capital flow enhances the company's growth prospect that is reflected in an increase in share price. Khouildi et al. (2017) mention that the certification of Shariah compliant status will eventually open the opportunity for the stocks to join the pool of Shariah investment universe which includes *takaful* funds and Islamic funds, but once it loses the status, it will create systematic effect especially the withdrawal from Shariah compliant investment universe.

Secondly, the positive effect is because an inclusion into the Shariah index is perceived as good news due to the nature of Shariah portfolio that was constructed based on high quality fundamentals and low D/E ratio. A lower leverage ratio and cash level of newly added stocks can be perceived as indicator of lower bankruptcy risk and good corporate governance and therefore, inclusion to Shariah index should have positive impact on the added stocks and the reverse for excluded stocks (Jaballah et al., 2018). Shariah compliant firms with lower leverage ratio are also found to have high investment activities (Ismail et al., 2011). In addition, the Shariah compliance label conveys information about the permissible operation, lawful practices and associated with the good image of the firms, such as quality, safety, environmental friendly and efficiency (McGowan & Muhammad, 2010). From corporate finance perspective, Shariah compliant certification can be an effective risk management tools for firms as there is a negative relationship between firm idiosyncratic risk and Shariah compliant status (Khaw et al., 2019).

Next, the explanation on the negative effect is first, inclusion into a Shariah index could be perceived as negative news due to limited diversification benefits, high industry concentration and limited sources of external financing, hence reducing the firms' potential returns. Sadeghi (2014) suggests that new additions to Shariah index convey information about Shariah screening that limits their investable universe, most likely to forgo better performance and bear significant unsystematic risk due to the lack of diversification and lesser selection choices. Yildiz and Dia-eddine (2016) documented negative reaction on additions to Shariah index using Turkey's Participation-30 Index, and attributed the findings to the limited products linked with the index and lack of investors' recognition towards the index, the dissatisfaction amongst domestic

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[1] See Mcgowan and Muhammad (2010) for full discussion of optimistic and pessimistic views on Shariah equity portfolios that explain the inconclusive index effects.

investors who perceived financial ratio screening not comparable to global standards, and inclusion of firms into the index is by chance rather than by choice.

Another explanation on the reverse effect of addition stocks can be related to capital market structure of Shariah compliant firms. According to Modigliani and Miller (1958), firms that increase their leverage in an imperfect capital market with corporate taxes can increase their assets' value. For conventional firm, it is an incentive for management to use more debt that results in increase in cash flows from tax shield on interest payments. However, higher financial leverage leads to higher default risk. In the case of Shariah-compliant companies, they refrain from taking on excessive debt as borrowing is capped at 33 percent. Alalmai et al. (2020) study on the capital structure of firms in Saudi Arabia and they found that the firms are less leveraged as compared to the one in non-Islamic environment and are inclined towards the use of internal funding for corporate financing. However, Miller-Modigliani Capital Structure Theory argues that the constraint will put the firm to the suboptimal level of capital structure that leads to a higher cost of capital. The insufficient diversification and the debt constraint in Shariah equity portfolio may signal negative information on the newly added firm into the Shariah index.

Apart from the explanation underlying the findings observed for Shariah index revision effect, this section also discusses the nature of the effect whether permanent or temporary based on the findings from the previous literature. The empirical evidence from conventional size-based index studies showed that the index effect could be temporary or permanent. In the case of Shariah index, the stock price reaction is expected to be permanent for inclusion and exclusion. Chen and Ngo (2017) showed inclusion into DJIM World had persistent positive price and liquidity effect, decrease the cost of equity and increase firms' operating performance. The study also found exclusion from DJIM World had sustained negative price and liquidity effect but no decrease in investors' awareness.

Furthermore, there is a documented evidence of asymmetric index effect from Shariah index revision, with deletions having more pronounced reactions compared to inclusions. The asymmetric reaction is based on the premise that news on revisions in Shariah index is a price sensitive information regarding the companies' financial health and the exclusion from Shariah index requires immediate disposal especially from index funds[2]. This selling pressure on the stocks deleted from Shariah index does provide buying opportunities for conventional investors to accumulate good quality stocks at relatively discounted prices if the securities are widely followed by conventional investors.

METHODOLOGY

The study used DJIMY25 Index, a Shariah blue-chip index. The eligible constituent of DJIMY25 Index must fulfil three (3) criterion as follows:
1) pass rules-based screens for Shariah compliance based on the DJIM Index Methodology,
2) less than 10 non-trading days over the past quarter,
3) follow Malaysia's Shariah Advisory Council (SAC) of the Securities Commission (SC) guidelines.

Stocks that have fulfilled the above criterion were ranked top-down according to size (market-capitalization) and liquidity (12-months average daily trading volume). The final ranking was determined using equally weighted combination of size and liquidity's ranks.

The index composition of DJIMY25 is reviewed annually in September since 2013. Prior to 2013, the annual index revision was done in June. During annual rebalancing, the investable weight factor (IWF) for each stock is reviewed and updated. The process is based on the market data from the end of July (for September annual review) and April (for June annual review). Besides the annual index revision, the stocks, weights and weighting cap factors are updated

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[2] Actively managed funds and institutional investors may have some buffer period before disposing of the deleted stocks to avoid losses and to recover the cost of investment of stocks deleted due to non-compliance

quarterly in the month of March, June, September and December. The index is also reviewed on ongoing basis for unusual corporate events such as delisting, bankruptcies, mergers and acquisitions. The companies deleted due to these corporate events will be replaced immediately. In general, no companies are to be added to the index between annual rebalancing, except for replacement for deleted constituents that fail the Shariah compliance requirements (S&P Dow Jones Indices, 2014). In terms of weighting, the DJIMY25 Index is weighted by float-adjusted market capitalization and reviewed quarterly. The weight of each individual constituent is capped at 20 percent of the index.

The DJIMY25 is rebalanced quarterly where the index component and/or the index weightage is reshuffled. This paper analysed the index revisions events of DJIMY25 Index from 2009-2015. The period of study is chosen due to availability of the data. The data to analyse the impact of DJIMY25 Index revision to the added and deleted constituent stocks consist of the date of index revision event of DJIMY25 and the event stocks. The data on the details of index additions and deletions, announcement dates (henceforth AD) and effective dates (henceforth ED) were collected from Bursa Malaysia and MyETF website. At the same time, the details of the event stocks were also cross-checked with the news retrieved from Dow Jones Press Room and Proquest Database. After the thorough process of validating the data, the study was confined to index revision events of DJIMY25 Index between June 2009 and March 2015.

After data validation from various sources, the the initial list of each event stocks was subject to screening for events related to change of company's name, delisting, spin-off and mergers and acquisitions (M&A), cleaning for the same event stocks which appear in two consecutive quarters, and ensuring sufficient observations of closing price and trading volume for the estimation and analysis period. After that, a final sample of 19 additions and 21 deletions from the thirteen (13) revisions that were done on DJIMY25 for the period of June 2009 to March 2015 were available for analysis. The details of the final sample are summarized in Appendix A.

To test for the possibility of the market reacting differently (asymmetric reaction) to deletion for different reasons and also to test the significance of the 'compliance effect', the sample of deletions were split into deletions due to ranking downgrade and deletions due to Shariah non-compliance. The first deletions happen during annual review while the latter can happen anytime. Stocks that are deleted due to the downgrading (but still Shariah compliant) are demoted to regional/country indices, whereas deletions due to Shariah non-compliance are removed from the entire Shariah compliant index universe which is the DJIM World Index. The sources of data indicated that Shariah non-compliance as a cause of deletion[3] but did not explicitly indicate deletion due to ranking downgrade. Based on the requirements of the Dow Jones Islamic Market Indices Methodology (June 2014, Jan 2015) that no components are added to a blue-chip index between annual rebalancing, except for replacements for non-compliance and corporate events, and since the companies in the final deletion list were already checked for corporate events, the key assumption in this paper is that "*all sample deletions in between annual rebalance were due to non-Shariah compliance*", that allows to ascertain the impact of deletion due to Shariah non-compliance. Since no information was available from the news of DJIM index changes on ranking downgrade, the sample of deletions were identified based on deletions *during* annual rebalance (i.e. in the month of June (2009-2012) and in the month of September (2013-2015)) and deletions *in between* annual rebalance (i.e. in the month of March, September, December (2009-2012) and in the month of March, June, December (2013-2015)). After separation of deletion samples, the final sample was divided into three categories, namely 19 additions, 14 deletions due to annual rebalance and 7 deletions due to non-Shariah compliance. Since the sample size for deletion due to non-Shariah compliance became smaller after the sample segregation, the study combined the same category of stocks from other index, DJIM

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[3] The announcement of DJIMY25 index revisions were retrieved from various sources i.e. Bursa Malaysia, Dow Jones Press Room, MyETF Report. The sources of data mostly indicate if the deletions were due to failure to meet index eligibility requirements.

Titans 100 Index (a subset of DJIM World Index) to provide better reliability of findings. After the combination which serve as robustness check, the sample of deletions due to non-Shariah compliance became 32.

An event study methodology was applied to estimate abnormal return, abnormal volume and abnormal return volatility for event stocks. The abnormal return represents the impact of the event on the value of the firms which is reflected in the firm's stock price around the announcement date (AD) and the effective date (ED).

Based on the literature of similar studies (Rahman & Rajib, 2014), the event window was designated from 20 days before the AD until 50 days after the ED i.e. (AD-20, ED+50). The estimation window was between 150 days before the AD to 21 days before the AD i.e. (AD-150, AD-21). The estimation window is used to compute the benchmark parameters whereas the event window is used to compute abnormal returns based on the estimated parameters.

To capture different market reaction at different time, the full event window was further segregated into six sub-periods i.e.

1. **Pre-announcement period** (from AD-20 to AD-2) in which the study test if the market anticipates the component changes in the index. The price movement prior to the announcement can be anticipated as the index composition changes are recurring events, therefore fund managers and analysts can precisely predict the stocks that are likely to be included or removed from the index. The anticipated price movement prior to announcement is in line with attention and liquidity hypothesis (Chen et al., 2004; Biktimirov & Li, 2014)

2. **Around the announcement date** (from AD-1 to AD+1) is when the price reaction and volume effect around the announcement date is expected to be observed. There is no specific information on the exact announcement times whether at the opening or at closing, therefore the announcement date (AD) and the days surrounding the announcement days (AD-1 and AD+1) are used to measure the impact of the index revision announcement[4].

3. **Post-announcement period** (from AD+2 to ED-1) enables the study to follow the market reaction from the announcement date until the day before the effective change date especially the index funds trading and arbitrageurs front-running.

4. **Around the effective date** (from ED-1 to ED+1) is when the price reaction and volume effect on the ED due to index funds' rebalancing activities are expected to be observed.

5. **Short-term post-effective period** (from ED to ED+10) in which to test the persistency of the impact within ten days after the ED. Furthermore, this window enables this study to test the Price-Pressure Hypothesis (PPH) in determining the temporary price effect.

6. **Long-term post-effective period** (from ED+11 to ED+50) in which to observe the permanent price and volume effect

Observations of the effect from different event windows allow this study to see the persistence of the impact, whether the price response to addition-deletion surrounding the Shariah index changes moves permanently or temporarily. The short-term or long-term effects would be able to substantiate whether information-based hypotheses or demand-based hypotheses explains the price response of Shariah index better. Information-based hypotheses such as Information Cost and Liquidity Hypothesis (ICLH), and Information Content Hypothesis (ICH) were discussed and empirically proven in the past studies by Beneish and Whaley (1996), Biktimirov and Li (2014), Lynch and Mendenhall (1997) and Brooks et al. (2013). Meanwhile, the demand-based hypotheses explained the index effect based on index funds trading activities following the index reconstitutions, which differ in terms of the persistence of

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[4] Some studies use the assumption that the announcement happens at close of the market. Others like Bildik & Gülay (2008) took both AD and AD+1 as announcement date.

the impact. Price-Pressure Hypothesis (PPH) explains the short-term effect and Imperfect Substitution Hypothesis (ISH) for long-term effect. The event windows in this study were designed to test two competing hypotheses, PPH and ISH to determine the long-term and short-term effects to stock price and trading volume. Yun and Kim (2010) and Azevedo et al. (2014) find evidence in support of PPH whereas Bildik and Gülay (2008) and Bechmann (2004) associate their findings on index revision with ISH. Furthermore, the design of event windows in this study moves from lower to higher event-window will indicate the extent of the market efficiency. In Malaysia's capital market, Muhammad et al. (2009) and Abd Karim (2016) have used index revision events to study the extent of Malaysia's market efficiency. Muhammad et al. (2009) conclude that Malaysia stock market is not efficient whereas the recent findings by Abd Karim (2016) indicates that Malaysia market is inefficient in the short run but efficient in the long run. In brief, the design of this event window enables this research to substantiate the puzzle of inconclusive evidence of index effect in Shariah index and the explainable hypotheses to contribute to the literature in this area. The timeline for full event window and the sub-event window is summarized in Figure 1:
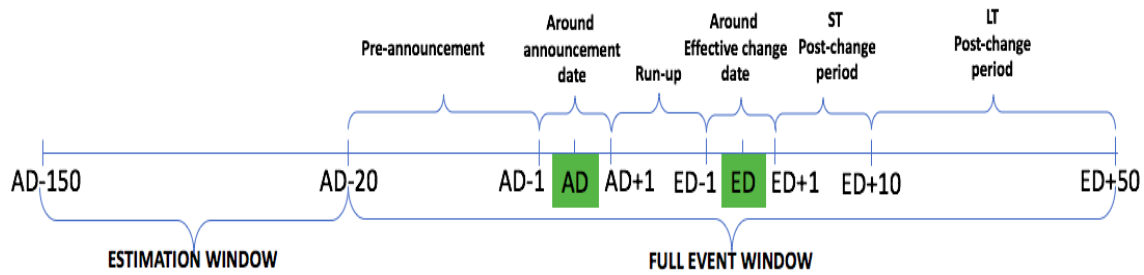
Figure 1: Timeline for Event Windows

Return Event Study

This study utilised standard market model to estimate the abnormal return. The daily abnormal returns are defined as the excess return on day t over the index return. The daily return R_t is computed as follows:

$$R_t = \ln\left(\frac{P_t}{P_{t-1}}\right) \tag{1}$$

where P_t is the stock/index adjusted closing price at time t and P_{t-1} is the stock/index adjusted closing price at time t-1. The expected returns in standard market model, denoted by MM, is computed by estimating a regression using ordinary-least squares (OLS) method:

$$R_{i,t} = \alpha_i + \beta_i R_{m,t} + \varepsilon_{i,t} \tag{2}$$

where return of firm i and return of reference market on day t is denoted by $R_{i,t}$ and $R_{m,t}$, respectively. The DJIMY25 Index are taken as proxies for market. The OLS estimates parameter α_i and β_i in Equation (2) based on the assumption that the error term is homoscedastic with a mean zero and a constant variance were used to estimate the abnormal returns.

The abnormal return for an individual stock i was estimated by taking the difference between the actual return and the expected return on day t surrounding the event date. The abnormal returns are computed as follows:

$$AR_{it} = R_{it} - E(R_{it}) \tag{3}$$
$$E(R_{i,t}) = \alpha_i + \beta_i R_{m,t} \tag{4}$$

where R_{it} is the rate of return on the stock of firm i on day t. Equation (4) is expected return from MM.

The average abnormal return (AAR) for day t is calculated as follows:

$$AAR_t = \frac{1}{n} \sum_{i=1}^{n} AR_{i,t} \tag{5}$$

where n is the number of firms in the sample.

To measure the total impact of an event over a particular event window, the abnormal return for firm i on day t may then be accumulated to create cumulative abnormal return (CAR), computed as follows:

$$CAR(t_1, t_2) = \sum_{t=t_1}^{t_2} AR_{i,t} \tag{6}$$

The cumulative average abnormal returns (CAAR) is further calculated, which represent the mean values for CAR for sample of additions and deletions stock. The CAAR for n firms in additions and deletions group for a sub-event window of length t_1 to t_2 is computed as follows:

$$CAAR = \frac{1}{n} \sum_{i=1}^{n} CAR\,(t_1, t_2) \tag{7}$$

where n is number of firms in the sample of additions or deletions group, t_1 is the first day of the sub-event window and t_2 is the last day of sub-event window.

To test the statistical significance of the abnormal returns, cross-sectional t-test (two-tailed) and the non-parametric Cowan's (1992) binomial sign test (z-test) are used. The formulae for t-statistic for testing $H_0: AAR = 0$ is as follows:

$$t_{AAR_t} = \sqrt{N}\,\frac{AAR_t}{S_{AAR_t}} \tag{8}$$

where S_{AAR_t} is the standard deviation across firms at time t and N is number of stocks in the addition and deletion groups.

$$S_{AAR_t}^2 = \frac{1}{N-1} \sum_{i=1}^{N} (AR_{i,t} - AAR_t)^2 \tag{9}$$

For CAAR the t-statistic for testing $H_0: CAAR = 0$ is given by

$$t_{CAAR} = \sqrt{N}\,\frac{CAAR}{S_{CAAR}} \tag{10}$$

where S_{CAAR} is the standard deviation across the sample.

$$S_{CAAR}^2 = \frac{1}{N-1} \sum_{i=1}^{N} (CAR_i - CAAR)^2 \tag{11}$$

The z-statistic is computed as:

$$z - stat = \frac{\omega - Np}{\sqrt{Np(1-p)}} \tag{12}$$

where ω is the number of stocks with actual positive abnormal returns on day t during the event period, N is the number of stocks in the sample, and p is the expected percentage of positive abnormal returns. Under the null hypothesis of no abnormal returns, the number of stocks with positive abnormal returns is expected to be in line with the fraction p of the positive abnormal returns from the estimation period. The null hypothesis is rejected when the actual number of positive abnormal returns is significantly higher than the expected number.

The fraction p is estimated as

$$p = \frac{1}{N}\sum_{i=1}^{N}\frac{1}{L_1}\sum_{t=T_0}^{T_1}\varphi_{i,t} \tag{13}$$

where $\varphi_{i,t}$ is 1 if the sign is positive and 0 otherwise. L_1 is the estimation window length with T_0 as the earliest day of the estimation window, and T_1 the latest day of the estimation window relative to the event day.

Volume Event Study

Harris and Gurel (1986)'s volume event study was used to detect investors' response to abnormal trading activities before, during and after the revision. The rationale to use the volume data associated with the event was to detect the timing of purchase by indexers and other institutional investors, as well as the movement of arbitrageurs. Arbitrageurs' movement should be apparent in the period after the announcement date but before the effective date to realise any significant profit that might be arisen due to price pressure associated with the event. Meanwhile, indexers only rebalance their portfolio on the effective date to minimise tracking errors.

The volume ratio measures the security volume relative to the market volume. The volume ratio is supposed to equal 1 as theoretically stock's trading volume relative to the market on any random day should be approximately equal to what it is on average. The volume time series data are divided into an estimation window (AD-90, AD-21) and event window (similar with return event study). The ratio is computed as follows:

$$VR_{i,t} = \frac{V_{i,t}}{V_{m,t}} \cdot \frac{\overline{V_m}}{\overline{V_i}} \tag{14}$$

where $\overline{V_i}$ is the average trading volume (i.e., stock price times number of traded stocks) of stock i during the estimation window; $\overline{V_m}$ is the average trading volume of the market during estimation window; $V_{i,t}$ represents the trading volume of the stock i on day t in the event period; and $V_{m,t}$ represents the market trading volume on the day t in the event period.

The cross-sectional average of volume ratio at each day t in event window denoted by AVR_{it} which is supposed to equal 1 if there is no change in volume during the event period relative to the estimation period.

$$AVR_t = \frac{1}{N}\sum_{i=1}^{N}VR_{it} \tag{15}$$

Then, the mean of AVR_{it} is calculated as follow:

$$MAVR_s = \frac{\sum_{t_1}^{t_2}AVR_t}{s} \tag{16}$$

where s is the event window length. Two-tailed t-tests will be performed to test the hypothesis that $MAVR_T = 1$. Percentage of firms with AVR>1 will be reported to complement the t-tests as a robustness check.

Volatility Event Study
To investigate the volatility effect, this study adopted volatility event study of Balaban & Constantinou's (2006) that simultaneously tests the effects of announcement of index reshuffle on the mean and conditional volatility of event stocks. Indirectly this approach helped to calibrates the result from MM described in previous section.

To estimate the abnormal volatility that could be induced by the index reshuffle event, the market model with GARCH errors (Bollerslev, 1986) and dummy variables that represent the event and effective date (both AD and ED) were used in both the mean and volatility functions. For this purpose, the GARCH (1,1) model was employed in this study.

$$R_{i,t} = c_i + \beta_i R_{m,t} + \gamma_i D_{i,t} + \varepsilon_{i,t} \tag{17}$$
$$h_{i,t}^2 = \alpha_{i,0} + \alpha_{i,1}\varepsilon_{i,t-1}^2 + \lambda_i h_{i,t-1}^2 + \delta_i D_{i,t} \tag{18}$$

where $D_{i,t}$ is a dummy variable such that $D_{i,t} = 1$ if day t is announcement day (AD) or effective day (ED) respectively for event stock i, 0 otherwise. $R_{i,t}$ is the return of the firm i on day t and $R_{m,t}$ is the return of the reference market on day t. The abnormal return and abnormal volatility for AD or ED for firm i are captured by γ_i and δ_i, respectively. To estimate the volatility using GARCH, a full data set of daily returns for the period AD-150, ED+50 was used. The pre- and post-event volatilities (AD-50 vs. AD+50, and ED-50 vs. ED+50) were compared to test the changes in volatilities induced by the index revision event.

The cross-sectional test statistics of Brown & Warner's (1980) for abnormal volatility which test whether the conditional volatility on the event dates is different from the other days across the firms is expressed as Eq.19. Whereas the corrected cross-sectional t-statistics of Balaban & Constantinou's (2006) that accounts for firm-specific volatility is shown in Eq.20.

$$t_{AV,t} = \frac{\overline{\delta}}{\sqrt{\frac{1}{n(n-1)}\Sigma_{i=1}^{N}(\delta_i - \overline{\delta_i})}} \tag{19}$$

where $\overline{\delta} = \frac{1}{N}\Sigma_{i=1}^{N}\delta_i$

$$t_{AV_C,t} = \frac{\overline{S}}{\sqrt{\frac{1}{n(n-1)}\Sigma_{i=1}^{N}(S_i - \overline{S_i})}} \tag{20}$$

where $\overline{S} = \frac{1}{N}\Sigma_{i=1}^{N}S_i$ and $S_i = \frac{\widehat{\delta_i}}{\widehat{\sigma_i}}$ with $\widehat{\sigma_i}$ being the standard deviation of estimated conditional standard deviation series for firm i.

To test whether event dates effect (AD and ED) are significant across the event firms investigated, the study computed the cross-sectional test-statistics for abnormal return expressed in Eq. 21. The corrected version of the test statistics of Balaban & Constantinou's (2006) is expressed as Eq. 22.

$$t_{AR,t} = \frac{\overline{\gamma}}{\sqrt{\frac{1}{n(n-1)}\Sigma_{i=1}^{N}(\gamma_i - \overline{\gamma_i})}} \tag{21}$$

where $\overline{\gamma} = \frac{1}{N} \sum_{i=1}^{N} \gamma_i$

$$t_{AR_C,t} = \frac{\overline{S}}{\sqrt{\frac{1}{n(n-1)} \sum_{i=1}^{N} (S_i - \overline{S_i})}} \qquad (22)$$

where $\overline{S} = \frac{1}{N} \sum_{i=1}^{N} S_i$ and $S_i = \frac{\hat{\gamma}_i}{\hat{h}_{i,t}}$ which standardised $\hat{\gamma}_i$ by the estimated conditional standard deviation $\hat{h}_{i,t}$ of firm i on the event date ($t=0$).

Furthermore, the study also estimates the firm and the market volatility of returns denoted by σ_i and σ_m, respectively, on a pre-event window [-50, 0] and post event window [0, 50]. $t=0$ indicates the event dates which are the announcement date (AD) and effective date (ED). For each firm i, the study calculates the pre-event and post-event volatility ratio as follow:

$$\lambda_i^{pre} = \sqrt{\frac{\sigma_i^{pre}}{\sigma_m^{pre}}} \text{ and } \lambda_i^{post} = \sqrt{\frac{\sigma_i^{post}}{\sigma_m^{post}}} \qquad (23)$$

The study analysed the changes in return volatility by testing whether the volatility ratios were different in the period before and after index revision event. The two sample t-tests and the counterpart non-parametric test, Wilcoxon Signed Test were employed for testing pre-event versus post-event volatility ratio.

RESULTS
Descriptive Statistics
This section reports the descriptive statistics of the DJIMY25 Index and the underlying constituent stocks that were affected by its index revision event throughout October 29, 2008, to June 17, 2015[5]. Panel A of Table 1 shows the sector classification of the overall DJIMY25 Index and the event stocks. As of December 2015, the DJIMY25 Index had exposure to seven sectors with Telecommunication sector as the largest contributor (26.9 %) based on its market capitalization. The least contributor was from Consumer Services sector (0.6 %). In 2015, the DJIMY25 Index no longer had exposure to Technology and Real Estate sectors.

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[5] This date includes the earliest day in the estimation period and the last day in the event period.

Table 1: Descriptive Statistics of DJIMY25 Index and its Event Stocks

This table shows some descriptive statistics of events stocks and the DJIM Titans Malaysia 25 Index (DJIMY25). The events stocks are grouped into additions, deletions (non-Shariah compliant) and deletions (annual rebalance) of stocks. Panel A shows the sector classification for each group. Panel B shows the number of stocks in each group for each year over the sample period (June 2009 to March 2015). Panel C shows some return and volume characteristics for event stocks and the DJIMY25 Index. Panel D shows the time series plot of Dow Jones Islamic Market Malaysia Titans 25 Index vs Financial Times Bursa Malaysia Kuala Lumpur Composite Index.

Panel A: Sector Distribution

Sector	DJIMY25 Index (as at Dec15)	#added	#deleted (annual rebalance)	#deleted (non-Shariah compliant)
Basic Materials	7.3%	0	2	1
Consumer Goods	13.9%	4	2	1
Consumer Services	0.6%	0	1	0
Health Care	13.9%	5	1	0
Industrials	22.3%	2	4	0
Oil & Gas	12.4%	2	1	2
Real Estate	0	2	0	2
Technology	0	1	1	0
Telecommunications	26.9%	3	2	1
Total	100%	19	14	7
Grand Total				**40**

Panel B: Distribution Over Time

Year	#added	#deleted (annual rebalance)	#deleted (non-Shariah compliant)
2009	2	3	0
2010	1	1	1
2011	4	4	0
2012	4	3	0
2013	5	1	3
2014	2	2	2
2015	1	0	1
Total	19	14	7
Grand Total			**40**

Panel C: Return and Volume Characteristics

	Return		Volume	
	DJIMY25	Event stocks	DJIMY25 (millions)	Event stocks (millions)
Mean	10.4	1.81	94.77	4.18
Median	10.28	0	84.55	1.35
Standard Deviation	10.62	33.33	43.63	8.56
Kurtosis	5.61	21.13	11.02	620.61
Skewness	0.36	0.62	2.59	16.00
Range	8.16	60.53	458.33	390.44
Minimum	-3.53	-29.51	23.81	0
Maximum	4.63	31.02	482.14	390.44
Observation	1634	8324	1635	6903

Panel D: Time Series Plot of DJIMY25
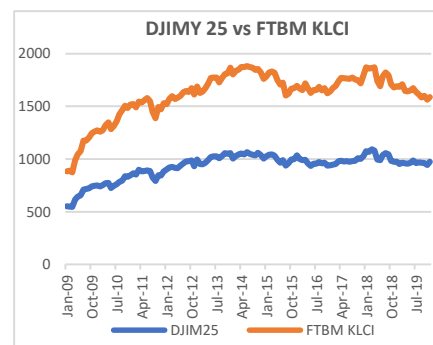
There were 40 samples of event stocks distributed into nine sectors. Particularly, the index addition stocks were distributed into seven sectors with the most came from Health Care sector (5) and the least number was from Technology sector (1). The DJIMY25 Index had exposure to the Technology sector with the inclusion of JCY International Bhd. in 2012, which later was excluded in 2013. The largest number of deleted stocks during annual rebalancing came from Industrial sectors (4), followed by two stocks from each Basic Materials, Telecommunications and Consumer Goods sectors. The rest of deleted stocks during annual rebalancing were classified into various sectors, i.e., Consumer Services, Technology, Oil and Gas and Health Care (one stock for each sector). Five sectors made up the sample of deleted stocks due to non-Shariah compliance, which were Oil and Gas, Consumer Goods, Telecommunications, Basic Materials, and Real Estates.

The highest number of stocks added to and deleted from the DJIMY25 Index was in 2013. Panel B shows that five stocks were added in year 2013, whereas four stocks were deleted (three were due to non-Shariah compliant at the DJIMY25 Index intra-quarter rebalancing and one at its annual rebalancing). Effective from November 29, 2013, the constituent of DJIM

Index families domiciled in Malaysia had to take into consideration the Shariah Advisory Council (SAC) of Securities Commission's (SC) revised screening methodology on top of the criteria set by S&P Dow Jones screening methodology.

Panel C depicts the relevant statistics of the DJIMY25 Index and the samples of event stocks for the period of October 2008 to June 2009. The first row of Panel C shows that the event stocks (additions and deletions) have an average (median) annual return of 1.81% (0%), which is lower than the DJIMY25 Index return of 10.4%. The annualized volatility of the event stocks' portfolio is three times the volatility of the DJIMY25 Index (33.33% vis-à-vis 10.62%). The event stocks are highly volatile with the mean annualized return ranged from -29.51% to 31.02%. The range of DJIMY25 Index's annualized return is between -3.53% and 4.63%. The return distributions for the DJIMY25 Index and the event stocks are leptokurtic but positively skewed. Kurtosis is far higher for the event stocks' portfolio (21.13) as compared to the DJIMY25 Index (5.61). Panel D shows the time series plot of DJIMY25 Index and the conventional market index, FTBM KLCI. It shows that the DJIMY25 Index movement is in tandem with the market movement throughout the study period.

Additions Stocks

The next section reports the finding of the study on the impact of DJIMY25 Index revision to three categories of event stocks – additions, deletions during index annual review, and deletions due to non-Shariah compliance. The event studies were carried out separately to analyse the index effect in the forms of abnormal returns, trading volumes and price volatility during index rebalancing from June 2009 to March 2015. The results for price effect (CAARs and AARs), volume effect (MAVRs and AVRs) and volatility effect (AAR and AAVy) are reported in Appendix B, C and D, respectively. To aid discussion, the three results are summarized in Figure 2 which combines the three metrics in each timeline started from the period before the announcement up to the post-effective date.

The DJIMY25 Index Revision Effect

ADDITION	(AD-20, AD-2)	(AD-10, AD-2)	(AD-1,AD+1)	(AD+2,AD+5)	(ED-1,ED+1)	(ED,ED+10)	(ED+11,ED+50)
Abnormal Return	(-)	+ -* + - - + - +* -	(+) + + +	(+) + + + -	(-*) + -* -*	(-*) -* -* + - .-* -* + -* + - -	(-*)
Abnormal Volume	(+)	+ - - - - - + + +	(+) + + +	(+*) - + + +	(+) +* - +	(+) -* + + + + + - - -* - -	(+)
Abnormal Volatility	(AD-50) ← — — (+*) — → (AD+50) (ED-50) ← — (-) — — → (ED+50)						
	=	=	=	=			

DEL (AR)							
Abnormal Return	(-*)	-* = = + + + - + -*	(+*) +* - +	(-*) -* - -* -	(-) -* +* +	(+) +* + + +* + -* - -* - + +*	(-)
Abnormal Volume	(+)	+ + - + + + + + -	(-) - - +	(+*) +* - +	(+) + + +	(+) + + + + + - - + + - +	(+)
Abnormal Volatility	(AD-50) ← — — (+*) — → (AD+50) (ED-50) ← — (+) — — → (ED+50)						
	=	=	=		↑		

DEL (NSC)							
Abnormal Return	(+)	- - -* +* -* - + +	(-) = = -*	(+) - +* +	(+) - + +	(+) + + -* -* -* + +* + + - -	(+)
Abnormal Volume	(+)	+ + + + + + + + +	(+) + + -*	(+) + + +	(+) + + -	(+) + - + + - + + + + + + -	(+)
Abnormal Volatility	(AD-50) ← — — (+*) — → (AD+50) (ED-50) ← — (+*) — — → (ED+50)						
	=	=	=		=		

Indicators:	
+	Positive abnormal return / higher than normal trading volume / increase absolute volatility
-	Negative abnormal return / lower than normal trading volume / decrease absolute volatility
=	Indifferent (Unchanged)
↑	Increase relative volatility
*	At least significant at 10% level

Figure 2: Summary of Index Effect from DJIM Titans Malaysia 25 Index

Addition stocks in Figure 2 show a surprising response of Malaysian capital market towards the news of inclusion to the DJIMY25 Index. The stock price response negatively to index additions of Malaysia Shariah blue-chip index. The negative response starts on the effective date and persists in the long run. The result is reflected from the significant abnormal returns in the short-term and long-term post-effective period. This is a bit puzzling because the index is tied up to MyETF DJIM Titans 25, the second largest Shariah ETF in the world in terms of the asset (as of 2016). As the index is linked to an ETF, it is expected that the ETF will buy the addition stocks near or on the effective date to be added to their portfolio. Usually, index funds manager rebalances their portfolio immediately near the effective date to reduce tracking error. However, the reaction from this passive fund is not strong enough to fully offset the negative

response from the market as a whole around the ED. The reason is most probably because MyETF is the only index fund linked to the DJIMY25 Index and has no significant role to influence the market from its demand. In other words, MyETF is not a market mover but a price taker in this case.

Addition stocks in Figure 2 also show that the volatility has also decreased around the effective date, which suggests that the addition to the DJIMY25 Index does not seem to bring any excitement to the market. This notion corresponds to the absence of any reaction on the announcement date or prior to that. Investigation on trading volume suggests that volume of transaction is significantly higher than normal only before the effective date, suggesting a selling pressure that causes negative abnormal returns on the effective date. The transactions are most probably executed by the institutional investors that sell in large blocks and subsequently affect the securities price. The returns of addition stocks plunged on the effective date with -1.11% losses, on average. This sharp decline in returns is associated with the spike in trading volume of 42% above normal time on ED-1 (see Figure 2 for illustration, Appendix B and C for abnormal return and abnormal volume figures, respectively). What prompt the institutional investors to dispose the addition stocks provide an interesting avenue for discussion.

The study offers possible explanation on the negative price effect for stocks added to the DJIMY25 Index. Most of the stocks added to the DJIM25 Index are not added for the first time and being added more than once. The evidence shows in between June 2009 to March 2015, there were 13 duplicated addition firms, either being deleted in the past or in the subsequent index rebalance. From 13 duplicated addition stocks, 9 were included as sample in this study (see Appendix E). In general, the stocks added to the DJIMY25 Index do not become the index member permanently and easily violates the index eligibility requirements. The investors could have lost confidence towards the stocks that being added and deleted from the index repeatedly, which indicates the firm's unstable performance. Such stocks also make the index become highly volatile especially for index that have small number of constituents like the DJIMY25 Index. The potential investors would be resistant to buy the stocks despite being added to the index. Meanwhile, the existing stockholders do not have incentives to hold the stocks and would sell them as evidenced by higher trading volume prior to the actual date of addition, which lead to decline in price of the added stocks. Ng and Zhu (2016) documented evidence that investors are generally not interested in stocks that repeatedly added and deleted from the FTBM EMAS Shariah Index. The study segregated the sample of additions and deletions stocks into two groups - only for the first timer, and for all samples including the one entering index multiples time. The negative index effect in Ng and Zhu (2016) is more pronounced for the case of deleted stocks that has been deleted in the past. An important practical implication of this finding is that index provider could have some buffer period and margin of exclusion before excluding companies that violated the financial screening ratios to ensure overall index stability.

In brief, the additions to the DJIMY25 Index have induced permanent negative abnormal returns with temporary increase in trading volumes. The trading volumes were significantly higher than normal on ED-1 and remain higher up to 5 days after the actual changes before subsequently decreased. In the context of market efficiency, there seems a delay in the processing the news of addition of stocks to the DJIMY25 index. The selling pressure starts in the run-up period (between the announcement and effective date) with increasing trading volumes but impacted the price significantly negative only on the effective date. Therefore, in general, the market is lack of efficiency in the short run with respect to the news of additions to Shariah blue-chip index.

Deletions during Index Annual Review
Next, although the study found an unexpected impact of index additions in Malaysian capital market, the index deletions effect is in line with the negative impact of deletions from the vast literature on index effect. Overall, the Malaysian stock market responds negatively to index

deletions (Abd Karim, 2016; Azevedo et al., 2014; Kassim et al., 2017; Ng & Zhu, 2016; Sakti, 2016; Yazi et al., 2015). The news of deletions is anticipated as shown by a significant negative price response prior to the announcement. However, the opposite price response is observed around the announcement date with significant positive returns, increased absolute volatility and a plunged trading volume (see Figure 2 for illustration). After the announcement date, the market continues to react negatively as evidenced by a negative abnormal return in the run-up period. The biggest losses incurred on AD+2 (-1.37%) is associated with the spike in trading volume of 68% above normal time. The trading volume starts to pick up significantly causing the stock price to incur negative abnormal return and continue to depreciate. The index fund rebalancing activities to dispose deleted stocks may have been executed before the effective date as there is no significant negative abnormal return on the effective date.

The study provides few possible explanations from the price and volume patterns observed in the deletion of stocks during the DJIMY25 Index annual review. Some investors anticipate the stocks that about to leave the index will depreciate in values possibly because of two reasons. First, the price will decrease due to the shift in demand from the MyETF that is going to rebalance its portfolio by selling deletion stocks. Second, the deletions during annual review carry variation of negative information and could impact the price negatively. This is because deletions during annual review have different reasons:

i) The stocks may be deleted due to ranking downgrade, which therefore will be demoted to a broader index.
ii) They may be demoted from the parent index, which therefore may result in the stocks to be deleted from the entire DJIM and Dow Jones Indexes universe.
iii) Lastly, the deletion is because the stocks are no longer Shariah compliant, which therefore will be deleted from the pool of Shariah compliant stocks, the DJIM World Index.

The first and second reasons, may carry similar information as the size-based index, in which deletions signal the unfavourable future prospects of the firms. While the third reason of being non-Shariah compliant may signal a private information on the increase in the firm's financial leverage. The investors who are risk-averse may be the first to liquidate their holdings before the price continues to decline. The trading volume patterns are steady with mostly higher than normal time in the pre-announcement period, which indicates a continuing downward momentum trading that significantly bring the price down (see Figure 2 for illustration). The investors may be overreacted to the anticipation of negative news causing the deleted stocks to trade less than their fair value. When the investors realised that the stocks are traded less than their fair value, the arbitrageurs might come in and the price adjustment takes place. This will result in the price to revert to its fair value as evidenced by positive abnormal return of 1.24%, on average, one day prior to the announcement. Once the announcement of index revision is released to the public, the trading volume of the deleted stocks starts to pick up and is visible right after the announcement day. This pattern shows the arbitrageurs movement in attempt to profit from the index revision announcement. The indexer's trading is also apparent during the run-up period that significantly drives down the price of deleted stocks. The result shows that the indexer executes trading near and on the effective date in order to minimise the tracking error. The temporary demand shifts due to index fund rebalancing activities causes a temporary price decrease, which then reverts to its equilibrium price. The price-reversal takes place on the effective date that becomes significant on day 3 after the actual change date. The price appreciates after the effective date as reflected by significant positive abnormal returns and significantly higher trading volumes (see Figure 2).

The empirical evidence found from index deletions during annual rebalancing suggests that the index effect in the Malaysian scenario can be explained by both demand-based hypotheses and information-based hypotheses. The visible anticipation effect and the

interactions around the announcement date suggest that index deletions of the DJIMY25 Index have information content. Meanwhile, the interactions in the run-up period, around the effective date and afterwards are due to a temporary shift in demand from the investing fund that tracks the index, thus are more related to demand based hypotheses, mainly supporting the price-pressure hypothesis (PPH).

Deletions Due to Non-Shariah Compliance
Regarding the index deletions effect from the sample deleted due to non-Shariah compliance, the study, at first, found difficulty to conclude the result due to small sample size. However, various robustness tests including a combination of samples from DJIM World confirm the finding[6]. The study concludes that a negative, small, and short-lived abnormal return is observed around the announcement date with significantly higher volatility. The negative price effect started earlier even before the official announcement of deletions.

The scrutiny on the daily abnormal returns and trading volumes suggests that stocks deleted due to non-Shariah compliance are highly volatile. Prior to the announcement of exclusion due to violation to the Shariah screening ratios, the trading volumes are consistently at higher than the normal level, which are three times as high as the normal time. However, during this period, the abnormal returns show a fluctuation with significant positive and negative abnormal returns. The trading volumes plunge on the day after the announcement (AD+1), to be as low as less than 50% of normal time. The lowest trading volume is associated with the most significant negative abnormal return of -0.44%. The volatile returns pattern continues even after the effective date. The plunge in trading volume right after the announcement of deletions following a momentum trading suggests that there are short of buyers in the market to buy the stocks that are deemed non-Shariah compliant. The investors may be resistant to buy the Shariah non-compliant stocks resulting in a price decline. In the Malaysian scenario, the news on Shariah compliant status matters to investors as the information is immediately processed and reflected in the price and trading volume patterns shortly after.

In Malaysian market, the study also found asymmetric responses between additions, deletions (annual rebalance), and deletions due to non-Shariah compliant. Although all event stocks experienced negative price effect, the impact of news on deletions from the DJIMY25 Index is more pronounced than the reactions to the additions' news. This can be evidenced by a significant daily loss of -1.37% in the run-up period, with a surge in trading volume to 68% higher than in normal time, for stocks deleted during the index annual review. Meanwhile, the news on additions experienced a significantly smaller loss on the effective date of -1.11%, which is initiated by a surge in trading volume of 42% higher than normal, on the previous day. However, the maximum loss after being reclassified as non-Shariah compliant is only -0.44% but trading volume plunges by 50%. The asymmetric reactions could be explained by the rich information content in the news of deletions from Shariah compliant index. The asymmetric information of deletion news that translate into asymmetric response in Malaysian market supports the study by Chen and Ngo (2017). The research empirically discovered that deletions from Shariah index reveal more information about the firm's operation and financial situation, especially the firm's operating and leverage characteristics.

Robustness Tests
Three robustness tests were performed to check if the price effect of the DJIMY25 Index revision holds for different market proxies, different methods to compute abnormal returns, or driven by a specific time period. The market proxies used for this robustness tests were EMAS Syariah Index and Kuala Lumpur Composite Index (KLCI). The other method used was the market model with GARCH (MMG) whereas the period divisions were June 2009 to June 2012

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[6] The full robustness results are available upon request.

and September 2012 to March 2015. The summary of the robustness checks, using both Average Abnormal Returns (AAR) and CAARs, is shown in Figure 3.

Abnormal Return DJIMY25

ADDITION	(AD-20, AD-2)	(AD-10,AD-2)	(AD-1,AD+1)	(AD+2,AD+6)	(ED-1,ED+1)	(ED,ED+10)	(ED+11,ED+50)
DJIMY25	(-)	+ -* + - - + - +* -	(+) + + +	(+) + + + - +	(-*) + -* -*	(-*) -* -* + - -* -* + -* + - -	(-*)
EMAS SYARIAH	(-)	- -* + - - + - + -	(+) + - -	(+) + + + - +	(-*) + -* -	(-*) -* - - - -* - + -* + - -	(-*)
KLCI	(-)	- -* + - - + - + -	(+) + + +	(+) + + + - +	(-*) + -* -	(-*) -* - + - -* -* + - +* + -	(-*)
GARCH-in-mean	(+)	+ - +* - - + - +* -	(+) + + +	(+) + - - - -	(-*) + -* -	(-) -* - + + - - + - +* + +	(-*)
Phase 1	(-*)	+ - - - - - + +* -*	(+) - - +	(-) - + + -* +	(-*) - -* -	(-*) -* - - + -* - + -* + - +	(-*)
Phase 2	(+)	- -* + - - + -* + +	(+) + + -	(+) + + - +	(-) + -* -	(-) -* - + - - + + - +* + +	(-)
DEL (NSC)							
DJIMY25	(+)	- - -* +* -* - + + -	(-) = = -*	(+) - +* + -	(+) - + +	(+) + - -* -* -* + +* + + - -	(+)
EMAS SYARIAH	(-)	- - - + -* - + + -	(-) + - -*	(+) - +* + -	(+) - + +	(+) + - -* -* - + +* + + - -	(+)
KLCI	(+)	- - - +* - - + = -	(-) + - -*	(+) - +* + -	(+) - + +	(+) + - -* -* - + +* + + - =	(+)
GARCH-in-mean	(+)	- - -* +* -* - + + -	(-*) + - -*	(+) - +* + -	(-) - + +	(+) + - -* - - + +* + + - -	(+)
Phase 1							
Phase 2	(+)	- - -* +* -* + + + +	(-) + - -*	(+*) + +* + -	(+) - + +	(+) + - -* -* - + +* + + + +	(+)
Combination of DJIM100 & DJIMY25	(-)	-* -* -* - -* - + - -	(-) = - -	(-) -* + -* - -*	(-) -* - +	(+) - + - + - + +* - = + -	(-)
DEL (AR)							
DJIMY25	(-*)	-* = = + + + - + -*	(+*) +* - +	(-*) -* - -* - -*	(-) -* +* +	(+) +* + + +* + -* - -* - + +*	(-)
EMAS SYARIAH	(-)	-* - + + + + - - -*	(+*) +* - +	(-*) -* - -* - -*	(-) -* + +	(+) + + + +* + -* - - - + +	(-)
KLCI	(-*)	-* + - + + + - + -	(+*) +* - +	(-*) -* - -* - -*	(-) -* + +	(+) + + + +* + -* - - - +* +	(-)
GARCH-in-mean	(-*)	-* + + + + + - + -*	(+*) +* + +	(-*) -* + -* - -	(-) -* + +	(+) + + +* +* + -* - - - + +	(+)
Phase 1	(-)	-* + - - + + + - -	(+*) +* + =	(-*) -* - -* - -	(-*) - + +	(+) + + + +* + - -* - - +* +	(-)
Phase 2	(-*)	+* - + + + - + -*	(+*) + - +*	(-*) -* - -*	(+) -* - +	(-*) - + + + + - + -* - - -	(-*)

Indicators:				
+	Positive abnormal return	Robustness test 1: The use of different market proxies	**ADDITION**	Addition to the DJIMY25
-	Negative abnormal return	Robustness test 2: The use of different specification	**DEL (NSC)**	Deletion due to non-Shari'ah compliance
=	Unchanged	Robustness test 3: The use of different time period	**DEL (AR)**	Deletion due to annual rebalance
*	At least significant at 10% level	Robustness test 4: The combination of sample Del (NSC)		

Figure 3: Summary of Robustness Checks for Abnormal Returns of Stocks Deleted and Added to DJIM Titans Malaysia 25 Index

The results imply that the negative effect for added stocks using the market model of different proxies and modified market model confirm the earlier estimation. The unexpected negative response started on the effective date but persisted in the long run. The robustness checks also confirm the earlier findings for stocks deleted due to non-Shariah compliance which experienced a negative price effect even before the official announcement though small and short-lived. The negative effects findings for sample of deletions due to annual rebalancing are also consistent with the above findings. Overall, the significance of price effect of the DJIMY25's event stocks holds for different market proxies and different model specification, but in small cases, are driven by a specific time[7].

CONCLUSION

Surprisingly, the market reacts negatively on the additions to the DJIMY25 Index, a Shariah blue-chip index that subjected to dual Shariah screening methodologies. In this case, the index additions have induced permanent negative abnormal return and higher volatility but have temporarily increased the trading volume. Shariah sensitive investors may have perceived these stocks negatively, possibly because they have been included and excluded from the index repetitively for failing the Shariah screening process. It shows that these companies were unable to maintain their financial ratios within the prescribed thresholds of being Shariah compliant in the long term. Investors seems hesitant to buy these stocks even after re-inclusion into the index.

The impact of deletions in Malaysia's case is in line with the findings from the vast literature that predicts deletions to cause negative abnormal returns. Most investors perceive index deletions as unfavourable news, thus impacted the price negatively. The selling pressure,

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[7] The robustness check results are available upon request.

possibly from index fund rebalancing activities, is visible on the post-announcement period and is settled on the actual change date. The 'compliance effect' in the Malaysian scenario can be observed more towards the return pattern that is becoming highly volatile around the announcement date through the post-effective date. Notwithstanding, investors should not underestimate the Shariah compliance endorsement as it can significantly affect the stock price, the trading pattern, and return volatility of the affected stocks. Shariah index membership can pose Shariah compliance risk if the company is unable to keep the Shariah compliant status for a certain satisfactory period.

The findings of this study have important implications for *stock issuing firms*, *investors* and *index providers*. First, for firms that make up the Shariah index, the study helps the firms' managers to understand the short-term and long-term implications of being a Shariah index member and when excluded from the index due to different reasons. The failure to comply with Shariah screening requirement in the long-term poses a Shariah compliant risk in terms of the inability to instill investors' confidence even after regaining the Shariah compliant status. Next, by understanding the impact of index changes to index new component and deleted stocks, index fund managers could formulate a trading strategy to avoid transacting at a disadvantageous price, hence striking a balance between return and tracking error of the fund. This study provides empirical evidence about the price of compliance that investors should bear while choosing Islamic equity investments especially the one utilising passive investment strategy like Islamic ETFs and Shariah tracker funds. Lastly, for index providers, it is important to acknowledge the implications of the Shariah screening process to the underlying constituent stocks for both short-term and long-term. Shariah compliant stocks can become non-compliant by chance or by choice. It is possible that the non-compliance is a technicality arising from the index methodology. For example, the use of market capitalization as the denominator in the Shariah screening financial ratios may cause the stocks to be excluded from the index at lower market-caps (hence have higher debt-ratio) and included in the index at higher market-caps (hence have lower debt-ratio). Therefore, it is reasonable for index providers to provide a *buffer period* and an *exclusion margin* before automatically deleting stocks that exceed the financial ratios thresholds.

This technical issue and the consequences have been recognised by index provider S&P Shariah Indices and Dow Jones Islamic Market Indices. A proposal to implement Shariah compliance buffer rules has been issued on Feb 2015 and the implementation started in June 2015. The buffer compliance rules were applied when determining the status of Shariah compliance for companies during index rebalancing with buffer period to be at 2 consecutive index rebalances and 2% exclusion margin. These changes are for the two accounting-based screens; leverage compliance ratio and cash compliance ratio. Each ratio was given additional 2 percentage points buffer for 2 consecutive evaluation periods[8]. Noted that the current benchmark for leverage ratio and cash compliance ratio are 33%. The stocks that are exceeding 35% thresholds will be immediately deemed non-compliant. If one of the financial ratios is exceeding the 33% thresholds but less than 35%, it will only be deemed non-compliant after remaining in the buffer range for 2 consecutive evaluation periods. The move from index providers seems to be more lenient but technically the practice has limited the frequency of index membership change in Shariah index which consequently stabilizes the index.

The present study has several limitations that need to be acknowledged and addressed in future studies. An obvious limitation of the study is that it was carried out on a relatively small sample size and the results should not be generalized. The future study can extend the sample size by using longer time period. The period of index revision after 2015 provides avenue for future discussion as the DJIMY25 Index is more stable after the implementation of compliance buffer and margin of exclusion in determining the Shariah compliance status of the constituent stocks. The samples of event stocks can also be divided into the first timers and the repeaters as

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[8] The current compliance buffer period is 3 consecutive index reviews (S&P Down Jones Indices, 2020)

described by Ng and Zhu (2016), to differentiate the impact and test the investor awareness hypothesis. The future study also could be directed at testing the index effect at index funds level for any indices that widely are followed by indexers.

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REFERENCES

Abd Karim, M. N. (2016). *Bursa Malaysia index series revision effects on market microstructure.* University of Hull.

Abdullah, M. H., & Bacha, O. I. (2001). Halal stock designation and impact on price and trading volume. *The Journal of Accounting, Commerce & Finance-Islamic Perspective, 66*–97.

Abdullah, F., Hassan, T., & Mohamad, S. (20070. Investigation of performance of Malaysian Islamic unit trust funds: Comparison with conventional unit trust funds. *Managerial Finance, 33*(2), 142-153.

Alalmai, S., Al-Awadhi, A.M., Kabir Hassan, M., & Turunen-Red, A. (2020). The influence of religion on the determinants of capital structure: The case of Arab Saudi. *Journal of Islamic Accounting and Business Research, 11*(2), 472-497.

Albaity, M., & Ahmad, R. (2008). Performance of Syariah and composite indices: Evidence from Malaysia. *Asian Academy of Management Journal of Accounting and Finance, 4*(1), 23-43.

Al-Khazali, O., Lean, H. H., & Samet, A., (2014). Does Islamic stock indexes outperform conventional stock indexes? A stochastic dominance approach. *Pacific-Basin Finance Journal, 28*, 29-46.

Asem, E., & Alam, S. (2012). The role of the S&P 500 index constituents in tracking the U.S. equity market. *International Journal of Economics and Finance, 4*(12), 15–22.

Azevedo, A., Karim, M., Gregoriou, A., & Rhodes, M. (2014). Stock price and volume effects associated with changes in the composition of the FTSE Bursa Malaysian KLCI. *Journal of International Financial Markets, Institutions and Money 281*, 20–35.

Balaban, E., & Constantinou, C. T. (2006). Volatility clustering and event-induced volatility: Evidence from UK mergers and acquisitions. *European Journal of Finance, 12*(5), 449–453.

Bechmann, K. L. (2004). Price and volume effects associated with changes in the Danish Blue-Chip Index-The KFX Index. *Multinational Finance Journal 8*, 3–35.

Beneish, M. D., & Whaley, R. E. (1996). An anatomy of the "S&P Game": The effects of changing the rules. *The Journal of Finance 51*(5), 1909–1930.

Bildik, R., & Gülay, G. (2008). The effects of changes in index composition on stock prices and volume: Evidence from the Istanbul stock exchange. *International Review of Financial Analysis, 17*(1), 178–197.

Biktimirov, E. N., & Li, B. (2014). Asymmetric stock price and liquidity responses to changes in the FTSE SmallCap index. *Review of Quantitative Finance and Accounting, 42,* 95–122.

Bollerslev, T. (1986). Generalized Autoregressive Conditional Heteroskedasticity. *Journal of Econometrics, 31*, 307–327.

Brooks, C., Kappou, K., Stevenson, S., & Ward, C. (2013). The performance effects of composition changes on sector specific stock indices: The case of European listed real estate. *International Review of Financial Analysis 29,* 132–142.

Brown, J., & Warner, B. (1980). Measuring security price performance. *Journal of Financial Economics, 8*, 205–258.

Charles, A., Darne, O., & Pop, A. (2015). Risk and ethical investment: Empirical evidence from Dow Jones Islamic Indexes. *Research in International Business and Finance 35,* 33-56

Chen, H., Noronha, G., & Singal, V. (2004). The price response to S & P 500 index additions

and deletions : Evidence of asymmetry and a new explanation. *The Journal of Finance, LIX*(4), 1901–1929.

Chen, H., & Ngo, T. (2017). Leverage-based index revisions: The case of Dow Jones Islamic Market World Index. *Global Finance Journal, 32,* 16–34.

Cowan, A. R. (1992). Nonparametric event study tests. *Review of Quantitative Finance and Accounting, 2,* 343–358.

Dharani, M., & Natarajan, P. (2011). Equanimity of risk and return relationship between Shariah Index and General Index in India. *Journal of Economics and Behavioral Studies, 2*(5), 213-222.

Elayan, F., Li, W., & Pinfold, J. (2000). *Price effects of changes to the composition of New Zealand share indices.* Massey University.

Ho, C. S. F., Rahmah, N. A. A., Yusuf, N. H. M., & Zamzamin, Z. (2014). Performance of global Islamic versus conventional share indices: International evidence. *Pacific-Basin Finance Journal, 28,* 110-121.

Ismail, A. G., Ma'in, M., & Ahmat, N. (2011). The impact of leverage on investment: Evidence from Shariah listed firms. *Journal of Muamalat and Islamic Finance Research, 8*(1), 105-120.

Jaballah, J., Peillex, J., & Weill, L. (2018). Is Being Sharia compliant worth it ? *Economic Modelling, 72,* 353-362.

Jamil, N. S., Hassan, H., & Bujang, I. (2020). The effect of Shariah compliance announcements on stock returns in Malaysia. *International Journal of Business and Society, 21*(1), 217-233.

Kamil, K. H., Jaapar, A. M., & Elias, M. (2017). Understanding shariah compliant equity investment in Malaysia. In H., Abdul Wahab (Ed.), *Integration of naqli and aqli knowledge: An application to actuarial science, risk management & financial mathematics curriculum.* USIM Press.

Kassim, N. S., Ramlee, R., & Kassim, S. (2017). Impact of inclusion into and exclusion from the Shariah index on a stock price and trading volume : An event study approach. *International Journal of Economics and Financial Issues, 7*(2), 40–51.

Khaw, K. L., Nordin, S., & Wong, W. C. (2019). Firm risk and corporate policies: From the shariah certification perspective. *International Journal of Business and Society, 20*(3), 1257-1275.

Khouildi, M. Y., Bengana, M., Riad, M. R., Aldirchawi, S., & Rakibi, M. (2017). Shariah screening methodologies: SAC-SC vs DJIM comparative study and impact assessment on their performance. *Global Review of Islamic Economics and Business, 5*(2), 68-82.

Liu, S. (2006). The impacts of index rebalancing and their implications: Some new evidence from Japan. *Journal of International Financial Markets, Institutions and Money, 16*(3), 246–269.

Lynch, A., & Mendenhall, R. (1997). New evidence on stock price effects associated with changes in the S&P 500 index. *Journal of Business, 70*(3), 351–383.

Mat Nor, F., Shaharuddin, A., Marzuki, A., & Ramli, N. A. (2019). Revised Malaysia Shariah screening: Its impact on Islamic capital market. *Research in World Economy, 10*(1), 17-30.

Mazouz, K., Mohamed, A., Saadouni, B., (2016a). Price reaction of ethically screened stocks: A study of the Dow Jones Islamic Market World Index. *Journal of Business Ethics,* 1–17.

Mazouz, K., Mohamed, A., & Saadouni, B. (2016b). Stock return comovement around the Dow Jones Islamic Market World Index revisions. *Journal of Economic Behavior and Organization, 132,* 50–62.

Mcgowan, C. B., & Muhammad, J. (2010). The theoretical impact of the listing of syariah-approved stocks on stock price and trading volume. *International Business & Economics Research Journal, 9*(3), 11–20.

Modigliani, F., & Miller, M. H. (1958). The cost of capital, corporation finance and the theory of investment. *American Economic Review, 45*(3), 261–297.

Muhammad, J., Ibrahim, I., Sufar, S. B., & Abd Rahman, N. M. (2009). The efficiency of stock market based on the inclusion-exercise of the Kuala Lumpur Syariah Index (KLSI). *Icfai Journal of Applied Finance, 15*(5), 33-48.

Ng, S., & Zhu, X. (2016). Do changes in index composition affect the stock prices and trading

volume ? The case of a shariah-compliant index in Malaysia. *Capital Markets Review, 24*(2), 14–39.

Rahman, A., & Rajib, P. (2014). Associated effects of index composition changes: an evidence from the S&P CNX Nifty 50 index. *Managerial Finance, 40*(4), 376–394.

Reddy, K., & Fu, M. (2014). Does shariah compliant stocks perform better than the conventional stocks? A comparative study stocks listed on the Australian stock exchange. *Asian Journal of Finance and Accounting, 6*(2), 155-170.

Sadeghi, M. (2008). Financial performance of Shariah-compliant investment : Evidence from Malaysian stock market. *International Research Journal of Finance and Economics,* 15–26.

Sadeghi, M. (2011a). Investment opportunities and stock liquidity : Evidence from DJIM index additions in the Persian Gulf states. *Investment Management and Financial Innovations, 8*(1), 53–62.

Sadeghi, M. (2011b). Shariah-compliant investment and shareholders' value: An empirical investigation. *Global Economy and Finance Journal, 4*(1), 44–61.

Sadeghi, M. (2012). Is Shariah-Compliant Investment Universally Sustainable ? A Comparative Study. 8th International Conference on Islamic Economics and Finance 61, 1–19.

Sadeghi, M. (2014). Are faithful investors rewarded by the market place? Evidence from Australian Shariah-compliant equities. I*nternational Review of Business Research Papers, 10*(2), 160–177.

Sakti, M. R. P. (2016). *The impact of stock delisting from the shari'ah-compliant list : Evidence from Bursa Malaysia.* IIUM, 1-20

S&P Dow Jones Indices. (2014). *Dow Jones Islamic Market Indices Methodology.* McGraw Hill Financial

S&P Dow Jones Indices. (2020). *Dow Jones Islamic market indices methodology.* https://www.spglobal.com/spdji/en/documents/methodologies/methodology-dj-islamic-market-indices.pdf

Wan Zainal, W. A., Kasim, N., Zakaria, N. B., & Mohamed, N. (2016). Disputes and resemblance: Comparative analysis of shariah advisory committee methodology and international indices. *Malaysia Accounting Review, 15*(2), 1-10.

Yazi, E., Morni, F., Song, S. I., (2015). The effects of shariah compliance announcement towards stock price changes in Malaysia. *Journal of Economics, Business and Management, 3*(11), 1019–1023.

Yildiz, S. B. (2020). Performance analysis of Turkey participation and conventional indices using TOPSIS method. *Journal of Islamic Accounting and Business Research, 11*(7), 1403-1416.

Yildiz, S. B. & Dia-eddine, K. (2016). Market response to the addition and deletion of participation index: Evidence from Turkey. *Journal of Islamic Economics, Banking and Finance, 12*(4), 211–224.

Yun, J., & Kim, T. S. (2010). The effect of changes in index constitution: Evidence from the Korean stock market. *International Review of Financial Analysis, 19*(4), 258–269.

Appendix A
General Information on the Final Sample of DJIMY25 Index (2009-2015)

INTERVAL	AD	ED	ADDITION	DELETION	TOTAL	Trading days between AD and ED
1	11/06/2009	22/06/2009	3	3	6	6
2	08/06/2010	21/06/2010	1	1	2	7
3	03/12/2010	20/12/2010	0	1	1	9
4	14/06/2011	20/06/2011	4	4	8	3
5	08/06/2012	18/06/2012	3	3	6	5
6	08/03/2013	18/03/2013	1	1	2	5
7	14/06/2013	24/06/2013	1	1	2	5
8	13/09/2013	23/09/2013	0	1	1	4
9	13/12/2013	23/12/2013	2	1	3	5
10	14/03/2014	24/03/2014	1	1	2	5
11	13/06/2014	23/06/2014	0	1	1	5
12	12/09/2014	22/09/2014	2	2	4	4
13	13/03/2015	23/03/2015	1	1	2	5
		Total	**19**	**21**	**40**	**Mean = 5.23**

Notes: The intervals, announcement and effective dates, number of additions and deletions for each period in the sample of DJIMY25 Index between the years 2009 and 2015. AD represents the announcement date and ED represents the effective date.

Appendix B

Abnormal Returns of Stocks Deleted and Added to DJIM Malaysia Titans 25 Index

This table shows the average abnormal return (AAR) and cumulative average abnormal return (CAARs) of additions and deletions of stocks from the DJIM Malaysia Titans 25 Index (DJIMY25) between June 2009 and March 2015. The abnormal returns are calculated using market model. The DJIMY25 Index is used as the market proxy in market model estimation. The null hypotheses are that AAR and CAAR are zero. Statistical significance is determined using cross-sectional t-test and the non-parametric generalized sign z-test. The asterisks, ***,**,* indicate significance at 1%, 5% and 10% level, respectively.

Days	AAR (%)	t-stat	GS z-stat	AAR (%)	t-stat	GS z-stat	AAR (%)	t-stat	GS z-stat
		Panel A: Additions			Panel B: Deletions Non-Shariah Compliance			Panel C: Deletions Annual Rebalance	
		n=19			n=7			n=14	
AD-10	0.03	0.07	0.23	-0.55	-1.06	-0.41	-1.12	-1.88*	-1.41*
AD-9	-0.55	-1.60*	-1.15	-0.72	-1.15	0.34	0.00	0.01	0.73
AD-8	0.40	1.16	0.23	-0.39	-1.96**	-1.92**	0.00	0.00	-0.34
AD-7	-0.26	-0.80	0.23	0.28	1.54*	1.10	0.37	0.42	-0.34
AD-6	-0.12	-0.35	0.23	-0.44	-2.12**	-1.92**	0.47	0.83	0.73
AD-5	0.15	0.40	0.23	-0.09	-0.18	-1.17	0.28	0.76	0.73
AD-4	-0.26	-0.83	-1.15	0.03	0.08	-0.41	-0.10	-0.27	0.73
AD-3	0.32	1.13	1.62*	0.16	0.56	-0.41	0.05	0.14	-0.88
AD-2	-0.25	-0.99	0.23	-0.03	-0.09	-0.41	-0.58	-1.54*	-1.41*
AD-1	0.08	0.24	-0.23	0.00	0.00	-0.41	1.24	1.76*	1.26
AD	0.03	0.11	1.15	0.00	0.00	-0.41	-0.04	-0.15	1.26
AD+1	0.12	0.47	0.69	-0.44	-2.68**	-1.92**	0.48	1.25	0.19
AD+2	0.05	0.22	0.23	-0.15	-0.26	-0.41	-1.37	-2.61**	-1.41*
AD+3	0.16	0.60	1.15	0.73	2.47**	1.10	-0.30	-0.65	-0.34
AD+4	0.10	0.23	0.68	0.60	0.97	1.10	-1.04	-6.65***	-3.02***
AD+5	-0.68	-1.14	-0.41	-0.72	-0.86	-0.41	-1.37	-1.09	-1.04
AD+6	0.37	0.53	0.15				-1.91	-2.18*	-0.95
ED-1	0.28	0.56	1.15	-0.49	-0.57	0.34	-1.00	-2.25**	-1.95**
ED	-1.11	-3.33***	-2.54***	0.37	0.58	0.34	0.25	0.26	1.80**

ED+1	-0.74	-1.23	-2.08**	0.34	0.57	0.34	0.33	0.68	0.73
ED+2	0.08	0.28	0.23	-0.34	-3.30***	-2.69**	0.70	1.17	0.73
ED+3	-0.08	-0.18	-0.23	-0.34	-2.55**	-1.93**	1.17	1.74*	1.26
ED+4	-0.56	-2.97***	-1.62*	-0.42	-1.46*	-1.17	0.15	0.29	1.26
ED+5	-0.21	-0.73	-2.08**	0.08	0.50	-0.42	-0.70	-1.91**	-0.88
ED+6	0.16	0.59	-0.23	0.66	2.36**	2.61***	-0.44	-1.05	-0.88
ED+7	-0.62	-2.82***	-2.08**	0.16	0.51	-0.42	-0.53	-0.88	-1.95*
ED+8	0.20	0.59	0.23	0.23	0.77	-1.17	-0.52	-0.60	0.19
ED+9	-0.02	-0.07	0.69	-0.09	-0.27	-0.42	0.69	1.17	0.19
ED+10	-0.03	-0.12	0.69	-0.10	-0.31	0.34	0.16	0.58	1.80**
Cumulative Average Abnormal Returns CAARs									
AD-20,AD-2	-1.37	-0.86	-0.23	0.36	0.21	0.33	-2.54	-1.48*	-1.42*
AD-1,AD+1	0.22	0.38	1.15	-0.44	-1.32	-1.18	1.68	2.06**	1.26
AD+2,AD+3	0.21	0.61	0.23	0.59	0.93	0.33	-1.66	-3.47***	-2.48***
AD+2,AD+4	0.10	0.19	0.68	1.19	1.42	0.33	-2.37	-3.97***	-2.39***
AD+2,AD+5	-1.08	-1.48*	-0.97	0.47	1.00	1.09	-3.26	-1.95**	-1.04
AD+2,AD+6	-0.41	-0.43	-0.85				-6.66	-2.08*	-1.95**
AD+2,ED-1	0.02	0.01		0.49	1.04		-3.61	-3.25***	
ED-1,ED+1	-1.57	-2.13	-1.61*	0.24	0.23	0.33	-0.42	-0.35	1.26
ED, ED+10	-2.93	-3.01***	-2.54***	0.54	0.41	-0.42	1.27	0.64	-0.34
ED+11,ED+50	-11.75	-2.87***	-1.61*	0.74	0.23	-0.42	-2.26	-0.56	-0.34

Appendix C

Abnormal Volume of Stocks Deleted and Added to DJIM Malaysia Titans 25 Index

This table shows the average volume ratio (AVR) and mean of average volume ratio (MAVR) of additions of stocks (Panel A), deletions of non- Shariah compliant stocks (Panel B), and deletions of annual rebalance stocks (Panel C) of the DJIM Malaysia Titans 25 Index between June 2009 and March 2015. The AVR is calculated using Harris and Gurel (1986)'s approach. The AVR is presented from ten days before the addition/deletion announcement (AD-10) to ten days after the actual addition/deletion (ED+10). The MAVR is presented for several event windows: pre-announcement period (AD-20,AD-2); around the announcement date (AD-1,AD+1); the run-up periods (AD+2,AD+3), (AD+2,AD+4), (AD+2,AD+5) and (AD+2,ED-1); around effective date (ED-1,ED+1); short-term post-effective period (ED+1,ED+10) and long-term post-effective period (ED+11,ED+50). Statistical significance is determined using *t*-test. The percentage of firms with AVR above 1 is given to all sample. The asterisks, ***,**,* indicate significance at 1%, 5%, and 10% level, respectively.

Days	*n*	AVR	*t*-stat	AVR>1 (%)	*n*	AVR	*t*-stat	AVR >1 (%)	*n*	AVR	*t*-stat	AVR>1 (%)
						Panel B: Deletions Non-Shariah Compliance				Panel C: Deletions Annual Rebalance		
		Panel A: Additions										
AD-10	18	1.50	0.92	50	7	1.18	0.45	57	14	1.21	0.91	64
AD-9	18	0.88	-0.82	28	7	1.03	0.06	14	14	1.11	0.25	21
AD-8	18	0.80	-1.49	28	7	1.82	1.33	57	14	0.96	-0.23	36
AD-7	18	0.91	-0.73	39	7	1.45	1.24	71	14	1.18	0.79	50
AD-6	18	0.86	-0.91	33	7	1.06	0.23	43	14	1.08	0.33	50
AD-5	18	0.95	-0.32	39	7	1.05	0.31	57	14	1.04	0.15	43
AD-4	18	1.13	0.53	39	7	1.70	1.60	71	14	2.17	1.13	36
AD-3	18	1.05	0.26	44	7	1.75	1.55	57	14	1.76	1.36	57
AD-2	18	1.16	0.69	44	7	3.02	1.23	57	14	0.97	-0.15	36
AD-1	18	1.31	1.18	56	7	1.65	0.90	43	14	0.95	-0.18	36
AD	18	1.09	0.40	44	7	1.76	0.96	57	14	0.70	-1.74	21
AD+1	18	1.08	0.63	50	7	0.50	-4.00***	14	14	1.21	0.56	50
AD+2	18	0.99	-0.05	61	7	1.12	0.34	43	14	1.68	1.96*	57
AD+3	14	1.18	0.88	50	7	1.53	0.95	43	14	0.76	-1.31	20
AD+4	12	1.54	1.51	67	7	1.79	1.15	43	14	1.54	0.85	43
AD+5	3	1.26	0.35	33					14	1.13	0.92	50
ED-1	18	1.42	1.86*	50	7	1.91	1.32	57	14	1.57	1.60	57
ED	18	0.88	-0.52	33	7	1.21	0.58	57	14	1.28	0.48	29
ED+1	18	1.28	1.06	39	7	0.93	-0.23	43	14	1.06	0.22	29

ED+2	*18*	1.34	0.66	39	*7*	1.17	0.47	43	*14*	1.11	0.39	29
ED+3	*18*	1.70	1.11	44	*7*	1.18	0.47	57	*14*	1.40	0.54	36
ED+4	*18*	1.08	0.26	22	*7*	0.87	-0.48	43	*14*	1.21	0.50	29
ED+5	*18*	1.14	0.49	33	*7*	1.20	0.54	57	*14*	0.76	-1.21	29
ED+6	*18*	0.94	-0.48	39	*7*	1.73	0.96	43	*14*	0.78	-0.99	21
ED+7	*18*	0.87	-0.70	33	*7*	1.12	0.24	29	*14*	1.53	1.12	36
ED+8	*18*	0.76	-1.76*	33	*7*	1.45	0.68	29	*14*	1.32	0.77	50
ED+9	*18*	0.99	-0.06	39	*7*	1.40	0.60	43	*14*	0.96	-0.15	36
ED+10	*18*	0.95	-0.35	39	*7*	0.98	-0.05	57	*14*	1.06	0.26	43

Mean Average Volume Ratios (MAVRs)

AD-20,AD-2	*18*	1.03	0.28	50	*7*	2.06	1.30	71	*14*	1.31	1.22	57
AD-1,AD+1	*18*	1.16	0.95	44	*7*	1.30	0.64	43	*14*	0.95	-0.26	43
AD+2,AD+3	*14*	1.09	0.67	57	*7*	1.32	1.11	57	*10*	1.16	0.54	40
AD+2,AD+4	*12*	1.22	1.37	58	*7*	1.48	1.17	57	*7*	1.42	1.10	57
AD+2,AD+5	*3*	0.91	-0.54	67					*4*	0.99	-0.21	75
AD+2,ED-1	*18*	1.25	1.73**	61	*7*	1.51	1.15	43	*14*	1.43	2.07**	57
ED-1,ED+1	*18*	1.20	1.08	56	*7*	1.35	0.87	43	*14*	1.30	0.84	29
ED+1, ED+10	*18*	1.11	0.56	39	*7*	1.20	0.50	43	*14*	1.12	0.48	50
ED+11,ED+50	*18*	1.06	0.50	44	*7*	1.06	0.23	43	*14*	1.04	0.22	36

Appendix D

Announcement Day (AD) and Effective Day (ED) Effects on Return and Volatility Functions of
DJIM Titans Malaysia 25 Index (DJIMY25)

This table shows the return and volatility of event stocks of the DJIM Titans Malaysia 25 Index on the announcement date (AD) and effective date (ED). The event stocks are: additions of stocks (Panel A), deletions of stocks due to non-Shariah compliance (Panel B), and deletions of stocks due to annual rebalancing (Panel C). The volatility effect also shows values before and after the announcement. The abnormal volatility is estimated using market model with (1,1) errors and dummy variables that represent the announcement date (AD) and effective date (ED) in both the mean and volatility functions. Statistical significance on the announcement date (AD) and effective date (ED) effects are determined using Test 1 (Brown & Warner's (1980) cross-sectional statistical test) and Test 2 (Balaban & Constantiou's (2006) corrected cross-sectional statistical test) for both abnormal return and volatility. For the difference in volatility before and after the events, statistical significance is determined using a standard *t*-test and the Wilcoxon signed-ranked test, both of which test the null hypothesis that the difference in volatility before and after is zero. The asterisks, ***,** and * indicate significance at the 1%,5%, and 10% level, respectively.

	Panel A: Additions		Panel B: Deletions Non-Shariah Compliance		Panel C: Deletions Annual Rebalance	
	n=19		*n*=7		*n*=14	
	AD	ED	AD	ED	AD	ED
AAR (%)	0.1258	-1.0070	0.0457	0.3271	0.0085	0.3221
Test 1	0.5089	-3.1464***	0.2066	0.5525	-1.1104	0.3342
Test 2	0.7186	-3.1656***	0.0005	0.6326	-1.0597	0.7336
AAVy	0.0010	-0.0029	0.0005	0.0029	0.0001	0.0096
Test 1			3.5332***	2.0212**	1.8058**	1.3387
Test 2	1.8376*	1.0424	5.7299***	3.7168***	1.8834**	1.3391
Pre-event	2.9684	3.1074	2.3815	2.2325	3.4911	3.4087
Post-event	2.9134	3.0194	2.2400	2.1125	3.8985	3.8751
Difference	0.0550	0.0880	0.1415	0.1200	-0.4074	-0.4664
% firm with post>pre	52.6	52.6	42.9	42.9	57.1	57.1

t-stat	0.2130	0.2649	0.5308	0.2970	-0.8614	-0.8242
z-stat	0.1610	0.7244	0.5669	0.3381	0.9103	1.5380*

Appendix E

List of Malaysia Firms Added and Deleted from DJIMY25 Index

This table contains the companies added to (19) delete due to annual rebalance (14) and deleted due to non-shariah compliant (7) of the DJIMY25 index between June 2009 and March 2015. Names that appear more than one are firms that were added or deleted multiple times.

Added		Deleted due to Non-Shariah Compliant	Deleted due to Annual Rebalance
Axiata Group Bhd	1	Batu Kawan Bhd	Axiata Group Bhd
Felda Global Ventures Holdings Bhd	2	Bumi Armada Bhd	IJM Plantations Bhd
Fraser & Neave Holdings Bhd	3	IOI Properties Group Bhd	JCY International Bhd
Hartalega Holdings Bhd	4	Malaysia Marine and Heavy Eng. Holdings Bhd	KNM Group Bhd
IHH Healthcare Bhd	5	PPB Group Bhd	Latexx Partners BHD
IJM Plantations Bhd	6	SP Setia Bhd Group	Lion Diversified Holdings Bhd
IOI Properties Group Bhd	7	Telekom Malaysia Bhd	Malaysian Bulk Carriers Bhd
JCY International Bhd	8		MISC Bhd
KPJ Healthcare Bhd	9		PLUS Expressways Bhd
Latexx Partners BHD	10		Sino Hua-An International Bhd
Malaysia Marine and Heavy Eng. Holdings Bhd	11		Star Media Group Bhd
MISC Bhd	12		TIME dotCom Bhd
Petronas Dagangan Bhd	13		United Plantations Bhd
Supermax Corp Bhd	14		Zelan Bhd
Telekom Malaysia Bhd	15		
TIME dotCom Bhd	16		
UEM Sunrise Bhd	17		
United Plantations Bhd	18		
Westports Holdings Bhd	19		

Appendix F

Malaysia Economics Indicator 2009-2019