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Shariah-compliant Investment and Shareholders' Value: An Empirical Investigation

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This paper investigates the impacts of index additions on the return and liquidity of Shariah-compliant shares in Egypt and Jordan. We use the sample of companies added to the Dow Jones Islamic Market index over the period of January 2008–December 2009. Our findings show that stock prices respond positively to index addition events in these countries. Furthermore, our study provides evidence in support of long-term increases in the returns and liquidity of added shares. These results are consistent with results from conventional index addition studies. Our findings have important implications for Shariah-compliant investors, as they show that companies whose activities reflect the beliefs and ethos of their investors in the Middle East are also attractive for investment.

Keywords: Shariah-compliant investment, index addition, event study, abnormal returns, liquidity effects, Middle East.

JEL Classification: G14, G15

1. Introduction

The Islamic equity funds (IEFs) market is one of the most dynamic sectors within the Islamic finance industry, growing at 15–20%[1] per year. These funds are different from conventional equity funds because they select their placements on the basis of their compatibility with Shariah[2] principles. The current number of Islamic funds is estimated at around 700, managing $US55.4 bn assets[3]. Although this market may still be small by world standards, it offers big potential over time as more Muslims become aware of these products. Shariah-compliant funds also have the potential to appeal to a wider constituency of investors keen to pursue socially responsible investment principles.

While Muslims with large amounts to invest can purchase Shariah-compliant equities directly and build up their own investment portfolios, IEFs mostly benefit investors with limited capital and no means to acquire a diversified portfolio or to benefit from the proportionately lower dealing charges associated with large-scale share acquisitions and disposals. Shariah-compliant companies are selected by a Shariah Supervisory Board of a

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financial institution, such as Dow Jones, which provides indexes that represent a portfolio of these shares.

Shariah-compliant equity investment demands an active strategy, requiring individuals or fund managers to continuously monitor the market to buy newly screened Shariah-compliant shares and sell those that have been deleted from the index. This is true, even for investors in the index funds, which replicate the performance of an index by holding all, or in the case of very large indexes, a representative sample of shares. While “indexing” is generally categorized as a passive investment strategy, index fund managers must still actively minimize the tracking error of their portfolio when the composition of the index they follow is changed, by buying the stocks that are added to the index and selling the stocks that are deleted from the index. These trading activities are expected to change demand for shares and affect their market price. Previous studies on market indexes document price and liquidity rise following index additions. However, due to the availability of a smaller investment universe, increased screening and monitoring costs, and restricted potential for diversification, the significant impacts of index additions for Islamic indexes could be different from those of conventional indexes.

Against this backdrop, we propose to investigate the efficiency of the equity market in reaction to DJIM index addition in Egypt and Jordan. The main focuses of our research are the following:

to investigate the effects on the price, performance and liquidity of Shariah-compliant investments resulting from the addition of stocks to the DJIM index in these countries;

to consider which explanations raised by previous research best explain the effects on the DJIM of stock additions.

We found that stock prices respond positively to index addition events in these countries. Furthermore, our study provides evidence in support of long-term increases in the returns and liquidity of added shares. These results are consistent with the results from conventional index revision studies.

The current study is important for several reasons. First, although Shariah-compliant investment is similar to Socially Responsible Investing (SRI), an area that has already attracted a great deal of research interest, certain differences are evident in the screening procedures that make Shariah-compliant investment different. For instance, some Islamic funds do not exclude weapons manufacturers but they do exclude conventional banks, while SRI funds normally exclude weapon manufacturing firms and do include banks. As another difference, concerns about environmental issues are not as important in screening Shariah-compliant companies as they are for SRI funds. Furthermore, Shariah-compliant companies are subject to certain financial ratio tests that are not relevant to conventional SRI companies[4].

Second, Miller–Modigliani capital structure theory contemplates that in an imperfect capital market with corporate taxes, companies can increase their assets' value by increasing their leverage. Given that Shariah-compliant companies have constrained levels of borrowing, it would be interesting to investigate how this constraint can affect their value.

Finally, finance theory based on the efficient market hypothesis (EMH) considers shares with identical risks and returns as perfect substitutes for each other. This makes market demand for securities elastic and horizontal. Since Shariah-compliant equities are not perfect substitutes for conventional equities, their demand may not be horizontal. This can bring about a different outcome to the study of a Shariah-compliant index revision.

The rest of this study is organized as follows: Section II is allocated to the literature review. We outline our methodology, data and hypothesis development in Section III. Empirical findings are discussed in Section IV. Section V articulates our conclusions, and describes the limits of our study.

2. Literature Review

From a theoretical perspective, there are two explanations for the effects of stock additions to an index: demand-based and information-based. The demand-based explanation sees index changes as information-free events. For example, Shleifer (1986), by employing the downward-sloping demand curve hypothesis, showed that the price effects following index changes are due to the demand from index tracking. These effects can be temporary or permanent. The temporary effect is explained by the price pressure hypothesis, predicting a reversal of initial price increases in the long run (Harris and Gurel, 1986). The permanent effect is explained by the imperfect-substitute hypothesis, which assumes that there would be no price reversal, as the new price reflects changes in the distribution of security holdings in equilibrium[5].

Information-based explanations include the information hypothesis and the liquidity hypothesis. Unlike the demand-based explanations, information-based explanations assume that index changes are not information-free events. Some studies, such those by Dhillon and Johnson (1991) and Jain (1987), support the information hypothesis: they showed that the addition of a stock to the index conveys favorable news about the firm's prospects and a permanent price increase can result following this event. Amihud and Mendelson (1986), Beneish and Whaley (1996), and Hegde and McDermott (2003) contended that the price reactions can be explained by changes in market liquidity. According to the liquidity hypothesis, the price increase at index inclusion is caused by the increased liquidity due to the greater visibility of the shares, greater interest from institutional investors, higher trading volume, and lower bid–ask spreads. Amihud and Mendelson (1986) suggested that the increase in stock liquidity is positively related to the firm's value through a reduction in the cost of capital. Previous studies, such as Harris and Gurel (1986), and Hegde and McDermott (2003) reported liquidity increases following index additions.

The topic of Shariah-compliant index revision is important from two perspectives. First, the nature of companies' activities and their capital structure makes them Shariah compatible in the first place. Second, changes in investors' demand result in subsequent market price reactions, according to our earlier discussion. For example, reduction in the level of debt in the capital structure can make a company Shariah-compliant, bringing about an increase in the demand from Muslims and higher share prices if demand is not fully elastic. At the same time, the lower level of debt may move the capital structure of the company to a suboptimal level, at a higher cost of capital than in equilibrium. This may send negative signals to the market when shares are added to a Shariah-compliant index. As a result, it is possible that the interaction of opposing market forces on index revision will bring about different outcomes compared with the effects of conventional index additions. Therefore, it is not possible to predict clearly how the performance and liquidity of shares included in or excluded from the DJIM index will change, as it largely depends on how the net effects of the influential factors are revealed through our empirical investigation.

3. Data and Methodology

3.1 Data

The data used in the present study were sourced from DJIM Indexes and DataStream. Data series consisting of daily stock prices, market index time series, bid and ask prices, and volume of trade was collected from DataStream. The rest of the data, such as the announcement dates of the additions, were collected from DJIM Indexes.

Our sample consists of 25 Egyptian and 9 Jordanian companies added to the DJIM index between January 2008 and December 2009. We used the following criteria to select our samples.

- The firms were not involved in a merger or an acquisition event that led to their addition to the DJIM Index.
- The firms' stocks did not split during the study period.
- The firms were not excluded for reasons such as unstable income, low profitability, and involvement in a merger or acquisition.
- The firms had historical data available for a period commencing 150 trading days before and ending 150 trading days after the announcement date.

3.2 Methodology

To determine the impact of additions to the DJIM index, we apply several measures of both short and long-term price and liquidity performance. We use standard event-study methodology to find the initial stock price reaction of firms when an announcement of an index change is made. We also use several liquidity proxies, including the bid–ask spread, volume of trade, volatility, and Amivest liquidity ratio to estimate changes in the liquidity of stocks following index addition.

3.2.1 Price Effect

To estimate abnormal share price returns, an event study methodology was applied. The estimated abnormal return is the difference between the realized return observed from the market and the benchmark return. The return to the market portfolio is estimated via both ordinary least square (OLS) and Scholes and Williams (1977) procedures. The latter method is usually used when stocks do not trade at the same level of frequency as the market index and OLS may produce biased beta estimates. This problem is exacerbated for infrequently or thinly traded stocks as the sampling interval is reduced[6]. The advantages of these models are that they control for the effect of market movements through the market portfolio, and also allow for an individual security's responsiveness as measured by beta. Return on share price index was used as a proxy for the market rate of return in each country.

Defining an event date is an important issue in event studies. We defined the event date as the day that a stock added to the DJIM index is announced. For each event, the return time series data are divided into an estimation period and an event window. The estimation time series data are used to calculate the benchmark parameters, and the event window period is used to compute prediction errors based on the estimated parameters. The abnormal returns are represented by the prediction errors. The abnormal returns over the event windows can be interpreted as a measure of the effect of the event on the value of the firms, which is reflected in their share price.

The length of the event window varies across prior studies. Dhillon and Johnson (1991) estimated the event window over the period starting 10 days before the event and ending 20 days after the event (represented as (–10, 20)). Harris and Gurel (1986) extended the post event window by 10 days (–10, 30). Shleifer (1986) has symmetric pre-event and post-event windows, which are 20 days before to 20 days after the event (–20, 20). Similar to Harris and Gurel (1986), we extend the event window from 10 days before, to 30 days after the event (–10, 30). The asymmetric event window was chosen to take into account the possibility of a slow reaction of the market to an event in developing countries.

The normal returns of stocks are the expected returns if there are no events. They are estimated over a period outside the event window (Peterson, 1989). For applications in which the determinants of the normal return are expected to change due to the event, the estimation period can fall on both sides of the event window. This period commences 125 trading days before and ends 125 trading days after the announcement dates, excluding the event period (–10, 30). As a result, the estimation period consists of the periods (–125, –11) and (26, 125). To avoid biasing the parameter estimates in the direction of the event effect, we did not allow the event period to overlap with the estimation period.

The following section describes the event study methodology that we used in our study. MacKinlay (1997), and Kothari and Warner (2004) have provided a survey of event study methods, and we follow their papers to describe the models here.

We define the market model we used in our study according to the following equation:

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

where:

- R_{it} is the return on firm *i* at time *t*.
- R_{mt} is the corresponding return on the S&P CITIC 300 Index at time *t*.
- α_i is the intercept term.
- β_i is a parameter that measures the sensitivity of R_{it} to the market index.
- ε_{it} is a random variable that by construction has an expected value of zero, and is assumed to be uncorrelated with R_{mt}.

Beta for the Scholes and Williams (1977) model was estimated as follows:

$$\hat{\beta}_j^* = \frac{\hat{\beta}_j^- + \hat{\beta}_j + \hat{\beta}_j^+}{1 + 2\hat{\rho}_m} \qquad (2)$$

where:

- $\hat{\beta}_j^-$ is the OLS slope estimate from the simple linear regression of R_{jt} on R_{mt-1}.
- $\hat{\beta}_j^+$ is the OLS estimate from the regression of R_{it} on R_{mt+1}.
- $\hat{\rho}_m$ is the estimated first-order autocorrelation of R_m.

As in OLS, the intercept estimator forces the estimated regression line through the sample mean:

$$\hat{\alpha}_j^* = \overline{R_{jEst}} - \hat{\beta}_j^* \overline{R_{mEst}}. \qquad (3)$$

where:

- $\overline{R_j}$ is the mean return of stock *j* over the estimation period,

- $\overline{R_{mEst}}$: is the mean market return over the estimation period.

Using the estimates from equation (1), the abnormal returns of each security over a test period were estimated according to the following relationship:

$$AR_{it} = R_{it} - \hat{\alpha}_i + \hat{\beta}_i R_{mt} \qquad (4)$$

where the coefficients $\hat{\alpha}_i$ and $\hat{\beta}_i$ are ordinary least squares estimates of α_i and β_i.

In addition, the average abnormal return (or average prediction error) AAR_t was calculated.

The daily abnormal returns were averaged using the below formula:

$$AAR_T = \frac{\sum_{j=1}^{N} A_{jt}}{N} \qquad (5)$$

where *T* is defined as the trading days before the event date.

Over an interval of two or more trading days beginning with day T_1, and ending with day T_2, the cumulative average abnormal return is as follows:

$$CAAR_{T_1,T_2} = \frac{1}{N}\sum_{j=1}^{N}\sum_{t=T_1}^{T_2} A_{jt} \qquad (6)$$

For each day in the event period, the cross-sectional variance of the standardized abnormal return is then calculated as follows:

$$S^2_{SAR_T} = \frac{1}{N-1}\sum_{i=1}^{N}\left(SAR_{it} - \frac{1}{N}\sum_{j=1}^{N} SAR_{jt}\right)^2 \qquad (7)$$

The standardized cross-sectional test statistic is thus:

$$Z_T = \frac{TSAR_t}{N^{\frac{1}{2}}\ S_{SAR_t}} \qquad (8)$$

The individual standardized cross-sectional test for market-model abnormal returns is reported to perform well even if there is an increase in the variance within the event period, and the sample contains small and thinly traded companies (Boehmer and Poulsen, 1991)[7].

A major challenge in event-study research is associated with the size of the data sample from which evidence can be presented in support of some hypothesis. MacKinlay (1997) suggested that a small sample will detect sufficiently large abnormal returns in an event study. However, the test statistics of these returns can be sensitive to the sample size, and the small-sample properties of the test statistics must be carefully considered. According to Brown and Warner (1985), a sample size of at least 50 securities makes the mean abnormal return distribution close to normal, and the standard parametric tests (relying on the normality assumption) are well specified. For samples of 5–20 securities, the goodness of fit tests do not indicate misspecification. However, the degree of skewness and kurtosis in the test statistics is higher than for samples of 50 (Brown and Warner, 1985). This can impact the level of the statistical significance of parametric *t*-statistics. Since the sample sizes for countries in our study are very small (9 and 29), nonnormality in the distribution of abnormal returns can prevail, affecting our test statistics. McWilliams and Siegel (1997) suggest using nonparametric tests, such as the binomial *Z* statistic, or the Wilcoxon signed rank test instead of parametric tests to solve this problem. In the present study, we estimate the nonparametric generalized sign test in conjunction with parametric *t*-statistics to check the robustness of the conclusions based on the above tests.

In addition to the short-term analysis, the long-term market price performance of added companies was also calculated and compared with the market performance. We estimate cumulative returns for the period (–10, 150) for a portfolio of added firms compared with the market as a whole.

3.2.2 Liquidity Effect

Market liquidity is an elusive concept and difficult to measure. In this study, we use four proxies to evaluate changes in market liquidity during post-event periods compared with the corresponding control periods. A higher number of tests help to assert the robustness of our findings and reduce the chance of making wrong inferences.

These liquidity proxies include the following. 1) Percentage spread, as the quoted spread normalized by the midpoint of the bid and ask prices. 2) Changes in the volume of trade as the daily average of the transaction size, normalized on the average volume of trade in the control period. 3) Changes in volatility, measured by the standard deviation of returns. 4) The Amivest liquidity ratio, as the average ratio of share volume to absolute return over all days with nonzero returns. This ratio measures the ability of a share to absorb changes in trading volume without any significant change in share price.

In calculating the percentage bid–ask spread and changes in the volume of trade, we largely follow Hegde and McDermott (2003). Changes in the volume of trade are directly related to market liquidity, and changes in the bid–ask spreads and volatility are inversely related to market liquidity. It is important to note that an increase in volume accompanied by an increase in volatility can actually impede market liquidity. The Amivest liquidity ratio is estimated according to Amihud (2002). Changes in this variable are directly related to the liquidity.

To extend our study of liquidity changes from short to long term, we estimate the liquidity proxy coefficients for several intervals, including (1, 25), (1, 50), (1, 100), and (1, 150), compared with the corresponding control periods of (–35, –10), (–60, –10), (–110, –10), and (–160, –10), respectively, where day 0 is the day on which the addition is announced. Mean difference represents the difference between average liquidity measures in each interval and that in the corresponding interval in the control period.

4. Results

In light of the insights we developed in previous sections, we applied a number of tests for the evidence of abnormal returns and change in liquidity as a result of DJIM index additions. Four of these tests are relevant to abnormal returns, and four to the changes in the liquidity proxies. Our findings have certain implications for the EMH, which predicts that stock prices reflect all publicly available information and market prices represent the fair value of the shares.

4.1 Price Effects

Table 1 and Table 2 present cumulative abnormal returns (CARs) for the firms added to the DJIM index. To test the robustness of our findings, we have used both the single-factor and Scholes–Williams market models as the benchmark for estimating normal return. Our results show that the magnitudes of CARs and the levels of their statistical significance from the application of the two methods are similar. Nevertheless, we report and discuss the results from the Scholes–Williams model to avoid asynchronous trading bias, as a considerable proportion of the shares included in this study are likely to trade less frequently. We discuss the significance of CARs according to the estimated parametric *t*-statistics, then apply nonparametric tests to investigate the robustness of our parametric tests due to the small sample of our data.

Table1: Cumulative Abnormal Returns and Relevant Statistics for Stock Additions to the DJIM Index				
This table presents the cumulative abnormal returns (CARs) around the index addition for the 25 Egyptian firms in our sample. Results are presented for the windows (–10, 0), (–5, 0), (0, 0), (0, +5), (0, 15), and (0, 30), where day 0 represents the addition date. The Generalized Sign *Z*-test is a test with the null hypothesis that the fraction of positive cumulative returns is the same as in the estimation period. The Positive/Negative column reflects how many firms had positive cumulative abnormal returns in the window. The symbols $, *, **, and *** denote statistical significance at the 10%, 5%, 1% and 0.1% levels, respectively, using a 1-tail test. The symbols), >, etc., correspond to $,* and show the significance and direction of the Generalized Sign-*Z* test.				
Scholes–Williams Market Model				
Intervals	**MCARs**	***t*-Statistics**	**Generalized Sign *Z*-test**	**Positive/ Negative**
(–10, 0)	1.71%	1.12	1.15	15/10
(–5, 0)	2.41%	1.75*	1.55$	16/9)
(0, 0)	2.85%	6.36***	4.35***	23/2 >>>
(0, +5)	3.44%	2.63**	2.74**	19/6 >>
(0, +15)	2.69%	1.72*	2.35**	18/7 >>
(0, +30)	6.31%	2.69**	1.95*	17/8 >

Table 1 presents the estimated CARs for index additions in the pre- and post-event periods for Egypt. The coefficient for CARs, accumulated during the period (–10, 0), is –1.71%. However, it is not statistically significant at the conventional levels. The CARs coefficient estimated over the shorter period (–5, 0) increases to 2.41% and becomes statistically significant at the 0.05 level. CARs coefficients for Day 0 (the event day) and for (0, 5) increase further to 2.85% and 3.44%, respectively, and become highly significant at the 0.01 level. CARs for (0, 15) drop to 2.69% and remain statistically significant at the 0.01 level. CAR coefficients increase further to 6.31% during (0, 30) and remain statistically significant at the 0.01 level.

Table 2 presents the estimated CARs for index addition in the pre- and post-event periods for Jordan. The coefficient for CARs, accumulated during (–10, 0) and (–5, 0) are 0.18% and –3.29%, respectively. However, they are not statistically significant at the conventional levels. The CARs coefficient for Day 0 is 4.00% and highly significant at the 0.001 level. For the post event period, CARs continuously increases and eventually reaches 11.83% during (0, 30). The *t*-statistics for this coefficient are highly significant at the 0.001 level.

The estimated coefficients for the generalized sign test in Tables 1 and 2 are consistent with the coefficients for *t*-statistics. The Positive/Negative column in these tables reflects the number of firms with positive cumulative abnormal returns relative to the number of firms with negative cumulative abnormal returns in the respective windows. The coefficients for these ratios correspond to CARs coefficients. Their level of significance and their direction also correspond to the level of significance and direction of the generalized sign test. Overall, the results from the nonparametric tests confirm that the results from the parametric tests are robust, and the small sample size is not an issue in this study.

Table2: Cumulative Abnormal Returns and Relevant Statistics for Stock Additions to the DJIM Index

This table presents the cumulative abnormal returns (CARs) around the index addition for the 9 Jordanian firms in our sample. Results are presented for the windows (–10, 0), (–5, 0), (0, 0), (0, +5), (0, 15), and (0, 30), where day 0 represents the addition date. The Generalized Sign *Z*-test is a test with the null hypothesis that the fraction of positive cumulative returns is the same as in the estimation period. The Positive/Negative column reflects how many firms had positive cumulative abnormal returns in the window. The symbols $, *, **, and *** denote statistical significance at the 10%, 5%, 1% and 0.1% levels, respectively, using a 1-tail test. The symbols), >, etc., correspond to $,* and show the significance and direction of the Generalized Sign-*Z* test.

Scholes–Williams Market Model				
Intervals	**MCARs**	***t*-Statistics**	**Generalized sign *Z*-test**	**Negative/ Positive**
(–10, 0)	0.18%	0.07	0.26	5/4
(–5, 0)	–3.29%	–1.25	–1.07	3/6
(0, 0)	4.00%	6.13***	2.92**	9/0>>
(0, +5)	4.07%	2.67**	2.26**	8/1>
(0, +15)	6.71%	1.84**	2.26**	8/1>
(0, +30)	11.83%	3.39***	2.26*	8/1>

The prolonged effects of the index additions on CARs in Table 1 and Table 2 indicate that these events are likely to contain information, thus sending signals about the features of the index additions to the market. To test this hypothesis, we compared the cumulative returns (CRs) for the added firms with the cumulative return for the market over the period (–10, 150)[8].

Figure1 through Figure 4 provide long-term evidence of market reaction to the index addition for both countries included in this study.

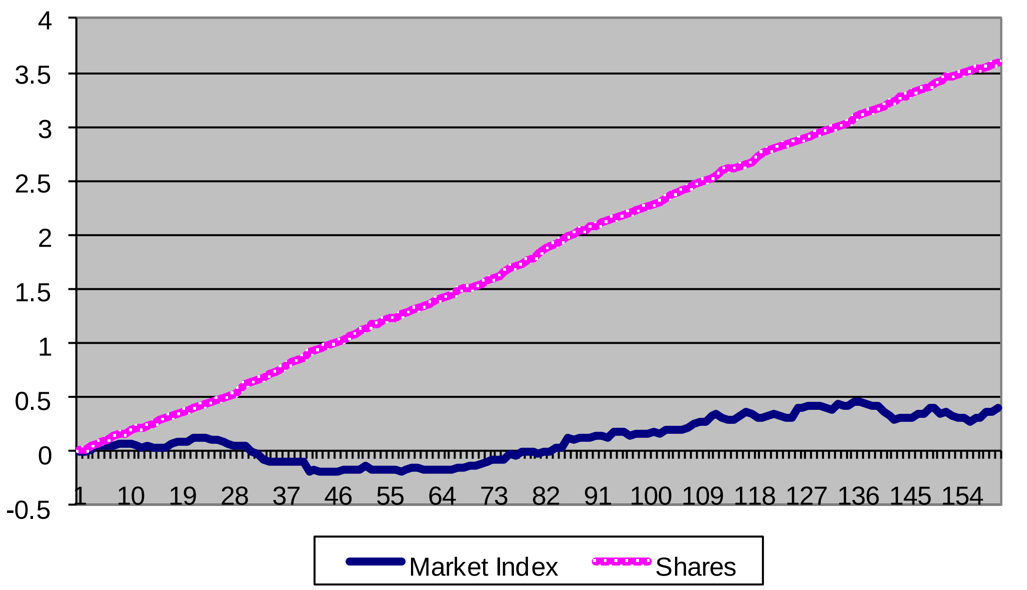

Figure 1 - Cumulative Firm Return and Market Return Around Day -10 to Day 150 Egyptian Stocks Addition to DJIM Index

Figure 1 illustrates CRs for the portfolio of added stocks, compared with the market CRs during (–10, 150) for Egypt, showing the shares' superior performance of 352% gain, compared with less than 48% for the market by Day 150. Figure 2 compares the performance of the same variables on a risk-adjusted basis, calculated using the Sharpe Ratio. According to this figure, the Sharpe Ratio for the shares shows a value of 34 compared with a ratio of 1.4 for the market.

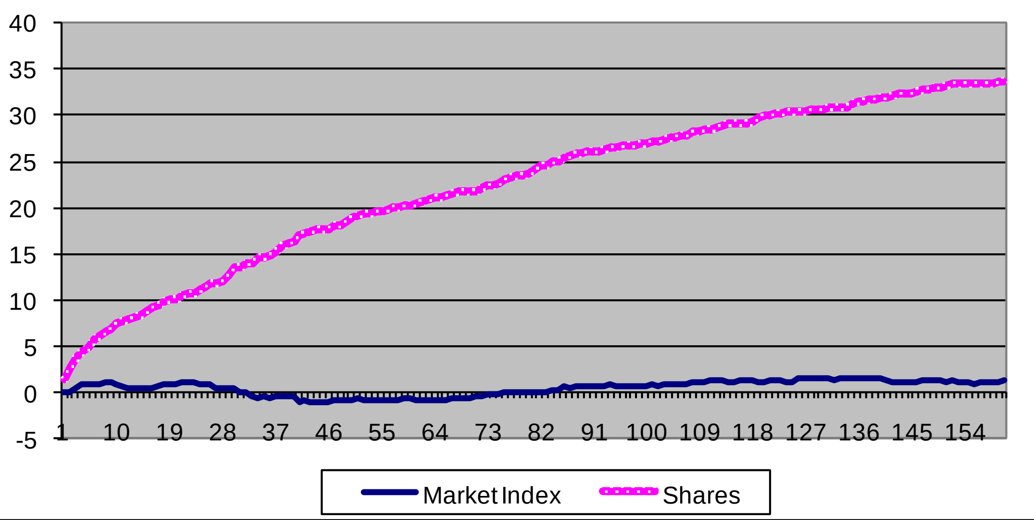

Figure 2 - Risk Adjusted Cumulative Firm Return and Market Return Around Day -10 to Day 150 Egyptian Stocks Addition to DJIM Index

Figure 3 - Cumulative Firm Return and Market Return Around Day -10 to Day 150 Jordanian Stocks Addition to DJIM Index

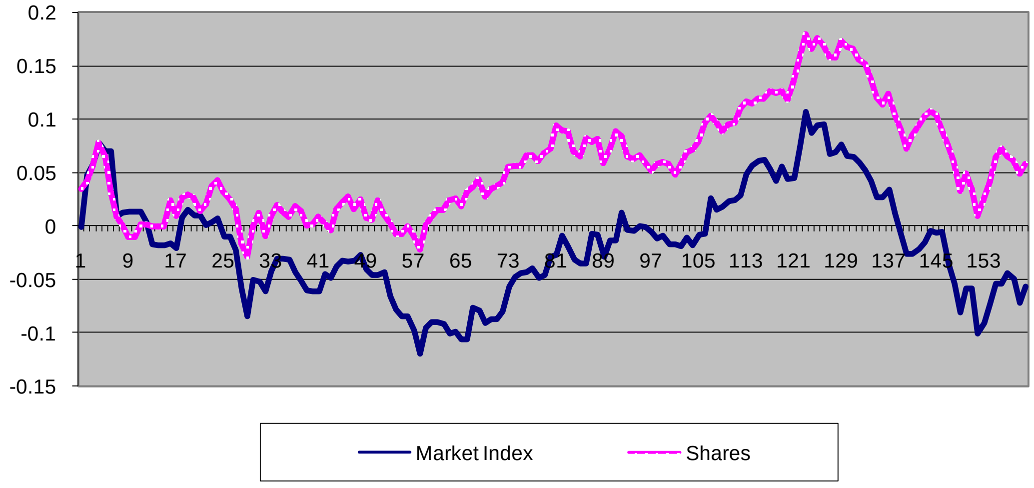

Figure 4 - Risk Adjusted Cumulative Firm Return and Market Return Around Day -10 to Day 150 Jordanian Stocks Addition to DJIM Index

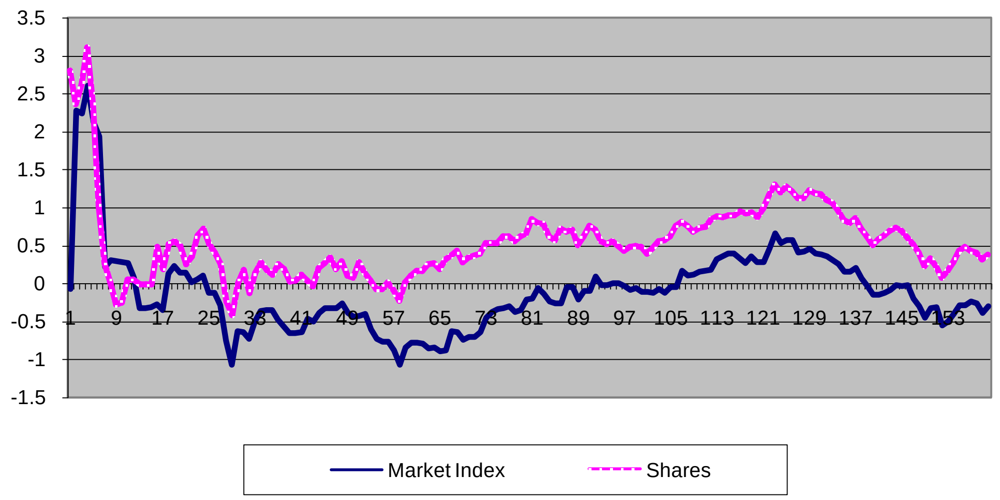

Figure 3 and Figure 4 provide long-term evidence of market reactions to the index addition for Jordan over (–10, 150). According to Figure 3, CRs for the portfolio of added shares reach 5.8%, compared with the market CRs of –5.7%, demonstrating the shares' superior performance by Day 150. Figure 4 compares the performance of the same variables on a risk-adjusted basis. According to this figure, the Sharpe Ratio for the market shows a value of –0.31 compared with a ratio of 0.37 for the shares.

An examination of estimated CARs in Tables 1 and 2 and Figure 1 through Figure 4 shows that the reaction of the stock markets to the index addition of Shariah-compliant shares is positive in the short and the long term. However, it varies in magnitude between the two countries. While the stock market reaction to the index in Egypt is more positive in the long term than in the short term, the Jordanian market shows a more significant positive reaction to the event in the short term than in the long term.

4.2 Liquidity Effects

In this section, we examine the liquidity effects of additions to the DJIM index. Tests were extended to different intervals to distinguish between the short- and long-term effects of the events. According to Amihud (2002), liquidity shocks and return shocks are positively correlated. Therefore, the examination of liquidity changes in this section should be considered as a complement to the findings of price effect analysis in the previous section.

Table 3: Measures of liquidity changes from pre- to post-stock additions to the DJIM Index				
This table presents the change of a variety of liquidity measures around the index addition day for an equally weighted portfolio of 25 Egyptian firms in our sample. Results are presented for the windows (1, 25), (1, 50), (1, 100), and (1, 150), compared with the control periods (–35, –10), (–60, –10), (–110, –10), and (–160, –10), respectively. The bid–ask mean difference represents the difference between average liquidity measures in each interval compared with the corresponding interval in the control period. The symbols $, *, **, and *** denote statistical significance at the 10%, 5%, 1%, and 0.1% levels, respectively, using a 1-tail test.				
Intervals / Liquidity measures	**(1, 25) vs (–35, –10)**	**(1, 50) vs (–60, –10)**	**(1, 100) vs (–110, –10)**	**(1, 150) vs (–160, –10)**
Standard Deviation (SD)	1.05%	0.85%	0.89%	0.85%
SD (control period)	1.49%	2.56%	2.05%	1.80%
SD change	**–0.44%**	**–1.71%*****	**–1.16%*****	**–0.95%*****
Relative bid–ask spread	1.53%	1.36%	1.35%	1.36%
Relative bid–ask spread (control period)	0.80%	0.71%	0.55%	0.45%
Bid–ask mean difference	**0.73%**	**0.65%**	**0.80%**	**0.91%**
Average daily volume	40.24	53.97	130.73	202.37
Average daily volume (control period)	25	50	100	150
Average daily volume change	**60.95%***	**7.94%**	**30.73%****	**34.91%*****
Amivest liquidity measure	13.85	13.84	13.68	13.69
Amivest liquidity measure (Control period)	13.29	13.32	13.81	13.88
Amivest liquidity measure change	**0.56*****	**0.52*****	**–0.13$**	**–0.19****

Table 3 provides evidence of changes in liquidity measures for Egypt. The results show a decline in the standard deviation of returns between 0.95% and 1.71%, accompanied by an increase in the volume of trade from 30.73% to 60.95%. Amivest liquidity measure changes also suggest an increase in the market liquidity over the short to medium term and a decline over the medium to long term. The coefficients for changes in the bid–ask spread are positive; however, they are not statistically significant. Overall, there is more evidence for improvement in the liquidity of the Egyptian stock market than for decline.

According to the estimated liquidity measures in Table 4 for Jordan, the standard deviation of return for this country has dropped from 0.17% to 0.30% depending on the time interval. This is accompanied by an increase in the volume of trade from 6.74% to 222.84% in the medium or long terms. However, the volume of trade has dropped by 13.76% in the short term. The relative bid–ask spread has also declined between 1.17 to 2.16 basis points over the entire period (over the short or long term). The Amivest liquidity measure shows an improvement in liquidity in the short term, and a decline in liquidity in the long term. Since the majority of liquidity measures indicate improvement in market liquidity, we conclude that index addition has improved the liquidity of the stock market in Jordan.

Table 4: Measures of liquidity changes from pre- to post-stock additions to the DJIM Index

This table presents the change of a variety of liquidity measures around the index addition day for an equally weighted portfolio of 25 Egyptian firms in our sample. Results are presented for the windows (1, 25), (1, 50), (1, 100), and (1, 150), compared with the control periods (–35, –10), (–60, –10), (–110, –10), and (–160, –10), respectively. The bid–ask mean difference represents the difference between average liquidity measures in each interval compared with the corresponding interval in the control period. The symbols $, *, **, and *** denote statistical significance at the 10%, 5%, 1%, and 0.1% levels, respectively, using a 1-tail test.

Intervals / Liquidity measures	(1, 25) vs (–35, –10)	(1, 50) vs (–60, –10)	(1, 100) vs (–110, –10)	(1, 150) vs (–160, –10)
Standard Deviation (SD)	1.05%	0.85%	0.89%	0.85%
SD (control period)	1.49%	2.56%	2.05%	1.80%
SD change	**–0.44%**	**–1.71%*** **	**–1.16%*** **	**–0.95%*** **
Relative bid–ask spread	1.53%	1.36%	1.35%	1.36%
Relative bid–ask spread (control period)	0.80%	0.71%	0.55%	0.45%
Bid–ask mean difference	**0.73%**	**0.65%**	**0.80%**	**0.91%**
Average daily volume	40.24	53.97	130.73	202.37
Average daily volume (control period)	25	50	100	150
Average daily volume change	**60.95%***	**7.94%**	**30.73%** **	**34.91%*** **
Amivest liquidity measure	13.85	13.84	13.68	13.69
Amivest liquidity measure (Control period)	13.29	13.32	13.81	13.88
Amivest liquidity measure change	**0.56*** **	**0.52*** **	**–0.13$**	**–0.19** **

5. Concluding Remarks

This paper investigates the impacts of index additions on the return and liquidity of Shariah-compliant shares in Egypt and Jordan. We used the sample of companies added to Dow Jones Islamic Market Index over the period of January 2008–December 2009. An event study methodology was applied to estimate cumulative abnormal returns in the days surrounding the event for testing the price effect. We used several liquidity measures; including the bid–ask spread, the Amivest liquidity ratio, standard deviation of returns, and volume of trade to estimate changes in the liquidity of the added shares. Consistent with the findings of index revision studies from developed countries, our results show that stock prices respond positively to index additions for both of the countries in our samples. Furthermore, our study provides evidence in support of short and long-term increases in the returns and liquidity of added shares. These results are consistent with the findings from conventional index revision studies. However, they contradict an empirical investigation of Shariah-compliant index revision in Australia by Sadeghi (2010). They also contradict the study by Chakrabarti et al. (2002) for 12 developing countries, showing a decline in market liquidity. Hacibedel and Bommel (2006) also found that “the liquidity analysis results do not support the liquidity hypothesis for explaining the permanent price impact" of stock additions to the Morgan Stanley Capital International Emerging Market Index for 24 countries. These findings have important implications for Shariah-compliant investors, as they show that companies whose activities reflect the beliefs and ethos of their investors in the Middle East are also attractive investments.

The possible reasons behind some of the mixed results for liquidity effects include the small data samples, clustering problems, and adverse information effects. For instance, liquidity suppliers may revise their bid–ask spreads upwards following index addition due to increases in adverse selection cost. There is also evidence that an increase in volume of trade, implying improvement in liquidity, may be accompanied by an increase in the standard deviation of returns, suggesting a decline in liquidity for some time intervals in our research. An obvious limitation of this study is that it was carried on a relatively small sample of stocks added to the DJIM Index. As a result, our findings should not be freely generalized.

Endnotes

[1] Price Waterhouse 2009 Report on Shariah-compliant funds.
[2] Islamic jurisprudence.
[3] Price Waterhouse 2009 Report.
[4] Socially responsible fixed-income securities are found in conventional financial markets, while, at least in theory, they are banned by Shariah.
[5] Refer to Beneish and Whaley (1996), Lynch and Mendenhall (1997), Kaul et al. (2000), and Wurgler and Zhuravskaya (2002) for more details.
[6] The frequency of trading declines with the reduction in the sampling interval.
[7] Index changes may result in an increase in the volume of trade, leading to an increase in return volatility.
[8] We believe that if index inclusion contains information, this information must have been reflected in share prices earlier than the event day and should extend for some time afterwards. As a result, we have used a sample of data that extends from 10 days before to 150 days after the event.

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