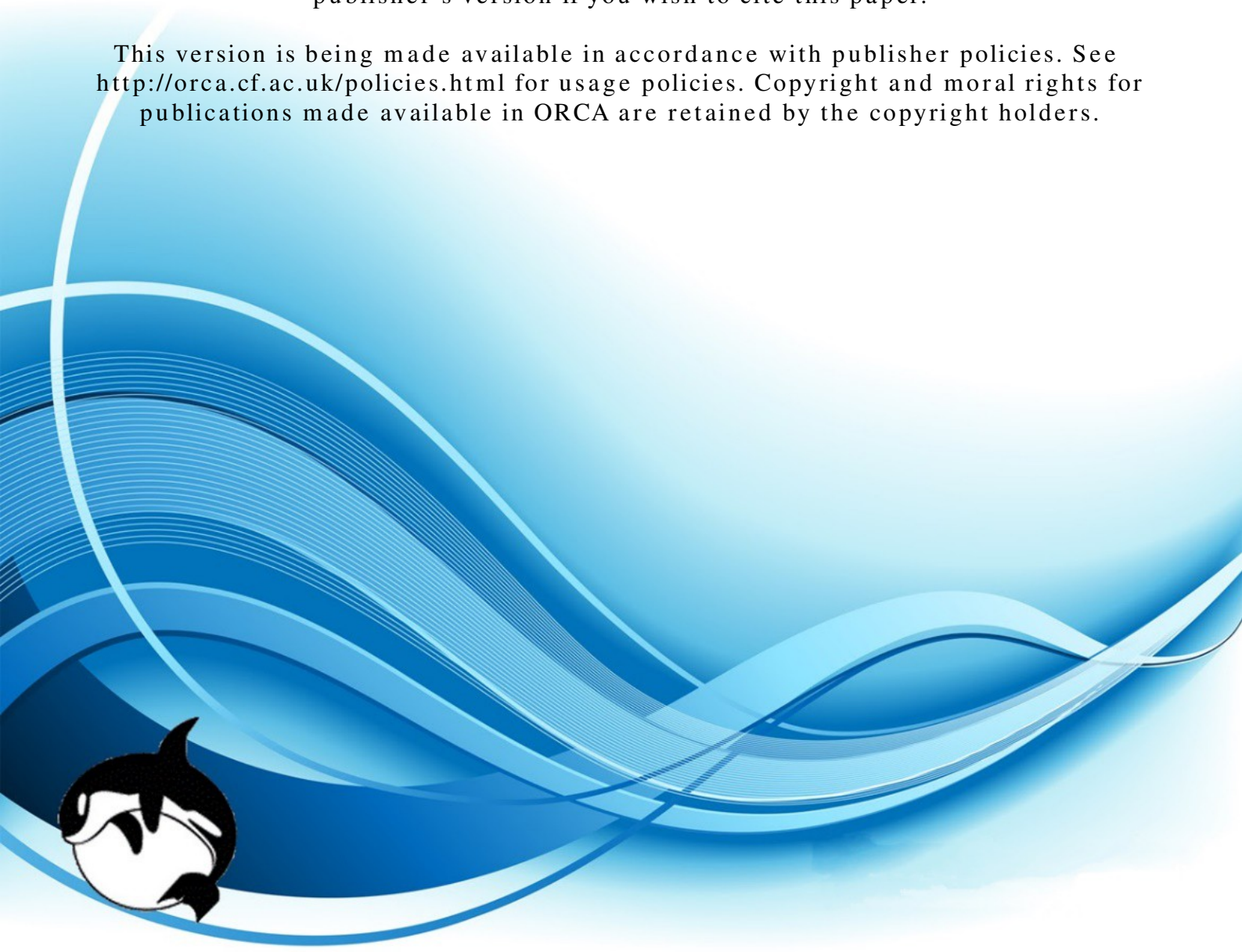

Price reaction of ethically screened stocks: A study of the Dow Jones Islamic Market World Index

Mohamed Abdul[a], Khelifa Mazouz[b], Brahim Saadouni[c,*]

[a] *Cranfield School of Management, Cranfield University*
[b] *Cardiff Business School, Cardiff University*
[c] *Alliance Manchester Business School, The University of Manchester*

Abstract

This paper investigates the short-term effects on the price of the ethically screened stocks of the Dow Jones Islamic Market World Index (DJIMWI) quarterly revisions. Using a sample of 8,250 stocks from May 1999 through June 2012, we find a significant price reaction of the ethically screened stocks following additions and deletions. The results show that additions (deletions) from emerging stock markets tend to experience a greater and significantly positive (negative) price response than additions (deletions) from the developed markets. Further tests reveal that the price reactions following DJIMWI revisions are likely to be driven by shifts in investor sentiment rather than changes in firm fundamentals.

[*] **Corresponding author:** brahim.saadouni@manchester.ac.uk

1. Introduction

Socially responsible investment (SRI) has become a major investment vehicle within the fund management industry over the past few decades. In addition to the conventional financial characteristics, such as risk and return, SRIs consider a corporation's relationship with society and its ethical principles as an integral part of the investment decision making (Nainggolan et al., 2015). One of the most controversial issues surrounding SRIs is whether the selection of investments based on ethical and social performance criteria has a bearing on the wealth maximisation objective of investors. To address this issue, most existing studies focus on comparing the financial performance of ethically screened funds to their conventional counterparts (see, e.g., Mallin et al., 1995; Renneboog et al., 2008; Abdelsalam et al., 2014). Unfortunately, however, the results to date have been mixed. Some studies show that ethical funds have underperformed both non-ethical funds and the market in general (Mallin et al., 1995). Others find that ethical funds outperform conventional funds during crisis periods, but underperform them in non-crisis periods (Nofsinger and Varma, 2014), and still others report no significant difference between the performance of SRI funds and conventional funds (Leite and Ceu Cortez, 2014).

In this study, we investigate the performance consequences of ethical outlays from a different perspective. Our analysis focuses on the stock market reactions to the Dow Jones Islamic Market World Index (DJIMWI) quarterly revisions. The DJIMWI is an ethical index which screens its investments for adherence to Islamic law. Its screening criteria are bound by well-defined religious guidelines, which help funds avoid investing in firms that engage in *haram*, *riba*, *maysir,* or *gharar* activities[1]. For instance, companies whose core business involves alcohol, conventional financial services, entertainment, pork-related products, tobacco or weapons are excluded from the index. Furthermore, companies with a debt level of more than one third of their market capitalisation are excluded (Hussein and Omran, 2005). Because of these stringent criteria, examining the price reactions to the DJIMWI quarterly revisions should shed light on whether the market places substance on companies' commitment to ethics and compliance with Shari'ah principles. Furthermore, investigating the changes in the return comovement structure around revision events should help us understand whether the price reaction is due to changes in firms' fundamentals or shifts in investor sentiment.

Our analysis is based on a sample of 8,250 companies (4,378 additions and 3,872 deletions) from 18 countries from May 1999 through June 2012 and yields several interesting

[1] Haram, riba, maysi and gharar are the Arabic words for sin, interest, gambling, speculation and uncertainty, respectively.

findings. First, we report significantly positive (negative) abnormal returns following additions to (deletions from) the DJIMWI. This suggests that investors perceive adherence to Islamic law as good news. This evidence contradicts the neo-classical view that ethical screening inhibits the wealth maximisation of investors (Luther et al., 1994) and supports the alternative view that ethical screening is unlikely to be costly as it is a form of behaviour that does not restrict itself to a particular grouping (Cullis et al., 1992). Second, we find that the market reactions to the DJIMWI revision announcements are significant and particularly strong for event stocks that are listed in developing stock markets. While, in theory, the DJIMWI selection criteria are based on publicly available information, investors' access to such information may depend on the disclosure and regulatory requirements of the exchange in which the event firm is listed. Companies listed in developed countries with well-functioning stock markets are typically better known to investors and more likely to be followed by analysts than those listed in less developed markets. Thus, the DJIMWI revision announcements are more likely to surprise the market when an event stock is listed in a less developed country than in a more developed one. Finally, we report a significant increase (decrease) in the comovement of the newly added (deleted) stocks with the existing constituents of the DJIMWI after controlling for changes in firms' fundamentals, including size, book to market, leverage and return on equity. This finding suggests the comovement is likely to reflect the common sentiment of ethical investors rather than changes in firms' fundamentals.

Our study makes three important contributions to the literature. First, we provide multi-country analysis of the price reactions to additions to and deletions from the DJIMWI, an ethical index which screens its investments for adherence to Islamic law. Although Islamic financial services have attracted the attention of academics, existing studies focus mainly on comparing the performance of Islamic funds to that of conventional funds and other benchmarks. Similar to other ethical funds, the results on the performance of Shari'ah-compliant funds have been mixed. For example, Nainggolan, How and Verhoeven (2015) document that Islamic equity funds underperform conventional funds by about 4.8% per annum, and Ashraf (2014) finds that the performance of Islamic equity indices is not significantly different from their conventional counterparts, while Annuar et al. (1997) show that Shari'ah-compliant funds outperform the market index. This study contributes to literature by using market reactions around ethical index revision events as an alternative approach to investigate the value relevance of ethical screening. The significantly positive (negative) abnormal returns associated with additions to (deletions from) the DJIMWI suggests that investors perceive ethical screening as a source of value creation.

Second, we identify ethical screening as a new source of stock return comovement. Several studies use additions to major market indices, such as the S&P 500 (e.g. Barberis et al., 2005; Vijh, 1994) and FTSE 100 (e.g. Coakley and Kougoulis, 2004; Mase, 2007), to study stock return comovement. They argue that since these revision events are information free, any change in the comovement structure in the post-revision periods should be attributed to investor sentiment. However, one major weakness of these studies is that the revision events associated with the major indices may not be entirely information free (e.g. Cai, 2007; Kaul et al., 2000; Brisker et al., 2013). The DJIMWI revisions, which are based on well-defined, publicly available, religious guidelines, provide an ideal context for testing the role of ethical investor sentiment in stock returns. We attribute the significant increase (decrease) in the return comovement following additions to (deletions from) the DJIMWI to the trading behaviour of ethical investors who share common sentiment.

Finally, we show that the market reactions to the DJIMWI revisions depend on the level of development of the event stock's country of origin. The effect of financial market development on stock price behaviour has been widely documented. For instance, Lasfer et al. (2003) show that stocks in more developed markets adjust quickly to large shocks. Titman et al. (2013) and Watanabe et al. (2013) find that the anomalous relationship between asset growth and subsequent returns is stronger in less developed markets. We contribute to this strand of the literature by analysing the relationship between development of the financial market and the price reaction to the ethically screened stocks. We find that investors from less developed markets react more strongly to the DJIMWI revisions than their counterparts from developed stock markets. This suggests the speed of price adjustment to ethical news depends largely on the level of stock market development.

The paper is organised as follows: Section 2 reviews the literature, while methodology and data are discussed in Sections 3 and 4, respectively. Results and analysis are presented in Section 5 and Section 6 concludes.

2. Literature review

One of the recent innovations and/or developments in finance is the rise of Islamic financial services around the world. McKinsey Management Consulting documents that "Islamic finance is the new force in the financial market". Many financial institutions such as Citibank, Barclays, Morgan Stanley, Merrill Lynch and HSBC sell Islamic financial products (Hassan and Girard, 2008), with the total value of Shari'ah-compliant assets reaching $939 billion at start of 2011 (Walkshäusl and Lobe, 2012). The growth of Shari'ah-compliant

instruments has led major stocks exchanges, such as New York and London, to launch indices that track the performance of firms that conform to the Islamic investing rules. These Islamic indices represent a fairly homogenous class of ethical equity funds which screen their investments to rule out sinful stocks (e.g. alcohol, gambling and tobacco) and apply further financial ratio filters (e.g. such as gearing and interest paid and received) to comply with the Shari'ah rules[2].

The noticeable increase in ethical and Shari'ah-compliant securities has attracted considerable attention from in the literature. One of the most contentious issues is whether constraining investments by ethical and religious filters have a bearing on financial performance. Some argue that ethical screening reduces the investment universe available to investors and yields a mean-variance efficient frontier that is less optimal than the one available to the conventional investors (Nainggolan et al., 2014). However, others maintain that screening potential investment opportunities with both financial and ethical criteria makes positive social and economic contributions. By screening potential investments, ethical investors ensure that the investments they select are consistent with their personal values, raise awareness to firms that are not responsive to ethical concerns and put pressure on unresponsive firms to social and ethical concerns to change (Sauer, 1997). Further, a company that adopts and implements an effective corporate responsibility policy may be better positioned to avoid any environmental and social crises that could lead to reputation damage among other issues. Environmentally superior products can also contribute to the product differentiation and develop strength in customer's loyalty (Webley et al., 2001). Ethical behaviour may also help firms to attract and retain talented employees, cut recruitment costs and remain ahead of the competition (Renneboog et al., 2008).

Given the theoretical ambiguity of the impact of ethical screening on portfolio performance, several studies have attempted to address this issue empirically. A common approach in the empirical literature is to compare the performance of ethical and religious funds with that of their conventional counterparts. Unfortunately, evidence from these studies is also not conclusive. For example, Hussein and Omran (2005) find that Dow Jones Islamic indices outperform conventional ones, particularly during bull markets (January 1996 – March 2000). Similarly, Aka (2009) shows that the MSCI World Islamic index significantly outperformed the MSCI All World index by more than 15% in 2004-2009. He concludes that the main benefit of adherence to Shari'ah principles is that the returns on investment tend to

[2] See Section 4 for more details on the selection applied by the DJIMWI.

be subject to less volatility and are likely to be cushioned against large market swings relative to conventional indices. Al-Rifai (2012) also reports that, during the last financial crisis, the Dow Jones Islamic indices outperformed their conventional counterparts. This may be explained by the fact that Islamic indices exclude highly geared firms and tend to attach greater weight to sectors such as healthcare, oil and gas and technology. They also exclude sectors such as entertainment and financial services, which were highly affected in the last financial crisis. Ho et al. (2014) also find that 12 Islamic indices from 8 countries outperformed their comparable conventional indices during crisis periods but the findings for non-crisis periods are not conclusive. In contrast, Hakim and Rashidian (2002) find that the conventional Wilshire 5000 index outperformed the Dow Jones Islamic Market index and the two indices appear to be completely unrelated to each other over time. Albaity and Ahmad (2008) also report that the Kuala Lumpur Syariah index (KLSI) underperformed (though marginally) the Kuala Lumpur Composite index (KLCI) from April 1999 through December 2006. Dharani and Natarajan (2011) report that Indian Islamic indices (Nifty Shari'ah) do as well as their conventional counterparts (Nifty index). The lack of difference in performance between the two types of indices is also reported by Ashraf (2014) and Hassan and Girard (2011). Charles, Darne and Pop (2015) find that the Dow Jones Islamic Market index was affected by the global financial crisis of 2007-2008 in the same way as conventional indices.

In this study, we deviate from the existing literature by evaluating the value relevance of ethical screening around Islamic index revisions. Several hypotheses have been advanced in the literature to explain the price impact of additions and deletions on major stock market indices, such as the S&P 500 and FTSE 100. First is the downward-sloping demand hypothesis, which suggests that a company's inclusion in an index results in an increase in demand for its stock from index funds. This, in turn, leads to upward price pressure in both the short and long run (Shleifer, 1986; Lynch and Mendenhall, 1997). This hypothesis is supported by empirical studies that have, for example, examined the S&P 500 (Harris and Gurel, 1986; Chan et al., 2013) and the FTSE 100 index (Opong and Hamill, 2004; Mase, 2007). Second, the price pressure hypothesis posits that index funds execute sizeable trade orders (purchase-added and sell-deleted stocks) around index revisions. This causes the prices of the affected stocks to temporarily move away from their equilibrium (Harris and Gurel, 1986). Using data relating to the FTSE 100 index revisions for 1984-2003, Mazouz and Saadouni (2007a) provide evidence in support of the price pressure hypothesis. Third, the liquidity hypothesis suggests that the liquidity of the added (deleted) stocks will improve (deteriorate) as a result of the index revision. The reasoning behind this hypothesis is that

there will be greater scrutiny by investment analysts, the media and the managers of index funds. This should lead to a decline in information asymmetry, which in turn should result in a decline in the liquidity premium. The decline in the liquidity premium should lead to a positive (negative) price response of the added (deleted) stocks. This hypothesis is supported by empirical studies that have, for example, examined the S&P 500 (Becker-Blease and Paul, 2006) and the Dow Jones Index (Beneish and Gardner, 1995). Finally, the investor recognition hypothesis suggests that additions to a major index help to increase investors' awareness about the firm, lower its shadow cost and increase its price (Chen et al., 2004).

Some studies examine the change in the comovement structure around index revisions (e.g. Barberies et al., 2005; Mase, 2007; Claessens and Yafeh, 2012), while others investigate the stock price reactions (see Oberndorfer et al., 2013). Although all of these studies report increased (decreased) comovement between newly added (deleted) stocks and the rest of the index, the reasons for this effect are still being debated, with many alternative theories reported. Barberies et al. (2005) argue that if S&P 500 revisions are information-free events, comovement changes following additions to (deletions from) the indices are more likely to be driven by shifts in investor sentiment than changes in firm fundamentals. While our study also investigates the price reaction and the comovement changes around index revisions, it differs from previous studies in a number of ways. First, ethical screening by Islamic indices differs from the screening of conventional indices, such as the S&P 500 or FTSE 100, as the selection criteria are bound by well-defined religious guidelines. Thus, investigating the market reactions to DJIMWI index revisions contributes to our understanding of the value relevance of ethical investments. Second, the DJIMWI index revision is based on publicly available information, while the assumption that conventional index revisions contain no information about firms' fundamentals has been challenged (e.g. Denis et al., 2003; Cai, 2007). Thus, the DJIMWI provides an ideal setting to test the comovement theories in an environment in which index changes do not carry any news about fundamentals. Finally, the constituents of the DJIMWI are drawn from stock markets that vary in terms of development and regulatory regimes and this provides a unique opportunity to examine the relationship between development of the financial market and price reactions to ethical screening.

3. Methodology

The daily abnormal returns of the individual stock *i* in a country *j* around an addition or deletion event date is estimated using the following equation:

$$R_{i,j,t} = \alpha_i + \beta_b R_{m,j,t} + \beta_s SMB_{s,j,t} + \beta_h HML_{h,j,t} + \varepsilon_{i,j,t} \quad (1)$$

Equation (1) is estimated over a minimum 50-day window ending 16 days before the announcement date for each portfolio company in a country *j*. $R_{i,j,t}$ is the continuously compounded return adjusted for dividend for stock *i,* country *j* at time *t*; $R_{m,j,t}$ is the logarithmic return of the local market index in country *j* at time *t*; β_b is the market beta. $SMB_{s,j,t}$ is the difference between the excess return on a portfolio of small stocks and the excess return on a portfolio of big stocks in country *j* at time *t;* β_s is the SMB factor load. $HML_{h,j,t}$ is the difference between the excess return on a portfolio of high-book-to-market stocks and the excess return on a portfolio of low-book-to-market stocks in country *j* at time *t*, β_h is the HML factor, while $\varepsilon_{i,j,t}$ is the error term.

We construct proxies for SMB and HML to control for the size and growth when estimating the daily abnormal returns for each country in our sample. The SMB proxy is constructed as follows: First, we rank all stocks for each country's local index constituents by firm size. Second, we assign stocks to two portfolios; one portfolio contains the 50% of stocks with highest market capitalisation (Big (B)) and the other includes the 50% of stocks with the lowest market capitalisation (Small (S)). Third, we form three portfolios (i.e. low, medium and high) from the highest 50% and three from the lowest 50%. Finally, we calculate the SMB as the daily difference between three small stocks portfolios (i.e. lowest 50%) and three big stocks portfolios (i.e. highest 50%). For the HML proxy, we construct three portfolios (top 30%, middle 40% and bottom 30%) based on book to market. Next, we calculate the HML as the difference between two high-book-to-market stock portfolios and low-book-to-market stock portfolios.

Equation (1) is estimated using the standard GARCH (1, 1) framework to allow the variance of the residual term ($\varepsilon_{i,j,t}$) to be systematic over time. Several studies find that controlling for the heteroscedasticity in the residuals improves the market model parameter estimates and the power of the statistical tests (see, e.g., Corhay and Rad, 1996; Savickas, 2003; Hahn and Reyes, 2004). The conditional variance of $\varepsilon_{i,j,t}$ in Equation (1), $h_{i,j,t}$, is modelled as follows:

$$h_{i,j,t} = \varphi_{i,j} + \gamma_{i,j} \varepsilon^2_{i,j,t-1} + \lambda_{i,j} h_{i,j,t-1} \quad (2)$$

$\varphi_{i,j}$ is defined as the permanent component of the conditional variance; $\gamma_{i,j}$ is the ARCH term and can be interpreted as information about the volatility observed from the previous period;

$\lambda_{i,j}$ is the GARCH term, which is the forecast variance from the last period or the impact of the old news on today's volatility.

The price reaction to additions (deletions) is measured using the average abnormal returns (AR_t) on a given day *t* and the cumulative abnormal return (CAR_s) over a window of *s* days, specified as follows:

$$AR_t = \left[\sum_{i=1}^{N} AR_{i,t}\right] / N \text{ and } CAR_s = \sum_{i=1}^{s} AR_t$$

where *N* is the number of stocks included in the analysis and *s* is the length of a given event window. The t-test is used to test whether CAR_s are statistically different from zero. We use Savickas's (2003) GARCH-based statistic to test whether the average daily abnormal returns differ significantly from zero. The test statistic is an attractive alternative to the PATELL test. Using simulation, Kolari and Pynnonen (2010) show that the PATELL test is not appropriate unless adjusted for cross-correlation. The GARCH-based statistic is described as follows:

$$\text{GARCH} - \text{test} = \frac{\sum_{i=1}^{N} \frac{S_{i,t}}{N}}{\sqrt{\left(\frac{1}{N(N-1)}\right)\cdot\sum_{i=1}^{N}\left(S_{i,t} - \sum_{i=1}^{N}\frac{S_{i,t}}{N}\right)^2}} \text{ and } S_{i,t} = \frac{AR_t}{\sqrt{\hat{h}_{i,j,t}}}$$

The GARCH test follows student's t distribution with *N-1* degrees of freedom. The GARCH-based statistic measures whether the average abnormal return observed over a window of length *s* is statistically significant[3].

Next we examine the comovements of the stocks that are added to or deleted from the DJIMWI. Consistent with Barberis et al. (2005), we first estimate the following univariate regressions for each event stock in every country in the sample:

$$R_{j,i,t} = \alpha_{j,i} + \beta_{j,\text{Islamic}} R_{\text{Islamici},t} + \varepsilon_{j,i,t} \quad (3)$$

[3] A similar approach is used by Oberndorfer et al. (2013). As robustness, we use the adjusted PATELL test suggested by Kolari and Pynnonen (2010) to correct for cross-correlation and the results are robust. We have used SAS to estimate Savickas's (2003) and PATELL test statistics.

We estimate Equation (3) by country and separately for the period before and after each addition and deletion event. $R_{j,i,t}$ is the return on the event stock , while $R_{Islamic,i,t}$ is the return on the DJIMWI. The pre-event period runs over 12 months ending 1 month before the revision announcement date, and the post-event period spans 12 months starting a month after the announcement date. We then estimate a bivariate regression of the following form:

$$R_{j,i,t} = \alpha_{j,i} + \beta_{j,Islamic} R_{Islamic,i,t} + \beta_{j,Local,i,t} R_{Local} + \varepsilon_{j,i,t} \quad (4)$$

where $R_{Local,I,t}$ is the return of the main local index of country *j* in which stock *i* is originated. We estimate Equation (4) separately for the 12-month period before and the 12-month period after each revision event. We run the regression over 12-month periods before and after the event and record the pre- and post-revision values of $\beta_{j,Islamic}$ and $\beta_{j,Local}$.

While the DJIMWI revision criteria are unlikely to carry signals about fundamentals, firm characteristics are not constant over time and may change following revision events. Thus, to control for the contemporaneous changes in firm fundamentals across pre- and post-decision, we estimate the following model[4]:

$$\Delta COMV = \gamma_0 + \gamma_1 \Delta MV + \gamma_2 \Delta BTM + \gamma_3 \Delta ROE + \gamma_4 \Delta IVS + \gamma_5 \Delta LEV + e \quad (5)$$

where Δ refers to the change that is the post-index revision minus the pre-index revision value in a given variable; $COMV$ is measured by the parameter $\beta_{j,i,Islamic}$ in Equation (4); MV is the natural logarithm of market capitalisation at the fiscal year end; BTM is the log of the book-to-market equity ratio, computed as the book value of equity scaled by the market value at the fiscal year-end; ROE is a profitability measure computed as earnings divided by equity book value; INV is capital expenditure scaled by total assets; and LEV is the sum of short-term and long-term debts scaled by the total book value of assets. We include the above variables as controls in Equation (5) because Fama and French (2015) show that size, value, profitability and investment are the main determinants of stock returns. Several other studies also show that leverage affects stock returns (see, e.g., George and Hwang, 2010).

[4] A similar approach is used by Claessens and Yafeh (2012) and Eun et al. (2015) in the context of periodic revision of the conventional stock indices.

4. Data

The list of additions and deletions is obtained from Dow Jones Company[5]. Our sample includes all firms that are added to (deleted from) the DJIMWI between May 1999 and June 2012. The selection process of DJIMWI consists of two stages. The first stage involves the filtering of companies on the basis of industry sector. To be considered for possible inclusion in the DJIMWI, the company's primary business activity must not be incompatible with Islamic principles. For instance, firms whose business activity includes pork, tobacco, alcohol, conventional banks and insurance, alcohol, arms/defence and leisure (e.g. gambling, pornography, hotels, media) are considered incompatible with Shari'ah law. The second stage entails the filtering of companies on the basis of financial ratios that are viewed as incompatible with Shari'ah investment guidelines. The financial ratios as per Shari'ah compliance are gearing (total debt/two-year moving average market capitalisation) and cash ratios; both must be less than 33%. The cash compliance ratios are calculated as (i) cash and interest-bearing securities divided by two-year moving average market capitalisation and (ii) accounts receivable deflated by two-year moving average market capitalisation. The screening methodology is subject to approval by an independent Shari'ah supervisory board.

Our initial data consist of a total of 14,092 revision events, 7,751 additions and 6,341 deletions. For our analysis, we require that either DataStream or Sedol codes be available so as to obtain daily stock prices and accounting data for firms in our sample by country of origin. Market and accounting data are important for our analysis in terms of investigating the impact of changes in firms' fundamentals and calculating proxies for SMB and HML, respectively. We exclude from our sample 448 additions and 404 deletions because either the DataStream or the Sedol code is not available. To construct portfolio returns at a country level, we require each country to have at least 15 companies added to and/or deleted from the index. Furthermore, each company must have daily stock prices at least 50 days prior to the index revision and up to 7 days after the revision. These sample selection requirements yields a final sample of 8,250 companies (4,378 additions and 3,872 deletions) for 18 countries. We control for the exchange rate disparity between the currencies of the 18 countries using the US dollar as the base currency. Furthermore, we classify counties in our sample into developed and developing countries using the World Bank country classification[6].

[5] We are grateful to Dow Jones Company for providing us the data and the announcement dates for additions and deletions from the Dow Jones Islamic Market World Index.

[6]http://www.un.org/en/development/desa/policy/wesp/wesp_current/2014wesp_country_classification.pdf

5. Results and Analysis

5.1. The price effect

Table 1 displays the frequency and the proportion of the addition and deletion samples. Panel A of Table 1 shows the results for the added and deleted sample by country of origin. Panel B presents the mean and median values of the market capitalisation for the added and deleted companies. Panel A shows that the number of firms added to (deleted from) the DJIMWI is dominated by firms from the US, Japan, Taiwan, Canada, Australia, UK and Hong Kong. Companies from these seven countries represent 85% of the total sample. Egypt and Indonesia are the only two Muslim countries in the sample, with a combined weight of about 2%. The proportion of companies from Muslim countries in the DJIMWI declines in May 2016 to only about 1%[7]. The mean (median) market capitalisation of the added (deleted) companies in Panel B suggests that event firms tend to be large. The mean (median) values of the firms added to the DJIMWI ranges between $114 M ($84.8 M) in the case of Egypt and $7310 M ($6170 M) in the case of Germany. By contrast, for the deleted sample the mean value is in the range of $111 M to $ 6170 M, while the median value is between $73.6 M and $ 1180 M. Overall, Panel B in Table 1 shows that the market capitalisation of the sub-samples of the added and deleted stocks is comparable.

TABLE 1 HERE

Table 2 shows the CAR associated with the ethically screened stocks that are added to the DJIMWI. We choose to focus on the short-term event windows to avoid the potential effect of changes in firm characteristics on our abnormal return estimates. The results are reported by country and the CARs are measured over [0,+1], [0,+2], [-3,+3], [-5,+5] and [-7,+7] windows around the additions. The CARs are computed using the three-factor model with GARCH (1, 1) to control for possible ARCH effects in the residuals of the factor model[8]. We use a country's main stock market index as the benchmark return in the three-factor model. We report positive and significant price reactions following additions to the DJIMWI in all countries in our sample except Canada, where CARs are negative but not statistically significant. We also find that firms based in Muslim countries, namely, Egypt

[7]https://www.djindexes.com/mdsidx/downloads/fact_info/Dow_Jones_Islamic_Market_World_Index_Fact_Sheet.pdf

[8] The factor loadings of the three-factor model by country are reported in the Appendix.

and Indonesia, exhibit the highest positive price reaction after joining the DJIMWI. For Egyptian firms, the CARs range between the lowest of 1.3% over the [0,+1] window to the highest of 2.8% over the [-3,+3] window. For Indonesia, the lowest CAR of 2.3% is observed over the [0,+1] and [-7,+7] windows, while the highest CAR of 6.3% is measured over the [-5,+5] window. On average, sample firms from the remaining countries show varying positive price reactions (depending on the estimation window) ranging between 0.1% and 1.4%. We further report the average CARs associated with additions to DJIMWI for the full sample and for the subsamples of developed and developing countries. Table 2 shows that the average CARs for these subsamples are positive and significant across the various estimation windows. The results also reveal that the positive price reaction is significantly higher for developing countries than developed ones. This is consistent with the view that stocks from developed markets adjust faster to public information, including those relating to ethicality, than their counterparts from developing markets (see, e.g., Lasfer et al., 2003; Titman et al., 2013; Watanabe et al., 2013).

TABLE 2 HERE

Next, we examine the announcement effect associated with deletions from the DJIMWI. Table 3 shows that the CARs following deletion events are negative for all countries and across all estimation windows. It also shows that the negative price reactions are stronger in developing countries. The highest significant CAR over the [0, +1] window is reported in Indonesia (-2.3%), followed by Egypt (-1.2%), Hong Kong (-1.1%) and Japan (-0.5%). The CARs over the [0, +1] window associated with the remaining sample countries are not significant. The number of countries with significantly negative CARs increases considerably (from 4 to 10) when CARs are measured over the [-5, +5] window around the deletion announcement dates. The CARs over the [-7, +7] window are also negative, but only (weakly) significant in 6 of the 18 sample countries. The significantly negative CARs over the [-7, +7] window range from -2.6% for India to -0.01% for Chile.

The last three rows of Table 3 present the average CARs associated with deletions from the DJIMWI for the full sample and for the subsamples of developed and developing countries. The average CARs associated with the full sample are negative and significant, varying from -0.5% to -0.8% across various study windows. The average CARs associated with the subsamples of developing and developed countries are also negative and significant across all windows, except for the [-7, +7] window in which the average CARs for developing countries are insignificant. The last row of Table 3 shows that the magnitude of

the negative CARs associated with deletions is significantly higher for developing countries than developed ones; again this may reflect the slow reaction of developing stock markets to public information announcements (see, e.g., Lasfer et al., 2003; Titman et al., 2013; Watanabe et al., 2013).

In sum, the results indicate that investors perceive additions to (deletions from) the DJIMWI as good (bad) news. This evidence is consistent with view that ethical considerations in investment decisions is a source of value creation (see, e.g., Renneboog et al., 2008; Webley et al., 2001) and contradicts with the notion that ethical and religious filtering produces a suboptimal mean-variance efficient frontier and inferior financial performance (Nainggolan et al., 2014).

TABLE 3 HERE

5.2. The comovement effect

Table 4 reports the comovement between the ethically screened stocks that are added to (deleted from) the DJIMWI with the constituents of the index using univariate analysis (Equation (3)). The results show a significant increase (decrease) in the comovement of the newly added (deleted) stocks with the existing DJIMWI constituents. The changes in the comovement following additions range from 0.693 in Indonesia to 0.0615 in Greece. Overall, our results confirm that stocks exhibit a strong and significant increase (decrease) in their betas following additions to (deletions from) the DJIMWI. Furthermore, we find that changes in the R^2 for the additions are positive and significant across all countries, indicating a stronger correlation between the newly added stocks and the existing constituents of the DJIMWI following additions. The results for the changes in betas and R^2 also hold for the full sample and when we partition the sample into developed and developing countries.

Table 4 also presents the changes in the comovement structure following deletions from DJIMWI using the univariate regression analysis. The univariate results show that changes in the slopes are negative and statistically significant for the stocks deleted from the index. The greatest (in absolute terms) change in comovement is when Brazilian firms leave the DJIMWI (-0.642), while the lowest change in comovement is reported in the case of Taiwanese firms (-0.0168). We also find that changes in the R^2 are positive in all countries, but statistically insignificant, except for Greece and Italy. This outcome suggests that the correlation between the deleted stocks and the Islamic index remains unchanged after the post-deletion period. This finding is consistent with the recognition hypothesis of Chen et al. (2004), who suggest that the benefits of index membership are permanent, as investors'

awareness increases after additions but does not decline after deletions. This may also reflect the slow portfolio rebalancing of DJIMWI trackers following the deletion events. The last three rows of Table 4 show that the average change in betas following deletions associated with the full sample and the subsamples of developed and developing countries is also negative and significant, while the average change in R^2 is statistically insignificant.

Overall, our results suggest that since DJIMWI revision decisions are based on publicly available information, the changes in betas and R^2 following the revision events may reflect the common behaviour of ethical investors rather than changes in firm fundamentals. Several studies in the social science literature suggest that religiosity affects individual values, beliefs and economic choices (e.g. Lehrer, 2004; Shukor and Jamal, 2013; Vitell, 2009). While prior literature does not suggest that religious adherence is the only source of ethical behaviour (Kurpis et al., 2008; Peterson et al., 2010), it clearly demonstrate that religiosity is positively associated with ethical behaviour (Webley, 1996). Thus, if DJIMWI investors share common ethical believes, their correlated demand would induce a common factor in stock returns, causing comovement among the index constituents.

TABLE 4 HERE

Table 5 presents the results of the bivariate regression (Equation (4)). We find that the comovement of newly added stocks with the DJIMWI increases, while their comovement with the local index decreases in the post-addition period, and vice versa for the newly deleted stocks. The results show that the changes in comovement with DJIMWI associated with both additions and deletions are significant across all countries and are stronger than those reported in Table 4. Our results remain robust when we group the sample countries into developed and developing. These findings are not consistent with the fundamental-based view, which suggests that since the DJIMWI revision criteria do not carry news about changes in firm fundamentals, changes in the DJIMWI and local index betas should not be statistically different from zero. However, the results provide strong support for the sentiment-based view, which suggests that correlated demand shocks of ethical investors, who track the DJIMWI, alter the comovement between newly added/deleted stocks with the existing constituents of the DJIMWI and the local index.

TABLE 5 HERE

To shed further light on whether the changes in the comovements are due to changes in investor sentiment or changes in firm fundamentals, we estimate Equation (5). The results

are shown in Table 6. Panel A reports the results from the sample of additions. The intercept of Equation (5) is significantly positive for all countries in the sample, suggesting that firm fundamentals cannot fully explain the shifts in the comovement structure in the post-addition period. The coefficients on the fundamental factors are also generally insignificant, with the exception of Canada, Chile, Finland, Greece, Japan and Spain, where some fundamental factors seem to have weak explanatory power. Nonetheless, changes in firm fundamentals do not explain changes in the comovements across different markets. For instance, in Canada, changes in the leverage explain changes in the comovements, while in Chile, Finland and Greece it is changes to the book-to-market ratio that explain the comovements.

In Panel B, we repeat the analysis for the sample of deletions. Similar to the results reported in Panel A, the intercept of Equation (5) is significant and the changes in the firm fundamentals are weakly associated with the changes in the comovements. We also do not find any consistent patterns to indicate that specific changes in firm fundamentals explain changes in the comovements. For example, the change in comovement is explained by changes in leverage in Australia, changes in ROE in Finland and changes in size and investments in the US.

Overall, consistent with our earlier findings, the results in Table 6 also indicate that the changes in the price behaviour following the DJIMWI index revisions are likely to be driven by the correlated demand of ethical investors, who may share common sentiment. Because of its adherence to Islamic law, the DJIMWI may not only attract Muslim investors, but also attract other investors who value high ethical standards. As many of the DJIMWI trackers share common code of ethics, their coordinated trading behaviour may induce a common sentiment to stock returns and therefore cause the constituents of the index to commove.

TABLE 6 HERE

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6. Conclusion

The exponential growth in ethical investments, which include both socially responsible investment (SRI) and faith-based funds, over the past two decades, has attracted significant attention in the literature. One of the most contentious issues relates to the potential impact of ethical restrictions on the financial performance of these investment vehicles. Some argue that ethically screened stocks represent a very constrained investment universe and perhaps limits potential diversifications (e.g., Nainggolan et al., 2014). Others maintain that investing in ethically screened stocks can create value by helping firms to secure competitive edge

(Porter and Kramer, 2006). This paper investigates the short-term price reactions of ethically screened stocks. Our analysis is based on the premise that since the DJIMWI revision decisions do not convey new information about firm fundamentals, any reaction to the DJIMWI quarterly revisions should reflect the extent to which the market places substance on firms' commitment to ethics and Shari'ah principles. Using DJIMWI revisions, we find that the markets react positively around the announcement for stocks that are added to the index and negatively to stocks that are deleted from the index. The CARs associated with the sample of additions (deletions) range between 0.7% and 1.3% (0.5% and 0.8%). This finding suggests that investors perceive firms' commitment to ethics and Shari'ah law as good news. In other words, investors believe that ethical compliance is likely to be a source of value creation rather than a diversification constraint. We also find that the market reaction is stronger when the event stock is listed in less developed stock markets. We attribute this finding to the information opacity of the developing markets. Specifically, stocks in developing countries are typically less known to investors and less likely to be followed by analysts, and investors are more likely to be surprised when such stocks join a major index.

We also investigate the change in the stock return comovement following the DJIMWI revisions. We find that the betas of the added (deleted) stocks exhibit a strong and significant increase (decrease) in post-revision periods. These results are even stronger when we control for the comovement with the local index and are robust across developed and developing markets. Finally, we use multivariate regression analysis to shed further light on whether the changes in the price behaviour following the revision events are driven by changes investor sentiment or by changes in firm fundamentals. We find that changes in the firm fundamental characteristics, such as size, book to market value and leverage, do not explain the shifts in the comovement structure following the index revisions. These findings suggest that changes in the price behaviour following index revisions are likely to reflect the sentiment of ethical investors rather than changes in firm fundamentals. Since many of the DJIMWI trackers share common code of ethics, their trading behaviour and coordinated demand is likely to induce a common factor in stock returns and therefore cause strong comovement among the index constituents.

Ethical approval: ***This article does not contain material from any studies with human participants or animals performed by any of the authors.***

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Table 1: Sample distribution and market capitalisation by country. Panel A shows the distribution, while Panel B shows the market capitalisation in US$ of the added and deleted stocks. Market capitalisation is calculated as the market price in US$ times the total number of outstanding shares and the figures are reported in millions. Developed countries include Australia, Canada, Finland, France, Germany, Greece, Italy, Japan, Spain, UK and US. Developing countries include Brazil, Chile, Egypt, Hong Kong, India, Indonesia and Taiwan.

Panel A: Distribution of added and deleted companies by country

	Added firms		Deleted firms	
Country	**Freq**	**Proportion**	**Freq**	**Proportion**
	#	**%**	**#**	**%**
Australia	333	7.6	263	6.8
Canada	436	10.0	338	8.7
Finland	40	0.9	31	0.8
France	69	1.6	75	1.9
Germany	110	2.5	101	2.6
Greece	44	1.0	46	1.2
Italy	55	1.3	58	1.5
Japan	756	17.3	704	18.2
Spain	32	0.7	32	0.8
UK	304	6.9	264	6.8
US	1148	26.2	1230	31.8
Brazil	44	1.0	37	1.0
Chile	42	1.0	34	0.9
Egypt	36	0.8	18	0.5
Hong Kong	284	6.5	234	6.0
India	119	2.7	29	0.7
Indonesia	52	1.2	33	0.9
Taiwan	474	10.8	345	8.9

Table 1 continues

Panel B: Market cap of added and deleted companies by country

	Added firms		Deleted firms	
	Mean	**Median**	**Mean**	**Median**
Australia	1220	408	1330	438
Canada	1610	590	1840	565
Finland	2350	1520	1550	1160
France	6500	1730	5760	1260
Germany	7310	1250	6170	1180
Greece	1380	895	917	265
Italy	4370	1350	4370	1090
Japan	2020	588	1920	548
Spain	3980	1780	4470	1510
UK	3730	1260	3720	1070
US	4260	1550	4160	1420
Brazil	4270	830	5720	1160
Chile	1350	699	1070	628
Egypt	114	84.8	111	73.6
Hong Kong	875	256	826	175
India	1150	192	586	119
Indonesia	691	271	734	156
Taiwan	583	238	557	191

Table 2: Cumulative abnormal returns (CARs) over different windows around additions to DJIMWI. The CARs are estimated using a three-factor model with the GARCH (1,1) framework. Developed countries include Australia, Canada, Finland, France, Germany, Greece, Italy, Japan, Spain, UK and US. Developing countries include Brazil, Chile, Egypt, Hong Kong, India, Indonesia and Taiwan. The test is GARCH-based statistics and ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

Country	**N**	**CAR [0,+1]**	**t-test**	**CAR [0,+2]**	**t-test**	**CAR [-3,+3]**	**t-test**	**CAR [-5,+5]**	**t-test**	**CAR [-7,+7]**	**t-test**
Australia	333	0.004	1.071	0.004	1.537	0.006*	1.667	0.012**	3.208	0.002	1.577
Canada	436	-0.006	-1.628	-0.001	-0.573	-0.009	-1.640	-0.001	-1.168	-0.005	-1.608
Finland	40	0.005	1.135	0.003	1.351	0.004	1.177	0.005	1.254	0.004	1.500
France	69	0.016**	2.855	0.018***	3.481	0.019**	2.155	0.012**	2.336	0.023***	5.584
Germany	110	0.001	1.198	0.002	1.479	0.001	1.572	0.003	1.389	0.016***	7.566
Greece	44	0.002	0.497	0.006	1.519	0.008*	1.791	0.001	0.335	0.002	0.515
Italy	55	0.001	0.187	0.008**	2.069	0.009**	2.645	0.014**	2.953	0.016**	2.241
Japan	756	0.005*	1.762	0.002	1.143	0.001	1.198	0.003***	3.465	0.001	1.295
Spain	32	0.002	0.248	0.007	0.897	0.008	1.093	0.021**	2.803	0.002	0.314
UK	304	0.005*	1.674	0.004	1.311	0.010***	3.516	0.006**	2.304	0.014**	2.343
US	1148	0.009*	1.735	0.008**	2.669	0.007*	1.881	0.004*	1.672	0.009*	1.713
Brazil	44	0.005	1.494	0.009	1.609	0.001	0.379	0.007*	1.941	0.010**	2.732
Chile	42	0.002	0.814	0.003	1.084	0.012***	4.046	0.001	0.543	0.008*	1.846
Egypt	36	0.013**	1.960	0.018***	4.643	0.028***	6.989	0.025**	2.536	0.014***	3.781
Hong Kong	284	0.011***	3.469	0.009**	2.718	0.016***	5.285	0.017**	2.001	0.021***	9.867
India	119	0.002	1.124	0.006*	1.744	0.005	1.598	0.025**	2.274	0.026***	9.107
Indonesia	52	0.023*	1.917	0.024**	2.491	0.034***	4.694	0.063**	2.042	0.023***	7.075
Taiwan	474	0.008	1.601	0.010**	2.766	0.009**	2.600	0.014***	3.876	0.016***	7.115
Full sample	4378	0.007***	3.853	0.008***	5.124	0.009***	3.967	0.013***	3.664	0.011***	5.309
Developed	3327	0.004***	2.430	0.006***	3.688	0.006**	2.781	0.007***	3.636	0.008***	2.963
Developing	1051	0.009***	3.258	0.011***	4.118	0.015***	3.292	0.022**	2.841	0.017***	6.614
Diff in CARs		-0.005	-1.581	-0.006*	-1.836	-0.009*	-1.831	-0.014*	-1.828	-0.009**	-2.544

Table 3: Cumulative abnormal returns (CARs) over different windows following deletions from the DJIMWI. The CARs are estimated using a three-factor model with the GARCH (1, 1) framework. Developed countries include Australia, Canada, Finland, France, Germany, Greece, Italy, Japan, Spain, UK and US. Developing countries include Brazil, Chile, Egypt, Hong Kong, India, Indonesia and Taiwan. The test is GARCH-based statistics and ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

Country	**N**	**CAR [0,+1]**	**t-test**	**CAR [0,+2]**	**t-test**	**CAR [-3,+3]**	**t-test**	**CAR [-5,+5]**	**t-test**	**CAR [-7,+7]**	**t-test**
Australia	263	-0.003	-1.626	-0.004	-1.537	-0.002	-1.222	-0.004***	-3.142	-0.002	-1.637
Canada	338	-0.006	-1.611	-0.001	-1.563	-0.008	-1.611	-0.003	-1.634	-0.002	-1.622
Finland	31	-0.005	-1.135	-0.003	-0.510	-0.004	-0.677	-0.003	-1.391	-0.004	-1.500
France	75	-0.001	-0.102	-0.001	-1.161	-0.008	-1.552	-0.012**	-2.336	-0.002	-1.584
Germany	101	-0.001	-0.420	-0.002	-1.604	-0.001	-1.572	-0.010***	-4.572	-0.006	-1.578
Greece	46	-0.002	-0.497	-0.006	-1.519	-0.008*	-1.791	-0.001	-0.335	-0.002	-0.515
Italy	58	0.001	0.187	-0.008**	-2.102	-0.009**	-2.645	-0.004	-1.353	-0.006	-1.241
Japan	704	-0.005*	-1.682	-0.002*	-1.696	-0.001	-1.198	-0.003*	-1.747	-0.001	-1.295
Spain	32	-0.002	-0.248	-0.007	-0.897	0.008	1.093	-0.012	-1.597	-0.002	-1.135
UK	264	-0.005	-1.474	-0.004	-1.311	-0.007**	-2.270	-0.016**	-2.154	-0.001	-0.492
US	1230	-0.004	-1.635	-0.003	-1.646	-0.001	-1.198	-0.004*	-1.772	-0.009*	-1.883
Brazil	37	-0.003	-0.945	-0.009	-1.009	-0.001	-0.379	-0.006	-1.492	-0.001*	-1.673
Chile	34	-0.002	-0.814	-0.003*	-1.841	-0.012**	-2.046	-0.013**	-2.426	-0.008*	-1.685
Egypt	18	-0.012**	-1.981	-0.018**	-2.643	-0.014***	-3.546	-0.013***	-3.258	-0.010**	-1.978
Hong Kong	234	-0.011***	-3.469	-0.009**	-2.718	-0.016**	-2.285	-0.007**	-2.805	-0.002	-0.987
India	29	-0.002	-1.124	-0.006**	-2.443	-0.005	-1.598	0.002	0.827	-0.026*	-1.661
Indonesia	33	-0.023**	-1.997	-0.024**	-2.491	-0.034***	-4.694	-0.014***	-14.876	-0.019*	-1.771
Taiwan	345	-0.008	-1.570	-0.010**	-1.977	-0.011**	-1.982	-0.013	-1.207	-0.002	-1.115
Full sample	3872	-0.005***	-3.964	-0.007***	-4.699	-0.007***	-3.597	-0.008***	-6.005	-0.006***	-3.634
Developed	3142	-0.003***	-4.541	-0.004***	-5.215	-0.004**	-2.442	-0.007***	-4.353	-0.003***	-4.325
Developing	731	-0.009***	-3.047	-0.011***	-4.118	-0.013***	-3.343	-0.009***	-4.120	-0.010	-0.009
Diff in CARs		0.006*	1.947	0.008**	2.669	0.010**	2.245	0.003	0.969	0.006*	1.717

Table 4: Changes in the return comovement following DJIMWI revisions: The univariate analysis (Equation (3)). $\overline{\Delta\beta}$ Islamic is the mean change in slope across the event date and $\overline{\Delta R^2}$ is the mean change in goodness of fit. The pre-event and post-event estimation periods are [-12,-1] and [+1,+12] months. The t-test is adjusted for cross-correlation and reported next to the change in the slopes and ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

Countries	**# of firms**	**Univariate (added sample)**				**# of firms**	**Univariate (deleted sample)**			
		$\overline{\Delta\beta}$ **Islamic**	**t-test**	$\overline{\Delta R^2}$	**t-test**		$\overline{\Delta\beta}$ **Islamic**	**t-test**	$\overline{\Delta R^2}$	**t-test**
Australia	333	0.4787***	16.58	0.0835***	20.64	263	-0.0282**	-2.22	0.0135	1.07
Canada	436	0.2683***	7.15	0.1305***	18.43	338	-0.0693***	-3.61	0.0167	1.37
Finland	40	0.3657**	2.95	0.1781***	4.72	31	-0.0830**	-2.28	0.0162	1.27
France	69	0.1682**	2.10	0.1340***	4.98	75	-0.0629**	-2.09	0.0136	1.01
Germany	110	0.0689*	1.74	0.0326*	1.91	101	-0.0618**	-1.98	0.0143	1.08
Greece	44	0.0615*	1.68	0.0475***	4.75	46	-0.0683***	-4.92	0.0074*	1.76
Italy	55	0.1489***	5.66	0.0838**	2.72	58	-0.4730***	-7.51	0.0146*	1.94
Japan	756	0.0912***	8.86	0.0125***	17.20	704	-0.0603***	-5.99	0.0013	1.51
Spain	32	0.4632**	2.29	0.1488***	5.76	32	-0.0394*	-1.87	0.0165	1.35
UK	304	0.2953*	1.90	0.1177***	6.94	264	-0.1678**	-2.60	0.0101	1.60
US	1148	0.5545***	24.80	0.1479***	24.35	1230	-0.3496**	-2.87	0.0135	1.41
Brazil	44	0.2253***	2.14	0.0328***	5.04	37	-0.6423***	-10.25	0.0193	1.47
Chile	42	0.4742***	8.45	0.1533***	7.23	34	-0.0234**	-2.01	0.0121	1.31
Egypt	36	0.1873***	7.71	0.0282	1.23	18	-0.1932**	-2.30	0.0059	0.43
Hong Kong	284	0.1954***	10.38	0.0275***	11.65	234	-0.1547***	-7.13	0.0023	1.39
India	119	0.1035***	5.54	0.0579***	17.01	29	-0.1759**	-2.41	0.0040	1.61
Indonesia	52	0.6930***	7.31	0.2032***	7.17	33	-0.2913**	-2.35	0.0019	1.10
Taiwan	474	0.1891***	5.40	0.0232**	2.96	345	-0.0168**	-2.62	0.0024	1.01
Full sample	4378	0.280***	6.42	0.107***	7.84	3872	-0.164***	-4.03	0.014	0.163
Developed	3327	0.2595***	5.056	0.1015***	6.293	3142	-0.1331***	-3.049	0.0125	1.461
Developing	1051	0.2954***	3.720	0.0752**	2.733	731	-0.2139**	-2.668	0.0068	1.568

Table 5: Changes in the return comovement around DJIMWI revisions: The bivariate analysis (Equation (4). $\overline{\Delta\beta}$ Islamic is the mean change in slope across the event date. We report the mean changes in the slope of the Islamic index ($\overline{\Delta\beta}$ Islamic) and local index ($\overline{\Delta\beta}$ Local). The pre-event and post-event estimation periods are [-12,-1] and [+1,+12] months. The t-test is adjusted for cross-correlation and reported next to the change in the slopes and ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

Countries	**# of firms**	**Bivariate (added sample)**				**# of firms**	**Bivariate (deleted sample)**			
		$\overline{\Delta\beta}$ **Islamic**	**t-test**	$\overline{\Delta\beta}$ **Local**	**t-test**		$\overline{\Delta\beta}$ **Islamic**	**t-test**	$\overline{\Delta\beta}$ **Local**	**t-test**
Australia	333	0.7243***	5.56	-0.4173**	-3.03	263	-0.3198***	-15.27	0.2272***	8.10
Canada	436	0.6414***	18.87	-0.1433***	-5.94	338	-0.3206***	-10.89	0.2064***	5.58
Finland	40	0.6221***	4.77	-0.0054	-0.13	31	-0.6406***	-4.87	0.2038**	2.46
France	69	0.4931**	2.98	-0.1122*	-1.66	75	-0.4299***	-7.25	0.2927**	4.20
Germany	110	0.0703***	4.63	-0.2101***	-4.40	101	-0.5666**	-2.32	0.1701**	2.61
Greece	44	0.4068***	6.44	-0.2380**	-2.27	46	-0.4474***	-8.36	0.3794***	4.54
Italy	55	0.1779***	4.21	-0.1109***	-5.66	58	-0.5730***	-6.41	0.1230**	1.99
Japan	756	0.1834***	6.35	-0.0785***	-3.27	704	-0.0779***	-4.81	0.8935***	75.52
Spain	32	0.4790***	5.53	-0.0427**	-2.03	32	-0.4410***	-5.44	0.2193**	2.58
UK	304	0.4257***	7.67	-0.1028*	-1.85	264	-0.2513***	-5.14	0.1570***	4.85
US	1148	0.8546***	8.25	-0.5725***	-3.82	1230	-0.5350***	-24.49	0.3649***	12.81
Brazil	44	0.2697***	3.02	-0.1284**	-2.26	37	-0.7240***	-7.91	0.5123***	5.00
Chile	42	0.4733**	2.75	-0.0019	-0.10	34	-0.3833***	-5.71	0.1400**	1.99
Egypt	36	0.2976**	2.41	-0.1247**	-2.15	18	-0.2362**	-2.02	0.1155**	2.09
Hong Kong	284	0.2254***	7.38	-0.0119***	-6.27	234	-0.1677***	-4.21	0.3548**	2.47
India	119	0.2750***	11.75	-0.0054	-0.23	29	-0.1954***	-4.46	0.0959**	2.18
Indonesia	52	0.7582***	5.18	-0.4175***	-3.49	33	-0.3213**	-2.42	0.1024**	2.01
Taiwan	474	0.1947***	4.00	-0.1413**	-2.01	345	-0.1748***	-11.05	0.1570***	4.87
Full sample	4378	0.421***	7.83	-0.159***	-4.21	3872	-0.378***	-8.89	0.262***	5.700
Developed	3327	0.4617***	6.261	-0.1849***	-3.596	3142	-0.4185***	-8.393	0.2943***	4.546
Developing	1051	0.3563***	4.753	-0.1187***	-2.152	731	-0.3147***	-4.217	0.2111***	3.491

Table 6: Effect of changes in firm fundamentals on change in the return comovement structure following DJIMWI revisions. The number of firms is the same as in the previous tables. Panel A shows the results from the sample of additions, while Panel B shows the results from the sample of deletions. *MV* is the logarithm of market capitalisation at the fiscal year-end. *BMT* is the book value of equity scaled by the market value at the fiscal year-end. *ROE* is earnings divided by equity book value. *IVS* is capital expenditure scaled by total assets, *LEV* is the sum of short-term and long-term debts scaled by the total book value of assets and ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

Country	**Constant**		**ΔMV**		**ΔBTM**		**ΔROE**		**ΔIVS**		**ΔLEV**	
Panel A	**Coeff**	**t-test**	**Coeff**	**t-test**	**Coeff**	**t-test**	**Coeff**	**t-test**	**Coeff**	**t-test**	**Coeff**	**t-test**
Australia	0.5201***	7.262	0.0000	-0.013	0.0003	1.219	-0.0001	-0.430	-0.0005	-0.522	-0.0006	-1.174
Canada	0.4780**	2.786	-0.0009	-0.248	-0.0002	-0.223	-0.0002	-0.211	0.0047	1.279	-0.0028*	-1.683
Finland	0.5001**	2.485	-0.0022	-0.842	0.0016*	1.747	0.0008	1.056	0.0026	0.990	-0.0003	-0.447
France	0.5028**	2.642	-0.0040	-0.991	0.0010	0.840	0.0012	1.037	-0.0055	-1.381	-0.0005	-0.423
Germany	0.4983**	2.269	0.0040	1.393	0.0005	0.579	-0.0005	-0.657	-0.0004	-0.145	-0.0001	-0.115
Greece	0.5002**	2.047	-0.0003	-0.086	-0.0018*	-1.786	0.0009	1.006	0.0015	0.459	-0.0024	-1.757
Italy	0.4999***	6.443	0.0002	0.159	0.0000	0.017	0.0000	-0.115	-0.0010	-0.941	-0.0003	-1.073
Japan	0.5002***	4.363	0.0018	1.189	0.0004	0.975	0.0007	1.617	-0.0018	-1.223	-0.0004	-0.925
Spain	0.4965**	2.332	0.0053*	1.691	0.0012	1.527	-0.0007	-0.899	0.0012	0.434	0.0001	0.173
UK	0.4999**	2.805	0.0033	1.414	0.0005	0.803	0.0003	0.378	-0.0020	-0.857	0.0000	0.014
US	0.5006**	2.186	-0.0006	-1.009	0.0001	0.579	0.0001	0.806	-0.0006	-0.951	-0.0001	-0.505
Brazil	0.5187**	2.641	0.0007	0.177	0.0008	0.691	-0.0013	-1.145	0.0001	0.033	0.0006	0.496
Chile	0.4658**	2.270	0.0037	1.296	-0.0016*	-1.759	-0.0009	-1.133	0.0036	1.254	-0.0006	-0.761
Egypt	0.4890***	7.642	0.0010	1.173	0.0002	0.854	0.0001	0.363	0.0002	0.283	-0.0002	-0.817
Hong Kong	0.5001**	2.895	-0.0016	-0.729	-0.0006	-0.965	0.0004	0.556	0.0007	0.332	-0.0002	-0.287
India	0.4989***	3.900	0.0016	0.976	0.0004	0.810	-0.0001	-0.134	-0.0001	-0.089	-0.0005	-1.057
Indonesia	0.5011**	2.464	0.0006	0.241	0.0004	0.553	0.0008	1.099	-0.0021	-0.797	-0.0007	-0.955
Taiwan	0.5041**	2.698	-0.0060	-1.533	-0.0002	-0.153	0.0003	0.225	0.0009	0.242	0.0004	0.376
Full sample	0.281***	5.38	0.0190	0.850	0.0090	1.360	0.0110*	1.74	0.0060	0.180	0.0040	0.610
Developed	0.4897***	3.692	0.0006	0.720	0.0003	1.224	0.0002	1.239	-0.0002	-0.203	-0.0007	-1.277
Developing	0.4968***	8.783	0.0001	0.004	-0.0001	-0.281	-0.0001	-0.355	0.0005	0.737	-0.0002	-0.909

Table 6 continues

Country	Constant		Size_Change		BTM_Change		ROE_Change		Investment_Change		Leverage_Change	
Panel B	**Coeff**	**t-test**	**Coeff**	**t-test**	**Coeff**	**t-test**	**Coeff**	**t-test**	**Coeff**	**t-test**	**Coeff**	**t-test**
Australia	-0.5005***	-7.260	-0.0003	-0.386	-0.0003	-1.143	-0.0002	-0.902	0.0012	1.280	-0.0005*	-1.694
Canada	-0.4974**	-2.772	-0.0017	-0.460	-0.0009	-0.881	-0.0011	-1.026	-0.0046	-1.267	-0.0015	-1.384
Finland	-0.4989**	-2.494	-0.0006	-0.235	0.0009	1.198	0.0014*	1.829	-0.0007	-0.271	0.0003	0.409
France	-0.4959**	-2.624	-0.0051	-1.280	0.0017	1.459	-0.0003	-0.231	-0.0024	-0.594	-0.0014	-1.216
Germany	-0.5015**	-2.284	0.0020	0.684	0.0004	0.470	-0.0013	-1.559	0.0006	0.194	0.0002	0.258
Greece	-0.4996**	-2.042	-0.0015	-0.462	0.0014	1.522	0.0003	0.360	0.0024	0.735	-0.0009	-0.967
Italy	-0.4998***	-6.422	0.0000	-0.024	0.0002	0.767	-0.0007*	-1.723	0.0001	0.098	-0.0002	-0.787
Japan	-0.5016***	-4.367	0.0011	0.744	0.0000	-0.001	-0.0006	-1.427	0.0012	0.768	-0.0002	-0.494
Spain	-0.5018**	-2.363	-0.0002	-0.056	0.0015*	1.898	0.0006	0.716	0.0008	0.281	0.0016*	1.704
UK	-0.5015**	-2.815	0.0018	0.754	0.0001	0.100	0.0001	0.213	0.0023	0.982	0.0006	0.924
US	-0.5011**	-2.185	0.0011*	1.790	0.0000	0.179	-0.0002	-1.091	0.0014*	1.7403	-0.0002	-1.050
Brazil	-0.4992**	-2.638	-0.0008	-0.203	-0.0023*	-1.713	0.0003	0.286	-0.0008	-0.196	0.0015	1.289
Chile	-0.5022**	-2.289	0.0007	0.240	-0.0007	-0.877	0.0005	0.549	0.0016	0.570	-0.0001	-0.125
Egypt	-0.5000***	-7.648	0.0012	1.350	-0.0003	-1.080	0.0003	1.087	-0.0008	-0.899	0.0003	1.156
Hong Kong	-0.4994**	-2.887	-0.0024	-1.075	-0.0009	-1.398	0.0000	0.021	0.0019	0.833	0.0001	0.128
India	-0.5030***	-3.918	0.0033*	1.795	0.0005	0.934	0.0005	0.965	0.0017	1.012	0.0001	0.259
Indonesia	-0.5000**	-2.459	0.0009	0.354	0.0004	0.477	-0.0002	-0.287	-0.0011	-0.412	0.0004	0.504
Taiwan	-0.5014**	-2.686	-0.0018	-0.458	-0.0010	-0.898	0.0007	0.585	0.0022	0.574	0.0022*	1.693
Full sample	-0.1900***	-4.061	0.018	0.840	0.001	0.030	-0.004	-0.570	0.037	1.630	-0.006	-0.920
Developed	-0.5000***	-8.269	-0.0003	-0.511	0.0005*	1.835	-0.0002	-0.780	0.0002	0.331	-0.0002	-0.742
Developing	-0.5007***	-9.236	0.0002	0.212	-0.0006*	-1.706	0.0003*	1.853	0.0007	1.196	0.0006*	1.919

Appendix: This table presents the regression results of the three factor models by country (Eq.(1) in Section 3). Panel A shows the results of the added sample, while Panel B shows the results of the deleted sample. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively. Equation (1) is estimated over a minimum 50-day window ending 16 days before the announcement date for each portfolio company in a country *j*. $R_{i,j,t}$ is the continuously compounded return adjusted for dividend for stock *i,* country *j* at time *t*; $R_{m,j,t}$ is the logarithmic return of the local market index in country *j* at time *t*; β_b is the market beta. $SMB_{s,j,t}$ is the difference between the excess return on a portfolio of small stocks and the excess return on a portfolio of big stocks in country *j* at time *t;* β_s is the SMB factor load. $HML_{h,j,t}$ is the difference between the excess return on a portfolio of high-book-to-market stocks and the excess return on a portfolio of low-book-to-market stocks in country *j* at time *t*, β_h is the HML factor, while $\varepsilon_{i,j,t}$ is the error term.

Country	Constant		$R_{m,j,t}$		$SMB_{s,j,t}$		$HML_{h,j,t}$	
Panel A: Added sample	α_i	t-test	β_b	t-test	β_s	t-test	β_h	T-test
Australia	0.0013***	4.447	0. 6700***	7.416	0.0115***	6.336	0.0021***	3.025
Canada	0.0021*	1.732	0. 3100***	8.816	0.0085***	3.011	0.0016	0.600
Finland	0.0014**	3.142	0. 6700***	4.489	0.0056***	5.500	-0.0074***	-6.626
France	0.0009*	1.983	0. 6200***	4.416	0.0078***	7.292	-0.0021**	-2.053
Germany	0.0003	0.603	0. 8800***	6.334	0.0043***	3.730	0.0005	0.489
Greece	0.0007	1.245	0. 8700***	3.577	0.0083***	6.687	0.0023**	1.967
Italy	0.0002	0.831	0. 600***	8.598	0.0045***	7.235	0.0006	0.895
Japan	0.0009**	3.594	0. 5300***	9.711	0.0109***	8.421	0.0002	0.359
Spain	0.0004	0.906	0. 7300***	5.988	0.0043***	4.444	0.0024**	2.690
U.K.	0.0055	0.121	0. 9200***	9.134	0.0013	1.183	0.0046***	4.681
U.S.	0.0005***	3.347	0. 9400***	5.849	0.0023***	5.539	-0.0020***	-3.807
Brazil	0.0006	1.179	0. 7100***	7.140	0.0048***	3.806	0.0010	0.878
Chile	0.0013**	3.371	0. 3700***	8.845	0.0008	0.734	0.0005	0.571
Egypt	0.0014*	1.739	0. 3200***	4.583	0.0055**	2.853	0.0062**	3.135
Hong Kong	0.0016**	2.678	0. 7000***	7.759	0.0097***	6.754	-0.0025*	-1.773
India	0.0010	1.259	0. 5600**	8.089	0.0031*	1.642	0.0038**	1.985
Indonesia	0.0054**	3.501	0. 6500**	3.225	0.0064	1.513	0.0069	1.328
Taiwan	0.0006**	2.423	0. 4200***	5.224	0.0068***	7.071	0.0006	0.939
Panel B: Deleted sample								
Australia	0.0007**	2.446	0. 3700***	5.779	0.0063***	8.985	0.0011*	1.664
Canada	0.0011	0.935	0. 6100***	4.760	0.0046*	1.626	0.0009	0.324
Finland	0.0005*	1.665	0. 3500***	7.679	0.0030**	2.915	-0.0039***	-3.511
France	0.0006	1.209	0. 3800***	7.574	0.0048***	4.448	-0.0013	-1.252
Germany	0.0002	0.374	0. 5500***	4.127	0.0027**	2.312	0.0003	0.303
Greece	0.0005	0.784	0. 5600***	8.554	0.0052***	4.212	0.0015	1.239
Italy	0.0001	0.474	0. 3400***	5.601	0.0026***	4.124	0.0003	0.510
Japan	0.0005**	2.049	0. 3000***	6.235	0.0062***	5.500	0.0001	0.205
Spain	0.0002	0.489	0. 3900***	8.633	0.0023**	2.399	0.0013	1.452
U.K.	0.0029	0.064	0. 4900***	5.141	0.0007	0.627	0.0025**	2.481
U.S.	0.0003**	2.108	0. 5900***	7.925	0.0015**	3.489	-0.0012**	-2.398
Brazil	0.0002	0.624	0. 5700***	9.084	0.0025**	2.017	0.0005	0.465
Chile	0.0008**	1.955	0. 2100***	5.130	0.0004	0.426	0.0002	0.331
Egypt	0.0007	0.939	0. 1800**	2.474	0.0030	1.541	0.0033*	1.693
Hong Kong	0.0009	1.500	0. 3900***	6.025	0.0054***	3.782	-0.0014	-0.993
India	0.0006	0.768	0. 3400***	4.934	0.0019	1.001	0.0023	1.211
Indonesia	0.0028*	1.820	0. 3100*	1.677	0.0033	0.787	0.0036	0.690
Taiwan	0.0004	1.381	0. 2400***	8.678	0.0039***	6.310	0.0003	0.535