

Is Being Islamic Worth It?

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Abstract

We investigate the valuation of the *Sharia* compliance of firms. Thus, we examine the price effects of additions and deletions to the Dow Jones Islamic Market Index (DJIMI). We use event study methodology to measure abnormal returns for companies from Muslim countries and the USA over the period of 2000 to 2009. We determine that additions to the Islamic index lead to a positive stock market reaction in Muslim countries but a negative reaction in the USA. We interpret these results to be a different investor perception of the *Sharia* compliance of firms by region. We observe that the financial crisis leads to a better perception of the addition to the Islamic index in both regions. Conversely, deletions of stocks from the DJIMI do not drive a significant stock market reaction in either region, regardless of the period. Our findings support the view that the valuation of the *Sharia* compliance of firms is conditional on the region of origin and the period.

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1. Introduction

There has been a large expansion of Islamic finance in the last two decades. Islamic financial assets have increased from \$150 billion in the mid-90s to \$1880 billion at the end of 2015 (Islamic Financial Services, 2016). This growth has been driven by the development of Islamic banks but also by the issuance of *sukuk* and the development of Islamic investment funds. According to the same report, the Islamic funds industry has grown from \$28.2 billion assets under management in 2004 to \$71.3 billion in 2015.⁴

Islamic funds contain equities of companies that are compliant with *Sharia* (Islamic law). *Sharia* includes a set of principles that prohibits interest, excessive uncertainty, gambling, the financing of certain economic activities, and promotes risk sharing, profit sharing and asset-backed financial transactions. Islamic fund providers therefore use Islamic indices, such as the Dow Jones Islamic Market Index (DJIMI). To become eligible for inclusion in an Islamic index, a company must undergo several screening filters. On the one hand, a firm's primary business must be compliant with *Sharia*. On the other hand, the firm must meet financial criteria. The DJIMI sets upper limits for the following ratios: total debt to market capitalization, sum of cash and interest-bearing funds to market capitalization and accounts receivables to market capitalization.

Our objective in this paper is to study the price effects of additions and deletions to Islamic indices. Reconstitutions of Islamic indices provide a unique opportunity to investigate the valuation of the *Sharia* compliance of firms. By examining how stock market investors respond to these reconstitutions, we can determine how worthwhile it is for investors to be Islamic.

The hypothesis of an increase in the price of added firms to Islamic indices has its roots in two arguments. First, being added to an Islamic index provides access to a new class of investors and should therefore increase the demand for the stocks of firms that are newly included in the Islamic index. The literature on conventional indices has provided evidence regarding the price pressure hypothesis, which states that inclusion in a conventional index leads to an increase in demand from tracker funds for firms newly included in the index (Harris and Gurel, 1986; Woolridge and Ghosh, 1986). In accordance with this hypothesis, membership in an Islamic index should enhance the demand for stocks of the newly included firm.

⁴ The number of Islamic funds has grown from 285 in 2004 to 1220 in 2015, with Malaysia and Saudi Arabia as the leading markets.

Second, the financial filters associated with the Islamic index may be considered positively by stock market investors. On the one hand, this addition is a signal of low indebtedness, which is perceived as an indicator of lower bankruptcy risk. In addition, less debt helps mitigate the agency costs that originate from conflicts between debtholders and shareholders (Jensen and Meckling, 1976). On the other hand, a low level of cash can be perceived as an indicator of good corporate governance since managers may be optimally deploying the cash (Dittmar and Mahrt-Smith, 2007; Harford, Mansi and Maxwell, 2008), and can also indicate a low level of risk, which decreases the need to retain cash reserves (Han and Qiu, 2007).

However, the positive stock market reaction following additions to an Islamic index can differ between regions based on the perception of investors of *Sharia* compliance. In Muslim countries, investors may place more value on companies that are added to Islamic indices. Such companies comply with specific Islamic prescriptions for financial ethics and can thus encourage purchase behavior that is based on the beliefs of the investors. There is evidence that culture influences stock market decisions (Grinblatt and Keloharju, 2001; Kumar, Page and Spalt, 2011). Religious attitudes and values impact the behavior of investors. Religious events such as Ramadan can influence stock prices in Muslim countries (Turk-Ariss, Rezvani, and Mehdian, 2011; Bialkowski, Etebari and Wisniewski, 2012; Bialkowski et al., 2013), suggesting a relation between the Muslim religion and investor behavior⁵. Conversely, investors with a negative perception of Islam can react negatively to an Islamic index addition. Therefore, this event would lead to a negative stock market reaction.

A financial crisis may influence the stock market reaction following additions to and deletions from an Islamic index by increasing the favorability of inclusion in such an index. The signal of low indebtedness associated with being *Sharia*-compliant can be more beneficial during episodes of generalized financial distress. Furthermore, Islamic indices had better financial performance than conventional indices during the financial crisis (Walkshäusl and Lobe, 2012; Ho et al., 2014). Moreover, the screening rules used by *Sharia* boards had excluded stocks such as Enron, WorldCom, Tyco and Global Crossing; these were included in the conventional Dow Jones index before they experienced scandals. In addition, the literature has shown that Islamic banks had better resilience than conventional banks during the financial crisis (Hasan and Dridi, 2010; Farooq and Zaheer, 2015). Therefore, the positive

⁵ In the context of predominantly Christian countries, the literature shows also that religious events like Easter week affect investor's decisions (Pantzalis and Ucar, 2014).

perception of being added to an Islamic index may have been amplified during the financial crisis.

To isolate the impact of following Islamic principles on stock market valuation, we based our identification strategy on an event study methodology to investigate the effects of additions to an Islamic index. We measure the abnormal stock returns of listed companies during the 2000-2009 period for two subsamples based on the reconstitution of the DJIMI. This Islamic index, which is considered the most important, was launched in 1999.

The first subsample contains US firms, while the second includes listed companies from nine countries with a large Muslim population (Egypt, India, Indonesia, Jordan, Kuwait, Malaysia, Morocco, Qatar, and Turkey). The results are compared for these subsamples because the psychological motives of these two populations can differ greatly. On the one hand, in accordance with evidence that the Muslim religion can influence the behavior of investors, investors in Muslim countries may prefer *Sharia*-compliant stocks. On the other hand, per the polls showing a negative opinion of Islam by a large proportion of the US population, US investors may have a more negative perception of being added to an Islamic index.⁶ In accordance with Morse and Shive's (2011) conclusion that patriotism affects investor decisions, such a view can therefore govern financial decisions.

Thus, the analysis of the stock market reaction following the reconstitution of the Islamic index provides information on the value of following Islamic principles. By considering two different regions, we can determine whether this reaction differs by region, while the comparison of the periods before and during the financial crisis informs whether the reaction differs by time.

Our paper therefore broadly contributes to the literature on Islamic finance. By providing insights on the stock market valuation of being Islamic, this paper provides crucial information to assess the value of a firm's *Sharia* compliance. This paper also extends the literature on Islamic indices. Many papers have compared the financial performance of Islamic indices with conventional indices (e.g., Girard and Hassan, 2008; Ashraf, 2014), while others have investigated the exposure of Islamic indices to risks (e.g., Shamsuddin, 2014).⁷ To our knowledge, we have conducted the first study that examines the stock market reaction to the additions to and deletions from an Islamic index. We therefore also contribute to the literature on the reconstitutions of indices, which has previously investigated

⁶ According to the Pew Research Center, in 2007, 45% of Americans believe that Islam encourages violence more than other religions. According to Brookings, in 2015, 61% of Americans have a generally unfavorable opinion of Islam.

⁷ Abdelsalam et al. (2014) compare the performance of Islamic funds and conventional funds.

conventional indices (Chen, Noronha and Singal, 2004) and sustainability indices (Cheung, 2011; Becchetti et al., 2012).

This study has important implications for investors and companies. It provides insights to companies regarding the short-term implications of being added to or deleted from an Islamic index. This study enables the determination of whether the efforts of managers to meet Islamic filters contribute to creating or destroying value in the short-run.

The remainder of the article is structured as follows. Section 2 provides an overview of Islamic indices. Section 3 describes data and methodology. Section 4 displays the results. Section 5 presents the study's conclusions.

2. Overview of Islamic Indices

The creation of Islamic indices has allowed both the provision of a list of *Sharia*-compliant investable equities and usage as a benchmark for Islamic funds managers. Indeed, having a list of Islamic fund investable equities is key for Muslim investors and Islamic fund managers since they construct their portfolios by selecting stocks from these Islamic indices. In addition, because speculation and investment in conventional bonds and monetary assets are prohibited, the management of Islamic funds is essentially passive; portfolio managers tend to track the financial performance of *Sharia*-compliant indices.

Many *Sharia*-compliant indices have been established by major index providers: the DJIMI, the Financial Times Stock Exchange (FTSE) Shariah Indexes, the Standard and Poor's (S&P) Shariah Indices and the Morgan Stanley Capital International (MSCI) Islamic index series. The first Islamic index was launched in 1999 by Dow Jones, followed by the FTSE in 2000, the S&P in 2006 and the MSCI in 2007.

Sharia compliance of each stock composing the Islamic index is certified by a *Sharia* board. The members of this board are scholars who have theological, financial and legal skills, and are internationally recognized because of their rarity. The number of board members can vary from one index provider to another.⁸

The *Sharia* board oversees the construction of Islamic screening rules. To be considered *Sharia*-compliant, the firm must pass both qualitative and quantitative screenings.

The qualitative or sectorial screen consists of excluding companies whose primary activity is considered prohibited (*haram*) by Islamic scholars. These firms include those

⁸ For instance, the *Sharia* board of the DJIMI includes four *Sharia* scholars.

whose core business involves conventional alcohol, tobacco, entertainment (e.g., casinos/gambling and pornography), weapons, pork, or conventional financial services, such as banking and insurance.

The second type of screening, quantitative or financial screens, is applied to companies that meet the sectorial criteria. The second filter is used to ensure the prohibition of interest and to guarantee a close link between production and finance. Thus, in this screening, *Sharia* scholars confirm that the level of indebtedness, the level of interest income, and the proportion of accounts receivables do not exceed certain thresholds. Companies that exceed one or more of these thresholds are excluded from a *Sharia*-compliant portfolio.

Since these thresholds are not explicitly defined in *Sharia*, they can differ slightly among Islamic indices providers. The *Sharia* board of the DJIMI uses three financial ratios that do not exceed 33%: total debt divided by trailing 24-month average market capitalization, the sum of a company's cash and interest-bearing securities divided by trailing 24-month average market capitalization, and account receivables divided by trailing 24-month average market capitalization.

When an investor buys shares, he becomes the owner of a share of a firm and, as such, he holds rights to its assets and liabilities. Thus, the prohibition of interest dictates control of the level of debt and interest-bearing securities.

Monitoring the level of account receivables is justified by the Islamic finance requirement for asset-backing. To proffer the real economy on a longer time horizon than conventional finance, *Sharia*-compliant portfolio managers eliminate companies for which fixed assets do not represent a major share of total assets.

The empirical literature shows that the Islamic screening process leads to the exclusion of 65% to 90% of stocks; the indebtedness ratio constraint results in the most exclusions (Abdul Rahman *et al.*, 2010; Peillex and Ureche-Rangau, 2013).

The comparative performance of Islamic indices relative to conventional indices has been documented. From a theoretical perspective, the use of negative screens shrinks the universe of stocks and therefore reduces index diversification. Thus, screened portfolios like *Sharia*-compliant indices should underperform unscreened portfolios like conventional indices. Many empirical studies compare the performance of Islamic indices and their conventional benchmarks and find no significant differences (for the Dow Jones: e.g. Jawadi *et al.*, 2014; for the MSCI: e.g. Walkshäusl and Lobe, 2012). Moreover, they show that Islamic indices have performed better than conventional indices during the financial crisis. This higher level of resilience is attributed notably to the exclusion of financial companies

from Islamic indices; these companies suffered significantly during the last financial downturn.

3. Data and methodology

We first present the stepwise procedure used to build our database. Next, we discuss the methodology chosen for our empirical analysis.

3.1 Data

We document the stock price movements that follow the inclusions and deletions of firms from the Dow Jones Islamic Market Index (DJIMI) over the 2000-2009 period.

Launched in 1999, the DJIMI was the first financial index to track the performance of the global universe of investable equities that pass the Islamic screens. Moreover, among the Islamic indices, the DJIMI is probably the most well-known and the most used by portfolios managers world-wide. Since 2010, the DJIMI has been managed by McGraw Hill Companies *via* a joint-venture with the CME Group. As this joint management may have changed the perception of investors, we do not include the announcements from 2010 on. In 2016, the DJIMI includes more than 2,600 companies originating from 56 countries and representing 10 industries. In market capitalization terms, the *Sharia*-compliant stocks included in the DJIMI originate primarily from non-Muslim countries (more than 95%). Per the DJIMI, the USA has the highest weighting (approximately 60%) followed by Japan (6%), the U.K. (6%), and Switzerland (5%).

For the study we consider stocks from Muslim countries and from the USA because we want to compare Muslim countries with a country that has a very different perception of Islam. In addition, the USA has the highest country allocation.

Muslim countries include Egypt, India, Indonesia, Jordan, Kuwait, Morocco, Qatar, and Turkey. The vast majority of the population of these countries is Muslim except for India for which the presence of a large Muslim population justifies inclusion in the sample.

The composition of the DJIMI is reviewed quarterly by the supervisory board of Islamic scholars; at that time the board may make such changes as deleting or adding stocks. The review occurs on the third Friday in March, June, September and December. Companies are removed from the DJIMI when they violate a financial requirement or if they experience an exceptional event such as a delisting, bankruptcy, merger, or takeover. In the database, we only retain the deletion events related to non-compliance with Islamic screens. Moreover, on

the second Friday of the third month of each quarter the DJIMI announces the companies that will be added to or deleted from the index. The initial database consists of 10,449 announcements of inclusion and exclusion events. To be sampled, companies must have stock price data available in the DataStream database.

In accordance with McWilliams and Siegel (1997), we eliminate observations that have been contaminated by other events that affect firm value such as a CEO change, profit warnings, earnings announcements, dividend payments, stock splits, changes in capital structure, etc... To identify these events, we use information from the LexisNexis database.

Table 1 exhibits the number of announcements of index additions and deletions by year separately for Muslim countries and for the USA. Our final sample includes 1,404 index inclusions and 930 index exclusions. The number of events in Muslim countries represents 35% of the index additions and 16% of the index deletions. In 2008, 164 US firms were deleted from the DJIMI and replaced by 312 additions of firms located in Muslim countries during the same period. These exclusions may be explained by the subprime crisis that strongly impacted the United States. During bearish periods, the market capitalization of firms tends to decrease. Hence, since the Islamic screening used by the DJIMI *Sharia* board is based on the market capitalization, these bearish periods lead to the elimination of more companies than do bullish periods. The average market capitalization value for US firms is systematically higher; this is consistent with our expectations.

Table 2 provides additional details about the firms in our sample. Panel A of Table 2 shows the breakdown of events by Muslim country. The largest group of firms is from Malaysia (43.35%) followed by India (26.13%) and Indonesia (9.01%). Panel B displays the number of firms in the sample by industry. Most of these firms operate in the manufacturing industry (50.54%), followed by services (15.25%), and the mining and construction sector (10.69%).

3.2 Event study methodology

We employ an event study methodology to estimate the stock market reaction to firm addition to and deletion from the DJIMI. Our estimation window covers 120 trading days: from $t - 140$ to $t - 20$, where t is the event date, i.e., the event date is when the changes are announced by the DJIMI. This period is sufficiently long to capture the stock market behavior without affecting the stability of our estimators.

We use an event window of 21 days (from $t - 10$ to $t + 10$) i.e., two trading weeks before and after the index redefinition. In accordance with the approach of Groening and Kanuri

(2013), we use a short event window to reduce the probability of including other events that may create bias in the abnormal returns. Moreover, this short event window is sufficiently long to capture the specific effects of the effective changes, which occur 5 trading days after the announcement date (i.e., the next Friday). In accordance with previous studies on index redefinition effects, we adopt the market model to compute the normal returns. This one-factor model relates the return of a given firm to the return on the market index (Lee et al., 2013). There is no significant difference between event study results derived from this model and from using more complex models, such as the Fama-French or the Carhart model, and obtained from the market model (MacKinlay, 1997). For any firm i at time t , the linear specification of the market model is defined as follows:

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

where R_{it} is the observed logarithmic return of company i on day t , R_{mt} is the logarithmic return on the corresponding market index on day t , α_i and β_i are the parameters to be estimated over the estimation window, and ε_{it} is the zero-mean disturbance term.

Daily stock returns data are collected from DataStream. We use the Russell 3000 as a proxy of the market portfolio for U.S. stocks. We use national indices for the market portfolio for companies originating from Muslim countries: the MSCI Egypt Index, the MSCI Indonesia Index, the NIFTY 500 for the Indian market, the MSCI Jordan Index, the Kuwait Stock Exchange Index, the MSCI Morocco Index, the MSCI Malaysia Index, the MSCI Qatar Index and the MSCI Turkey Index.

Then, following Zou and Li (2016), the daily abnormal return over a certain event window for each stock is calculated as the difference between the actual return and the estimated (expected) return:

$$AR_{it} = R_{it} - \hat{\alpha}_i - \hat{\beta}_i R_{mt} \quad (2)$$

The next step aggregates the abnormal returns across companies. This aggregation is calculated by averaging the abnormal returns for all companies in the sample on a given day for each day of the event window ($t - 10$ to $t + 10$), i.e.

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

where N denotes the number of companies that experienced an addition to or a deletion from the DJIMI.

Finally, we measure the persistence of the market reaction surrounding the announcement of an Islamic index redefinition by aggregating the AAR_t through time over the

whole event window and different subperiods. The cumulative average abnormal return, $CAAR_i(t_1, t_2)$, is the sum of all AAR_t between t_1 and t_2 such that

$$CAAR_i(t_1, t_2) = \sum_{t=t_1}^{t_2} AAR_{it} \quad (4)$$

These $CAAR_i(t_1, t_2)$ are averaged over four event windows. The main event window is $[0,0]$ i.e., the day of the announcement of the DJIMI reconstitution. We then consider $[-1,+1]$, $[-2,+2]$, and $[-5,+5]$ to distinguish temporary price changes from more permanent ones in accordance with prior literature.

To test the statistical significance of the cumulative abnormal average returns and the abnormal average returns, in accordance with the approach of Clacher and Hagendorff (2012), we perform parametric and non-parametric tests, namely, the Student and Wilcoxon tests.

4. Results

In this section, we document the price movements surrounding the announcements of inclusions into and exclusions from the DJIMI. We first present results over the whole period. We then display the findings by separately considering the period before the crisis and considering the crisis period. Finally, we provide several robustness tests.

4.1 Main estimations

We present the main estimations by studying the stock market reaction that follows additions to and deletions from the Islamic index over the whole period. Table 3 summarizes CAARs surrounding the announcements of stock additions to the DJIMI for the USA and Muslim countries over the whole period. Two major findings emerge.

First, we observe that the CAARs are negative when US stocks are included in the DJIMI. The CAARs for the US stocks are significantly negative for all event windows except for $[0,0]$ for which the negative CAARs are not significant. These results suggest that, on average, investors react negatively to US stock additions to the DJIMI. Second, in contrast, we find that the CAARs are positive when stocks originating from Muslim countries are added to the DJIMI. They are significantly positive for the three shortest of the four event windows. This finding means that the stock market reacts positively to the announcement of the addition to the DJIMI. Our main conclusion is therefore that the addition to an Islamic index leads to a stock market reaction; however, the sign of this reaction is influenced by the firm's region of origin.

This conclusion can be interpreted as follows. In Muslim countries, the addition to an Islamic index leads to a greater demand for the stock by investors who appreciate the *Sharia* compliance of the newly added firm. These investors assign great value to this new information because of their religious beliefs. This finding agrees with the results obtained in studies showing the influence of Ramadan on investor behavior (Turk-Ariss, Rezvanian, and Mehdian, 2011; Bialkowski, Etebari and Wisniewski, 2012). Therefore, Muslim investors who believe that the criteria applied by *Sharia* scholars successfully transcribe Islamic law may have decided to invest heavily in stocks that are newly included in the DJIMI. Conversely, the negative reaction in the US originates from the negative perception by investors of the signal sent by *Sharia* compliance. No religious motive can motivate a positive reaction in this country, however the addition to the Islamic index increases the degree of adverse reaction based on a negative view of such an event.

The perception of investors for being Islamic would then dominate the positive reaction that the membership in an Islamic index signals a lower bankruptcy risk because of lower indebtedness and the price pressure hypothesis for the US, while it can amplify this response for Muslim countries.

Table 4 displays the results of stock deletions from the DJIMI over the whole period. Stock deletion announcements do not lead to a significant stock market reaction in most cases. For the US, we observe that the CAARs surrounding the announcements of stock exclusions are not significant for three windows, while they are significant and positive for the window [0,0]. For Muslim countries, we find that the CAARs are not significant in all cases except for significantly positive ones for the longest event window.

Thus, we interestingly find that the stock market response following stock deletions is not at all symmetric to the observed reaction following stock additions. Namely, deletion from the Islamic index does not lead to a stock market reaction. This conclusion applies to both regions.

In other words, while stock market investors react to an addition, they do not react when a deletion occurs. This conclusion is consistent with the finding of Chen, Noronha and Singal (2004) for conventional indices. Namely, the researchers show that, while stock prices increase following S&P500 index additions, the negative effects of deletions are much smaller or may not be observed. They explain this asymmetric result using the concept of investor awareness. As investors become aware of a stock when it is added to the index, they are more likely to buy it. Conversely, when the stock is deleted from the index, investors do not become unaware of it.

In the context of Islamic indices reconstitutions, we similarly interpret our findings. After the inclusion of a firm in the DJIMI, stock market participants become aware of the *Sharia* compliance of this firm. However, the deletion does not make them unaware of this signal. The investors continue considering that the firm is in compliance with the requirements for inclusion in the Islamic index. Hence, investors may avoid massive selling or buying of shares when the firm is removed from the Islamic index, regardless of their perception of the firm's *Sharia* compliance.

4.2 Impact of the financial crisis

We investigate how the financial crisis may influence the stock market reaction following additions to and deletions from the Islamic index. We define 2000-2007 as the pre-crisis period and 2008-2009 as the crisis period. Tables 5 and 6 report the CAARs surrounding the announcement of stock inclusion in the DJIMI during both periods.

The key finding is the impact of the period on the results. For the US, we observe that the addition of stocks in the DJIMI leads to a significantly negative market reaction before the financial crisis for most windows, with a non-significant reaction for [0,0]. However, the stock market reaction becomes non-significant during the crisis for most windows. The reaction can be significantly positive for the window [0,0].

For Muslim countries, we find that the addition of stocks in the DJIMI induces a non-significant stock market reaction before the crisis but a significantly positive one during the crisis for three of the four tested windows.

Thus, we observe that the financial crisis has increased the CAARs in both regions. Overall, the crisis has turned a pre-crisis negative reaction into a non-significant reaction in the US, and a non-significant reaction into a positive reaction in Muslim countries. In summary, the financial crisis has led to a better perception of the addition to the DJIMI for all stock market investors.

This conclusion can be explained by the fact that the financial crisis has amplified the positive financial information associated with the addition to an Islamic index. Such a positive signal occurs because the *Sharia*-compliance is associated with an upper limit on indebtedness that can be particularly beneficial during episodes of financial distress. In addition, stock market investors can be sensitive to the fact that Islamic indices had a better financial performance than conventional indices during the financial crisis (Walkshäusl and Lobe, 2012) or that Islamic finance can be associated with higher resilience during troubled times (Hasan and Dridi, 2010; Farooq and Zaheer, 2015).

We next consider the deletions from the DJIMI before and during the crisis periods. Tables 7 and 8 display the results for each period. We determine that deletion from the index does not cause a significant stock market reaction before the crisis for both regions. During the crisis, this finding remains valid for Muslim countries. The behavior is more ambiguous for the US, which has a positive stock market reaction for several windows that is significant.

Hence the deletion does not influence the stock market reaction for both periods in Muslim countries and, to a lesser extent, in the US. The difference in the reaction of stock market investors following index additions and deletions can again be attributed to investor awareness.

In summary, the financial crisis has enhanced the valuation effects of being added to an Islamic index. However, the crisis has not barely modified the perception of investors of index deletions; this again shows an asymmetric reaction in accordance with investor awareness.

4.3 Robustness checks

We use various means to check the robustness of our results. For each robustness check, we provide results following additions and deletions to the DJIMI over the whole period.

First, we use a longer estimation window. While the estimation window stretches from 140 to 20 days before the event in the main estimations, we adopt a window from 250 to 20 days before the event. The results are reported in Table 9.

We obtain overall the same findings than in the main estimations. The CAARs are positive when stocks originating from Muslim countries are added to the DJIMI, while they are negative when US stocks are included. The sign is not significant for all event windows and the significance can differ between both statistics for significance. However the broad conclusion remains the opposing reactions for both regions. In addition, we show again that stock deletion announcements do not lead overall to a significant stock market reaction. The CAARs surrounding the announcements of stock exclusions are never significant for Muslim countries, while they are positive and significant for two event windows with each statistic.

Second, we use the MSCI Emerging Markets Index instead of national indices in the market model to measure the expected returns of stocks of companies located in a Muslim country. The specification of the index can exert an impact on the measured expected returns and it can be appropriate to consider a global index to replace national indices. The results are presented in Table 10.

We find out that the CAARs are still significantly positive following announcements of inclusions with the three shortest windows. Only with $[-5,+5]$, the CAARs are positive but not significant. To announce deletions from the DJIMI leads to a non-significant reaction when considering the t-statistic, but it can drive a significant reaction with the z-statistic. So these results corroborate our main findings for additions but moderate the absence of reaction following deletions.

Third, we apply the Fama and French three-factor model to generate expected returns. We report these estimations in Table 11. Interestingly, this alternative specification of our model provides strong support for the findings on the additions but moderate our conclusions on the deletions.

Namely, we observe that the addition of stocks in the DJIMI leads to a significantly negative market reaction in the US and a significantly positive market reaction in Muslim countries for all windows. Therefore our conclusion that the addition in the DJIMI leads to opposing effects in both regions is confirmed. However, the deletion of stocks from the DJIMI tends now to exert a significant and positive impact on the stock market reaction in most cases.

Overall, we observe that the robustness checks confirm our main findings regarding the additions of stocks in the DJIMI. They lead to opposing effects in the US and in Muslim countries. They moderate our conclusion on the deletions from the DJIMI since we can observe significant effects of these events on the stock market reaction with some specifications.

5. Conclusions

This paper examines the valuation of the *Sharia* compliance of firms. To this end, we investigate the price effects of additions to and deletions from Islamic indices using an event study methodology. We are then able to analyze whether it is worthwhile for listed companies to follow Islamic principles.

We find evidence that being Islamic has a significant impact on stock market reaction. Additions to the Islamic index lead to a stock market response that differs by the firm's region of origin. The impact on market valuation is negative in the US but positive in Muslim countries. We interpret these results by the different perception of investors of the *Sharia* compliance of firms in both regions. While the addition to an Islamic index leads to a greater

demand of investors attracted by the *Sharia* compliance, US investors may react negatively based on the negative perception of Islam.

Conversely, stock deletions from the Islamic index do not lead to a significant stock market reaction in both regions. This asymmetric reaction can be explained by investor awareness in accordance with Chen, Noronha and Singal (2004). Adding a firm to an Islamic index increases the awareness of stock market investors of the firm's *Sharia* compliance, while the deletion does not make them unaware.

The stock market valuation following additions to and deletions from the Islamic index is influenced by the financial crisis. We observe that the financial crisis leads to a better perception of the addition to the Islamic index for both regions. We explain that finding by the fact that *Sharia* compliance is associated with financial filters on indebtedness; this can be perceived positively during episodes of financial distress. In addition, the better performance of Islamic indices during the financial crisis may have improved the perception of *Sharia* compliance. The financial crisis has not modified the overall perception of a deletion from the Islamic index for both regions; a deletion is still generally not significant.

The main insight for investors and companies is that the addition to an Islamic index can lead to value creation or value destruction conditional on the firm's region of origin and on the period. At the same time, overall, the deletion from an Islamic index has no impact on stock market valuation.

This paper opens avenues for further research. It represents an initial investigation on how reconstitutions of an Islamic index can influence stock market reaction. Future work could examine this response by considering the personal characteristics of the investors. Information on the religion and opinions of investors could be considered to increase our understanding of how worthwhile it is to be Islamic.

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Table 1
Number of index additions and deletions

| Year | No. of index additions | Average market value | No. of index deletions | Average market value |
|----------------------------------|------------------------|----------------------|------------------------|----------------------|
| <i>Panel A: USA</i> | | | | |
| 2002 | 86 | 2366.69 | 98 | 2455.58 |
| 2003 | 110 | 2591.34 | 116 | 3601.37 |
| 2004 | 157 | 3037.66 | 47 | 2356.91 |
| 2005 | 120 | 6452.44 | 106 | 4399.16 |
| 2006 | 157 | 4901.05 | 96 | 4908.71 |
| 2007 | 197 | 7304.66 | 127 | 8597.16 |
| 2008 | 57 | 2516.76 | 164 | 3237.78 |
| 2009 | 32 | 2524.74 | 25 | 6698.66 |
| Total | 916 | 3961.92 | 779 | 4531.92 |
| <i>Panel B: Muslim countries</i> | | | | |
| 2000 | 2 | 289.88 | 0 | 0 |
| 2001 | 4 | 218.63 | 9 | 242.69 |
| 2002 | 14 | 417.69 | 8 | 412.41 |
| 2003 | 14 | 956.83 | 11 | 395.11 |
| 2004 | 29 | 251.12 | 12 | 1584.36 |
| 2005 | 14 | 1798.14 | 25 | 287.65 |
| 2006 | 38 | 379.68 | 17 | 975.25 |
| 2007 | 43 | 1095.06 | 17 | 972.17 |
| 2008 | 312 | 2174.21 | 37 | 410.97 |
| 2009 | 18 | 1863.44 | 15 | 223.67 |
| Total | 488 | 944.47 | 151 | 611.59 |

This table displays the number of newly included or excluded firms to the index in our sample by year and market. The unit of average market value is in millions of dollars. Period: 2000-2009.

Table 2
Number of firms in the sample by country and industry

| <i>Panel A: Geographical classification</i> | | |
|---|--------------|---------|
| Country | No. of firms | Percent |
| USA | 1695 | 72.62% |
| Muslim countries | 639 | 27.38% |
| Egypt | 24 | 3.76% |
| India | 167 | 26.13% |
| Indonesia | 58 | 9.01% |
| Jordan | 13 | 2.03% |
| Kuwait | 44 | 6.89% |
| Malaysia | 277 | 43.35% |
| Morocco | 7 | 1.01% |
| Qatar | 11 | 1.72% |
| Turkey | 38 | 5.95% |
| Total | 639 | 100% |
| <i>Panel B: Industrial classification</i> | | |
| Industry | No. of firms | Percent |
| Agriculture, forestry and fishing | 32 | 1.74% |
| Mining and construction | 197 | 10.69% |
| Manufacturing | 926 | 50.24% |
| Transportation and public utilities | 168 | 9.12% |
| Wholesale trade and retail trade | 146 | 7.92% |
| Finance, insurance and real estate | 93 | 5.05% |
| Services | 281 | 15.25% |
| Total | 1843 | 100% |

Table 3
Cumulative average abnormal returns of added stocks over the whole period

| Event windows | Markets | CAAR (%) | Positive CAAR (%) | <i>t</i> -stat | <i>z</i> -stat |
|---------------|------------------|----------|-------------------|----------------|----------------|
| [0,0] | USA | -0.07% | 49.0% | -0.80 | -0.59 |
| | Muslim countries | 0.17% | 52.7% | 2.59** | 1.18 |
| [-1,+1] | USA | -0.52% | 46.7% | -3.30*** | -1.98** |
| | Muslim countries | 0.73% | 55.4% | 5.66*** | 2.36** |
| [-2,+2] | USA | -0.63% | 46.8% | -2.97*** | -1.92* |
| | Muslim countries | 0.74% | 55.2% | 4.22*** | 2.27** |
| [-5,+5] | USA | -1.46% | 45.3% | -4.37*** | -2.84*** |
| | Muslim countries | 0.19% | 51.9% | 0.65 | 0.82 |

This table displays cumulative average abnormal returns (CAARs) of the added firms by type of market (916 U.S. stocks additions vs. 488 stocks from a Muslim country) across four event windows. The percentage of positive CAARs is presented in the fourth column while the next two columns provide the Student *t*-stat and Wilcoxon *z*-stat. Stars denote significance (* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$).

Table 4
Cumulative average abnormal returns of deleted stocks over the whole period

| Event windows | Markets | CAAR (%) | Positive CAAR (%) | <i>t</i> -stat | <i>z</i> -stat |
|---------------|------------------|----------|-------------------|----------------|----------------|
| [0,0] | USA | 0.24% | 52.8% | 2.46** | 1.54* |
| | Muslim countries | 0.10% | 54.6% | 1.13 | 1.14 |
| [-1,+1] | USA | -0.16% | 50.3% | -0.73 | 0.18 |
| | Muslim countries | 0.28% | 55.3% | 1.31 | 1.30 |
| [-2,+2] | USA | -0.20% | 51.1% | -0.69 | 0.61 |
| | Muslim countries | 0.39% | 53.9% | 1.20 | 0.97 |
| [-5,+5] | USA | 0.13% | 51.3% | 0.28 | 0.75 |
| | Muslim countries | 0.88% | 54.6% | 1.73* | 1.14 |

This table displays cumulative average abnormal returns (CAARs) of the deleted firms by type of market (779 U.S. stocks deletions vs. 151 stocks from a Muslim country) across four event windows. The percentage of positive CAARs is presented in the fourth column while the next two columns provide the Student *t*-stat and Wilcoxon *z*-stat. Stars denote significance (**p*<0.1, ***p*<0.05, ****p*<0.01).

Table 5
Cumulative average abnormal returns of added stocks before the financial crisis

| Event windows | Markets | CAAR (%) | Positive CAAR (%) | <i>t</i> -stat | <i>z</i> -stat |
|---------------|------------------|----------|-------------------|----------------|----------------|
| [0,0] | USA | -0.11% | 47.5% | -1.13 | -1.27 |
| | Muslim countries | 0.00% | 47.3% | 0.03 | -0.57 |
| [-1,+1] | USA | -0.49% | 45.2% | -3.03*** | -2.39** |
| | Muslim countries | -0.28% | 41.1% | -2.23** | -1.89* |
| [-2,+2] | USA | -1.06% | 42.7% | -4.72*** | -3.67*** |
| | Muslim countries | -0.14% | 49.1% | -0.69 | -0.19 |
| [-5,+5] | USA | -1.83% | 41.7% | -5.17*** | -4.14*** |
| | Muslim countries | 0.14% | 50.9% | 0.49 | 0.19 |

This table displays cumulative average abnormal returns (CAARs) of the added firms by type of market (630 U.S. stocks additions vs. 115 stocks from a Muslim country) before the subprime crisis periods. Period: 2000-2007. The percentage of positive CAARs is presented in the fourth column while the next two columns provide the Student *t*-stat and Wilcoxon *z*-stat. Stars denote significance (**p*<0.1, ***p*<0.05, ****p*<0.01).

Table 6
Cumulative average abnormal returns of added stocks during the financial crisis

| Event windows | Markets | CAAR (%) | Positive CAAR (%) | <i>t</i> -stat | <i>z</i> -stat |
|---------------|------------------|----------|-------------------|----------------|----------------|
| [0,0] | USA | 0.47% | 60.7% | 1.29 | 2.01** |
| | Muslim countries | 0.27% | 54.4% | 2.99*** | 1.60 |
| [-1,+1] | USA | -0.52% | 53.9% | -0.91 | 0.74 |
| | Muslim countries | 1.13% | 59.9% | 6.39*** | 3.58*** |
| [-2,+2] | USA | 1.11% | 59.6% | 1.45 | 1.80* |
| | Muslim countries | 1.19% | 58.7% | 4.97*** | 3.14*** |
| [-5,+5] | USA | -2.25% | 42.7% | -1.56 | -1.38 |
| | Muslim countries | 0.50% | 54.1% | 1.24 | 1.49 |

This table displays cumulative average abnormal returns (CAARs) of the added firms by type of market (286 U.S. stocks additions vs. 373 stocks from a Muslim country) during the subprime crisis periods. Period: 2007-2009. The percentage of positive CAARs is presented in the fourth column while the next two columns provide the Student *t*-stat and Wilcoxon *z*-stat. Stars denote significance (**p*<0.1, ***p*<0.05, ****p*<0.01).

Table 7
Cumulative average abnormal returns of deleted stocks before the financial crisis

| Event windows | Markets | CAAR (%) | Positive CAAR (%) | t-stat | z-stat |
|---------------|------------------|----------|-------------------|--------|--------|
| [0.0] | USA | 0.18% | 50.8% | 1.41 | 0.33 |
| | Muslim countries | 0.01% | 53.7% | 0.06 | 0.66 |
| [-1.+1] | USA | -0.29% | 47.1% | -1.00 | -1.25 |
| | Muslim countries | -0.01% | 52.4% | -0.11 | 0.44 |
| [-2.+2] | USA | -0.30% | 48.4% | -0.80 | -0.70 |
| | Muslim countries | 0.10% | 52.4% | 0.54 | 0.44 |
| [-5.+5] | USA | -0.85% | 50.5% | -1.45 | 0.23 |
| | Muslim countries | 0.25% | 56.1% | 0.80 | 1.10 |

This table displays cumulative average abnormal returns (CAARs) of the deleted firms by type of market (463 U.S. stocks additions vs. 82 stocks from a Muslim country) before the subprime crisis periods. Period: 2000-2007. The percentage of positive CAARs is presented in the fourth column while the next two columns provide the Student t-stat and Wilcoxon z-stat. Stars denote significance (*p<0.1, **p<0.05, ***p<0.01).

Table 8
Cumulative average abnormal returns of deleted stocks during the financial crisis

| Event windows | Markets | CAAR (%) | Positive CAAR (%) | <i>t</i> -stat | <i>z</i> -stat |
|---------------|------------------|----------|-------------------|----------------|----------------|
| [0.0] | USA | 0.53% | 56.6% | 2.22** | 1.82* |
| | Muslim countries | 0.22% | 52.8% | 1.02 | 0.41 |
| [-1.+1] | USA | 0.16% | 58.7% | 0.34 | 2.40** |
| | Muslim countries | 0.59% | 52.8% | 1.06 | 0.41 |
| [-2.+2] | USA | 0.00% | 56.1% | 0.00 | 1.67* |
| | Muslim countries | 0.65% | 50.9% | 0.75 | 0.14 |
| [-5.+5] | USA | 3.07% | 52.9% | 2.73*** | 0.80 |
| | Muslim countries | 1.50% | 49.1% | 1.13 | -0.14 |

This table displays cumulative average abnormal returns (CAARs) of the deleted firms by type of market (316 U.S. stocks additions vs. 69 stocks from a Muslim country) during the subprime crisis periods. Period: 2007-2009. The percentage of positive CAARs is presented in the fourth column while the next two columns provide the Student *t*-stat and Wilcoxon *z*-stat. Stars denote significance (**p*<0.1, ***p*<0.05, ****p*<0.01).

Table 9
Alternative estimation window

| Event windows | Markets | CAAR (%) | Positive CAAR (%) | <i>t</i> -stat | <i>z</i> -stat |
|---|------------------|----------|-------------------|----------------|----------------|
| <i>Panel A: Cumulative average abnormal returns of added stocks over the whole period</i> | | | | | |
| [0,0] | USA | -0.01% | 56.6% | -0.17 | 3.92*** |
| | Muslim countries | 0.16% | 51.3% | 2.62** | 0.58 |
| [-1,+1] | USA | -0.59% | 54.2% | -4.45*** | 2.64*** |
| | Muslim countries | 0.61% | 52.9% | 5.15*** | 1.30 |
| [-2,+2] | USA | -0.01% | 44.8% | -0.07 | -3.21*** |
| | Muslim countries | 0.55% | 49.3% | 3.68*** | -0.31 |
| [-5,+5] | USA | -0.26% | 43.0% | -0.79 | -4.37*** |
| | Muslim countries | 0.09% | 46.9% | 0.44 | -1.39 |
| <i>Panel B: Cumulative average abnormal returns of deleted stocks over the whole period</i> | | | | | |
| [0,0] | USA | 0.23% | 51.7% | 2.35** | 0.93 |
| | Muslim countries | 0.12% | 50.3% | 1.26 | 0.08 |
| [-1,+1] | USA | 0.12% | 52.2% | 0.61 | 1.21 |
| | Muslim countries | 0.21% | 54.3% | 1.03 | 1.06 |
| [-2,+2] | USA | 0.22% | 55.4% | 0.87 | 3.00*** |
| | Muslim countries | 0.30% | 51.0% | 0.96 | 0.24 |
| [-5,+5] | USA | 0.73% | 53.1% | 1.81* | 1.71* |
| | Muslim countries | 0.70% | 54.3% | 1.51 | 1.06 |

This table displays cumulative average abnormal returns (CAARs) by type of events and type of market (916 U.S. stocks additions vs. 488 stocks from a Muslim country and 779 U.S. stocks deletions vs. 151 stocks from a Muslim country) across four event windows. The estimation window covers 230 trading days from $t-250$ to $t-20$, where t is the event date. The percentage of positive CAARs is presented in the fourth column while the next two columns provide the Student t -stat and Wilcoxon z -stat. Stars denote significance (* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$).

Table 10
Alternative index for Muslim countries

| Event windows | Markets | CAAR (%) | Positive CAAR (%) | t-stat | z-stat |
|---|------------------|----------|-------------------|----------|---------|
| <i>Panel A: Cumulative average abnormal returns of added stocks over the whole period</i> | | | | | |
| [0,0] | Muslim countries | 0.72% | 69.5% | 10.38*** | 8.67*** |
| [-1,+1] | Muslim countries | 1.47% | 69.3% | 10.93*** | 8.58*** |
| [-2,+2] | Muslim countries | 1.67% | 64.0% | 9.30*** | 6.25*** |
| [-5,+5] | Muslim countries | 0.37% | 51.1% | 1.59 | 0.49 |
| <i>Panel B: Cumulative average abnormal returns of deleted stocks over the whole period</i> | | | | | |
| [0,0] | Muslim countries | 0.14% | 57.6% | 1.43 | 1.87* |
| [-1,+1] | Muslim countries | 0.27% | 63.6% | 1.24 | 3.34*** |
| [-2,+2] | Muslim countries | 0.40% | 57.0% | 1.20 | 1.71* |
| [-5,+5] | Muslim countries | 0.67% | 52.3% | 1.38 | 0.57 |

This table displays cumulative average abnormal returns (CAARs) of Muslim countries by type of events (488 Muslim countries stocks additions vs. 151 Muslim countries stocks deletions) across four event windows. The MSCI Emerging Markets Index is used in the market model to measure the expected returns. The percentage of positive CAARs is presented in the fourth column while the next two columns provide the Student *t*-stat and Wilcoxon *z*-stat. Stars denote significance (* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$).

Table 11
Estimations with Fama and French three-factor model

| Event windows | Markets | CAAR (%) | Positive CAAR (%) | <i>t</i> -stat | <i>z</i> -stat |
|---|------------------|----------|-------------------|----------------|----------------|
| <i>Panel A: Cumulative average abnormal returns of added stocks over the whole period</i> | | | | | |
| [0,0] | USA | -0.31% | 46.1% | -4.55*** | -2.08** |
| | Muslim countries | 1.19% | 75.6% | 14.88*** | 11.40*** |
| [-1,+1] | USA | -0.29% | 51.6% | -2.20** | 0.97 |
| | Muslim countries | 2.79% | 77.0% | 17.49*** | 12.03*** |
| [-2,+2] | USA | -1.42% | 49.5% | -7.83*** | -0.29 |
| | Muslim countries | 4.12% | 78.2% | 17.96*** | 12.57*** |
| [-5,+5] | USA | -2.79% | 28.2% | -10.92*** | -11.99*** |
| | Muslim countries | 5.57% | 78.8% | 18.23*** | 12.84*** |
| <i>Panel B: Cumulative average abnormal returns of deleted stocks over the whole period</i> | | | | | |
| [0,0] | USA | 0.29% | 51.8% | 3.02** | 1.00 |
| | Muslim countries | 0.24% | 57.1% | 2.30** | 1.77* |
| [-1,+1] | USA | 0.33% | 53.1% | 1.77* | 1.71* |
| | Muslim countries | 0.62% | 60.4% | 2.50** | 2.58** |
| [-2,+2] | USA | 0.34% | 53.4% | 1.33 | 1.93* |
| | Muslim countries | 1.02% | 61.7% | 2.64*** | 2.90*** |
| [-5,+5] | USA | 1.47% | 56.1% | 3.38*** | 3.43*** |
| | Muslim countries | 2.16% | 59.7% | 3.47*** | 2.42** |

This table displays cumulative average abnormal returns (CAARs) by type of events and type of market (916 U.S. stocks additions vs. 488 stocks from a Muslim country and 779 U.S. stocks deletions vs. 151 stocks from a Muslim country) across four event windows. The Fama and French three-factor model is used to generate the expected returns. The percentage of positive CAARs is presented in the fourth column while the next two columns provide the Student *t*-stat and Wilcoxon *z*-stat. Stars denote significance (**p*<0.1, ***p*<0.05, ****p*<0.01).