REUNIR:
Revista de Administração, Ciências Contábeis e Sustentabilidade
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ARTIGO ORIGINAL

Religion and Finance: The Case of Islamic Equity Indices[1]

Religião e Finanças: O Caso dos Índices de Ações Islâmicas

Religión y Finanzas: El Caso de los Índices de Acciones Islámicas

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KEYWORDS
Asset Pricing;
Equity Indices;
Islamic Finance

Abstract: The principles of Islamic indices are similar to those of other ethical indices in terms of the screening process; both of them are also characterized by their short histories. Therefore, after Islamic indices were introduced in the late nineties, many financial markets and index providers launched their own Islamic indices for investors looking for investment opportunities without compromising their beliefs. Analysing the financial performance of Islamic equity indices from all relevant providers, we document these indices to outperform their conventional benchmarks on a global and developed market level after controlling for investment styles and a potential back-testing bias. To explain this outperformance puzzle, we investigate fundamental, behavioural and research design related explnations but the overall results persist. When eliminating the effect of the financial services industry from conventional benchmarks, however, the outperformance of all indices except the Dow Jones Islamic Market world index disappears. This implies that Islamic equity indices have outperformed due to their critical position towards risk-free interest and the financial services industry. We conclude that they represent a viable alternative for risk-averse passive investors, especially during periods of high uncertainty around financial services. Further research is needed to fully understand the abnormally good performance of the DJIM.

PALAVRAS-CHAVE
Precificação de ativos;
Índices de Ações;
Finanças islâmicas.

Resumo: Os princípios dos índices islâmicos são semelhantes aos de outros índices éticos em termos do processo de triagem; ambos também são caracterizados por suas histórias curtas. Assim, depois que os índices islâmicos foram introduzidos no final dos anos noventa, muitos mercados financeiros e provedores de índices lançaram seus próprios índices islâmicos para investidores que buscavam oportunidades de investimento sem comprometer suas crenças. Analisando o desempenho financeiro dos índices de ações islâmicos de todos os provedores relevantes, documentamos esses índices para superar seus benchmarks convencionais em um nível de mercado global e desenvolvidos após o controle de estilos de investimento e um possível viés de back-testing. Para explicar esse excelente desempenho, investigamos explicações relacionadas ao projeto fundamental, comportamental e de pesquisa, mas os resultados gerais persistem. Ao eliminar o efeito da indústria de serviços financeiros dos benchmarks convencionais, no entanto, o desempenho

[1] Submetido em 04.06.2019. Publicado em 20.07.2019. Responsável Universidade Federal de Campina Grande/UACC/PROFIAP/CCJS/UFCG
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superior de todos os índices, exceto o índice mundial Dow Jones Islamic Market, desaparece. Isso implica que os índices de ações islâmicos tenham superado devido à sua posição crítica em relação ao interesse livre de risco e à indústria de serviços financeiros. Concluímos que eles representam uma alternativa viável para investidores passivos avessos ao risco, especialmente durante períodos de alta incerteza em relação aos serviços financeiros. Mais pesquisas são necessárias para entender completamente o bom desempenho anormal do DJIM.

PALABRAS CLAVE
Tasación de activos;
Índices de Acciones;
Finanzas islâmicas

Resumen: Los principios de los índices islámicos son similares a los de otros índices éticos en términos del proceso de selección; Ambos se caracterizan también por sus historias cortas. Entonces, después de la introducción de los índices islámicos a finales de los años noventa, muchos mercados financieros y proveedores de índices lanzaron sus propios índices islámicos para los inversores que buscaban oportunidades de inversión sin comprometer sus creencias. Al analizar el desempeño financiero de los índices de capital islámico de todos los proveedores relevantes, documentamos estos índices para superar sus puntos de referencia convencionales en un nivel de mercado global y desarrollado después de controlar los estilos de inversión y un posible sesgo de pruebas de respaldo. Para explicar este rompecabezas de rendimiento superior, investigamos las explicaciones fundamentales, de comportamiento y de diseño de investigación, pero los resultados generales persisten. Sin embargo, al eliminar el efecto de la industria de servicios financieros de los puntos de referencia convencionales, el rendimiento superior de todos los índices, excepto el índice mundial del Mercado Islámico de Dow Jones, desaparece. Esto implica que los índices de capital islámico han superado su rendimiento debido a su posición crítica frente a los intereses libres de riesgo y la industria de servicios financieros. Concluimos que representan una alternativa viable para los inversionistas pasivos que rechazan el riesgo, especialmente durante los períodos de alta incertidumbre en torno a los servicios financieros. Se necesita más investigación para comprender completamente el rendimiento anormalmente bueno del DJIM.

Introduction

The Islamic finance industry has experienced a period of strong growth and recent figures suggest that $2.13 trillion worth of assets is being managed in accordance with Islamic principles (IFSB, 2018). Besides Muslim economies, major financial market places are making increasing efforts to facilitate Islamic financial services. For instance, at the 2013 World Islamic Economic Forum in London, British Prime Minister David Cameron stated his ambition for "London to stand alongside Dubai and Kuala Lumpur as one of the great capitals of Islamic finance anywhere in the world" (REUTERS, 2013). Although Islamic banking and finance has emerged into a well- researched field of study, our academic understanding of the return and risk implications of integrating Shari'ah principles into equity investment processes is still limited and challenged by conflicting findings (ABDELSALAM; DUYGUN, 2014; BECK et al., 2013; JOHNES et al. 2014; PLATONOVA, 2018).

The objective of this study is to analyse the financial performance of equity investments that comply with Islamic principles. We argue that, conceptually, these investments are best characterised by Islamic equity indices, which represent the Shari'ah-compliant sub-universes of major international equity indices. Dow Jones launched the first Islamic index in 1999 and today most major index providers offer similar indices, resulting in a wide range of benchmarks for Islamic investors. Analysing the performance of these indices instead of Islamic mutual funds allows us to separate the merits of the Islamic equity investment approach from the specific skills of fund managers (SCHRÖDER, 2007). As a result, we measure only the extent to which the security screening of Islamic equity investing impacts financial performance and exclude the influence of fund manager skill or strategy.

Previous research on the financial performance of Islamic indices displays conflicting results. Some recent studies find them to outperform during bear markets and underperform during bull markets (e.g., Al-Khazali et al., 2014; AKHTAR; JAHROMI, 2015). In contrast, the earlier work of Hussein and Omran (2005) found the opposite and several recent studies of multiple index providers observed no significant performance difference (LOBE et al., 2012; ASHRAF, 2016). There also appears to be some evidence of a better performance in developed than in emerging markets, although none of these studies controlled for backtesting bias inherent in the indices of several providers, which make historical performance data available for several years prior to the actual index launch (WALKSHÄUSL; LOBE, 2012a, 2012b).

Analysing Islamic indices from all major providers at the global, developed market and emerging market between September 1996 and September 2012, we document that Islamic equity indices outperform their conventional counterparts at the global and developed market level. The results are robust to multifactor econometric modelling and are consistent across multiple index providers. Furthermore, in our research design we address two methodological challenges often faced by previous work. First, possible back-testing biases in the return data is controlled for, as several Islamic equity indices offer back-tested performance data for their screening methodologies as part of their historical return data. Second, we construct an alternative, ex-financials benchmark variable. This allows us to specifically investigate the implications of the exclusion of financial stocks by Islamic investors through a comparison of Islamic indices performance vis-à-vis an all stock and an ex-financials benchmark.

Based on this research design, our study's predominant contribution results from our ability to statistically challenge and eventually explain our observed outperformance of Islamic equity indices. First, we find a back-testing bias embedded in several Islamic indices, suggesting that they tend to perform better in back-tested performance periods compared to their post-launch periods. Nevertheless, the alphas remain relatively constant after controlling for such back- testing bias. Similarly, our results can also not be explained by the previously found Ramadan premium (BIAŁKOWSKI et al., 2012). However, by isolating and controlling for the effects of critical events, such as financial crises, we find that Islamic indices performed relatively better during the recent credit crisis. Although these results reiterate that the investment philosophy embedded in Islamic finance (e.g. the ban of interest and excessive risk-taking) can introduce improved downside risk features, they do not explain the recorded Islamic investing premium. Only when we exclude financial stocks from the conventional benchmarks, the outperformance of Islamic indices disappears for all indices except the DJIM. This finding implies that several Islamic indices have yielded superior return due to their exclusion of financial stocks (as a result of their philosophical disagreement with the concept of interest rate). It also reveals that further research into DJIM's performance may be needed; as such, a robust outperformance of an index is rather unusual.

Background

Islamic Equity Investing Fundamentals

Islamic finance is an investment philosophy that adheres to Islamic principles based on Shari'ah law. These principles are manifested in four prohibitions that signify the compliance with Islam whereby the first three refer to transactions and the fourth to products and services (AYUB, 2009): (i) the prohibition of riba states that any form of gain must be justified by an effort or risk-taking. Hence, all forms of effortless guaranteed interest common to the western financial system are strictly forbidden in business transactions; (ii) The prohibition of maysir implies that one cannot increase wealth by the games of chance which prevent speculation; (iii) The prohibition of gharar forbids investors to deal with financial transactions that involve uncertainty or hazard caused by lack of clarity regarding the subject matter or the price in a contract or exchange, such as conventional derivatives, short-selling and insurance; and (iv) The prohibition of haram products and services states that investors should not invest in products that do not comply with Shari'ah law (Ayub, 2009; Warde, 2010).

To adhere to the above prohibitions, Islamic equity investing applies a set of negative screens to ensure that the investable universe is halal, which is the Arabic translation of the word for "allowed". The screening process is a two-step procedure where firms first must pass a set of industry screens and a set of financial screens. The screening criteria must be defined by a Shari'ah advisory board that normally is constituted by a group of experts in Islamic law. The purpose of the industry screening is to exclude firms that are involved in business activities that are considered sinful or harmful

to societies. Although somewhat inconsistent, there seems to be a consensus among Shari'ah scholars of what industries should be considered sinful. Common prohibited sectors include alcohol, entertainment, pork-related products, pornography, tobacco and the weapons industry.

In contrast to other forms of social norm based investing, Islamic investors are also restricted from investing in firms with unsatisfying financial characteristics. The main motivation for looking into a firm's financial statements is that business transactions cannot involve interest in any form (due to the prohibition of riba). Most publicly traded firms, however, are largely integrated into the conventional (interest-based) banking system. Hence, a zero tolerance on interest payments would virtually eliminate the investable universe. To overcome this issue, Shari'ah scholars have agreed to define threshold levels for the respective accounting ratios (El-Gamal, 2006). Typically, Islamic index providers examine firms based on four financial characteristics: (i) Liquidity – the sum of a firm's liquid assets cannot represent too much of its total market value as the profit must be from non-liquid assets; (ii) Interest – since Shari'ah strictly bans interest as a source of income, the interest screen is concerned with identifying the proportion of the total profit that stem from such activities; (iii) Debt – interest is not only banned as a source of income but also as a payment form. Hence, to pass the debt screen a firm cannot be highly leveraged; and (iv) Non-permissible income – as multinational public firms often have several business activities, it could be the case that some parts of their overall business entail haram activities. Shari'ah boards allow a certain level for such income subject to haram purification rule (i.e., charitable giving on the part of the profit generated from such activities).

Despite being a cornerstone of Islamic equity investing, the screening process is not controlled by regulatory authorities, with a few exceptions such as of Malaysia. Instead, index providers are free to use their own advisory boards that define the screening criteria based on their interpretation of Shari'ah. The screening criteria have proven to be inconsistent among index providers (Derigs and Marzban, 2008). While the business screens are quite similar, the financial screens differ substantially. More specifically, there is a difference on whether market capitalization or total assets is used to determine a firm's value. For instance, Dow Jones, Russell and S&P use market capitalization while MSCI and FTSE use total assets.

Empirical evidence on Islamic Index Performance

Early work on Islamic index performance is characterised by what can be viewed as limited data samples and straightforward performance measurements, such as Sharpe ratio and Jensen's Alpha. Albaity and Ahmad (2008), for instance, analyse the performance of a single Islamic index (The Kuala Lumpur Syariah Index) over a 6-year period (1999 to 2005). Hakim and Rashidian (2004) compare the performance of the Dow Jones Islamic Index relative its conventional counterpart over the period January 2000 to April 2004. Hashim (2008) analyse the performance of three FTSE indices: the FTSE All-World, FTSE All-World Islamic, and the FTSE 4 Good. In a more robust research design setting, Girard and Hassan (2008) analyse FTSE Islamic indices covering five regions (Global, Asia-Pacific, Americas, Europe and South Africa) from December 1998 to December 2006. While these studies cover different time periods and geograhpical regions, they all observe a statiscially insiginificant difference in performanece bwtween Islamic and conventional indices on risk-adjusted basis. Hussein and Omran (2005), however, present evidence that Islamic index performance depends on the overall market conditions. When analysing the returns of a sample of 13 indices from the Dow Jones Islamic Index series between December 1995 and June 2003, the authors observe a tendency for Islamic indices to outperform in bull market periods while underperforming in bear markets. This is surprising from a theoretical perspective, since the Islamic accounting screens have rather conservative characteristics and could, hence, be expected to lead to improved risk properties, leading to outperformance in bear market periods.

In contrast to the early stream of literature discussed above, more recent studies analyse larger datasets. For example, Walkshäusl and Lobe (2012b) examine 35 MSCI Islamic country indices from June 2002 to June 2011 using the Carhart (1997) four-factor model with MSCI's conventional indices as market benchmarks, which led them to conclude that the "results provide supportive evidence that religious stock screens in the context of index-based Sharia-compliant investments do not reduce financial performance" (CARHART 1997). It is noteworthy that they found the US and developed market Islamic indices to significantly outperform, but only during their financial crisis sample period (i.e., January 2008 to June 2011). Using a ratio and style analysis, Walkshäusl and Lobe (2012a) analysed MSCI Islamic indices of eight regions over the sample period June 2002 to May 2012, which confirmed the outperformance in developed regions and add the finding of an underperformance in emerging regions. Since MSCI launched their Islamic index series in July 2007 though, both abovementioned studies by Walkshäusl and Lobe depend less on live (real-time) data collected since the index launch than on back-tested data that MSCI used to develop the index product. Hence, these results should be interpreted with care, as they might be affected by a back-testing bias.

Islamic index performance may indeed be more driven by economic context than investment region. Using a stochastic dominance analysis, however, Al-Khazali et al. (2014) found nine Dow Jones Islamic indices to underperform their conventional counterparts between 1996 and 2006, while outperforming during 2007 to 2012. Their findings directly contrasts Hussein and Omran's (2005) earlier results, as it indicates that Islamic indices offered superior performance during the recent financial crisis. These results are also confirmed in Arouri et al. (2013) portfolio simulations where Islamic indices tracking the European, US and World regions where found to offer superior risk and return trade-offs during the financial crisis in 2007-2008.

Akhtar and Jahromi (2015) specifically focus on the relative difference in performance between Islamic and conventional investments during the global financial crisis. Analysing the returns of Islamic and convetional indices from multiple index providers in 11 Islamic and 8 non-Islamic countries between 2004 and 2014 in a panel regression framework, they conclude that "[…] there are significant benefits of Islamic stocks in times of a crisis that is caused by excessive leverage and risk taking, and in particular a significant exposure to risky assets" (Akhtar and Jahromi, p.29). In contrast, Ashraf (2016) investigated 29 Islamic and conventional indices from multiple providers (i.e., Dow Jones, FTSE, MSCI and S&P) between December 2000 and May 2012 in a time series

framework and did not find any supporting evidence that Shari'ah principles impact financial performance. His finding is confirmed by Lobe et al. (2012) who study 155 Islamic indices between January 2001 and June 2012.

In conclusion, previous research on the financial performance of Islamic indices is split between studies finding them to outperform during bear markets and underperform during bull markets (i.e., Al-Khazali et al., 2014, Akhtar and Jahromi, 2015), while the earlier work of Hussein and Omran (2005) found the opposite and several large recent studies of multiple index providers found no significant performance difference (LOBE et al., 2012; ASHRAF, 2016). There also appears to be some evidence of a better performance in developed than in emerging markets but none of these studies controlled for backtesting bias inherent in the indices of several providers, which make historical data available for multiple years prior to the actual index launch (WALKSHÄUSL; LOBE, 2012a, 2012b).

Related Islamic Finance Literature

Outside the Islamic index literature, our study is related to some particular studies which examine important aspects that could improve the understanding of potential drivers of Islamic equity performance. Derigs and Marzban (2008) studied the performance implications of employing different Shari'ah screening strategies to a set of financial portfolios, which resulted in several interesting observations. Specifically, building financial portfolios based on the screening practises of several providers, one could achieve improved risk and return attributes. Furthermore, by introducing a hypothetical screening approach where the level of Shari'ah compliance is measured on a portfolio level rather on a single asset level, the efficient frontier for an Islamic equity portfolio could be improved significantly, achieving a risk and return profile similar to a conventional portfolio. Finally, it was concluded that if Islamic investors were to use the current screening practises, they are better off using market capitalization than total assets as a divisor in the financial ratios.

More recent evidence on the potential difference in performance between different Shari'ah guidelines is provided by Ashraf and Khawajab (2016). Adopting in the portfolio construction the methodology of four leading Islamic index providers and one standard setting body, market capitalisation as a divisor in the financial screening led to superior risk-adjusted returns relative portfolios construed with total assets as a divisor. Such positive results may related to Białkowski et al.'s (2012) work. They studied the effect Ramadan has on stock prices in 14 Muslim countries. Drawing on theories from positive psychology, the authors hypothesized that Ramadan, one of the five pillars of Islam which is the religious practice of fasting from dawn to sunset during the ninth month of the Islamic calendar, could have a positive impact on stock prices. This Ramadan month could increase investor optimism because it increases social awareness and solidarity among Muslims. Consistent with this prediction, they found that stock markets in Muslim countries perform significantly better during the Ramadan month compared to the rest of the year. An interesting observation was that these markets became less volatile during Ramadan, despite sharp increases in stock returns. In contrast, studies of Islamic equity mutual funds tend to find those to significantly underperform. El-Masry et al. (2016) provide evidence of the performance Islamic mutual funds for ten countries in the MENA region. With a sample of 106 Islamic mutual funds over the period January 2006 and December 2013, the authors document an overall underperformance relative their conventional counterparts. Which is broadly in line with the findings of Hoepner et al. (2011) and Nainggolan et al. (2015).

Hypotheses

Opponents of Islamic equity investing, however, are likely to argue that its religious constraints are likely to harm the performance attributes of Islamic indices. The negative screening undertaken by index providers to meet compliance with Shari'ah imply significant reduction of the investable universe. This could result in a financial cost due to less favourable risk-return trade-offs (RENNEBOOG et al., 2008). Empirical observations made by Hong and Kacperczyk (2009) also implies that certain market segments excluded by Shari'ah-based screening generate superior risk-adjusted returns. This could mean that Islamic indices will face relatively worse performance when compared to unconstrained market benchmarks. Furthermore, since the accounting-based screening will exclude stocks that do not meet the criteria of certain financial ratios, notwithstanding financial performance, the returns of Islamic indices can be further reduced.

On the contrary, proponents of Islamic equity investing would argue that its ethical focus is likely to enhance performance characteristics due to risk reduction. For instance, Renneboog et al. (2008) also postulate that firms that comply with ethical screens are less likely to be affected by costs related to unethical activities. Furthermore, Shari'ah-based screens exclude firms that operate with high levels of financial leverage and firms that are involved in speculative financial activities. Avoiding such firms could eventually drive the average return above the overall benchmark, especially during periods of financial crises. For instance, Arouri et al. (2013, p. 34) found that 'the impact of the current crisis on the Islamic finance industry is less marked than on conventional finance'. Following the arguments discussed above, we arrive at the following three hypotheses:

- *H0: The performance of Islamic equity indices, relative to unconstrained counterparts, is indifferent from zero*
- *H1a: The performance of Islamic equity indices, relative to unconstrained counterparts, is significantly larger than zero.*
- *H1b: The performance of Islamic equity indices, relative to unconstrained counterparts, is significantly smaller than zero.*

Data

Islamic Index Data

As previously discussed, one of the main shortcomings of analysing equity indices that they are purely hypothetical, hence making it difficult incorporating trade-related information. Two alternative research settings would allow to incorporate such information. The first approach would entail obtaining firm-level data and effectively construct Shari'ah-compliant portfolios, following the screening methodologies made available by index providers and mutual fund managers. The main disadvantage of this

approach, however, is that screening for Shari'ah compliance is not always a straight forward process, but involves careful consideration of Shari'ah expertise. Hence, following such a procedure could result in a portfolio that would not necessarily be compliant with Islamic principles in practise.

A second alternative approach that would allow to incorporate tradable information would be to analyse Exchange Traded Funds (ETFs). An ETF is a financial instrument aimed to track the movements of a broader stock market index, where the price is determined by the value of its underlying constituents. In other words, using ETF rather than index data would allow to include tradable data while maintaining the advantages of passive investment products. The main disadvantage, however, is that the number of Shari'ah-compliant ETFs are few which would have limited the scope of our analysis significantly. Nevertheless, given the similarity between ETFs and indices, we would expect the performance to be very similar.

Two main attributes differentiate our dataset from most previous Islamic index studies. First, we include Islamic indices from five providers: Dow Jones, MSCI, FTSE, Russell and S&P. This allows us to analyse the financial impact of different screening methodologies. This is an important aspect as Derigs and Marzban (2008) found substantial differences concerning the divisor in the financial ratios used by index providers. In the case of our sample, FTSE and MSCI use total assets to define a firm's value while Dow Jones, Russell and S&P use market capitalization. The first approach assumes that a firm's books should determine its value while the latter approach suggests a market-driven valuation approach. Practically, the financial screens used by FTSE and MSCI should, therefore, be more stringent than the others, as market values exceed book value of assets substantially in most industries. In total, our sample includes 32 indices that together cover ten regional and global markets. Collectively, our sample stretches from September 1996 to September 2012. Total return data (i.e., closing price which includes dividends) for all indices are obtained from Bloomberg, Thomson Reuters Datastream and in some cases from the index providers directly. All data is in USD and we compute monthly return as follows:

$$R_{it} = ln\left(\frac{P_{it}}{P_{it-1}}\right)$$

where Rit is the monthly return of the index i at time t, ln stands for the natural logarithm, and Pi,t is the total return index at time t. For statistical reasons, we exclude all indices with a sample period of less than 30 months.

Benchmark Data

Throughout our analysis, we employ a matched pair approach. That means that each Islamic index has a conventional market benchmark from the same index family. This is crucial as index providers could have asset universes that differ considerably (e.g., in size, weighting scheme). From a research design perspective, using matched pair in the analysis of screened portfolios enhances research quality. Intuitionally, this approach also acknowledges the potential critique of data mining that could arise from employing a single market benchmark index to multifamily index setting. If a single index is used, then it can be questioned whether the market benchmark has been chosen on the basis of a favourable outcome. To systematically use market benchmark from the corresponding index family would, in contrast, make the analysis robust to a potential data mining bias via arbitrary benchmark suggestions.

3.3 Islamic Index descriptive statistics

The descriptive statistics are reported in Table 1. It can be observed that 8 out of the 13 Islamic indices have higher mean excess return than their conventional counterparts while only 5 have higher standard deviations. Interestingly, all five Islamic indices with a global exposure have superior mean excess returns, and all but one (Dow Jones) have lower standard deviation. Column four and five in Table 1 report the base date and launch date of each Islamic index, respectively. Any difference between the two indicates that the index is subject to back-tested performance history. This means that the index has been constructed with the advantage of hindsigh. Potential implications of back-tested performance history will be further

Results

As previously mentioned, we have so far not been able to explain where the documented outperformance and underperformance of Islamic indices stem from. In this section, we, therefore, control for a number of possible explanations associated with crises and market downturn risk. Similarly, we also investigate possible behavioural and research design related explanations.

Is there a risk management effect?

It has been argued that many attributes of the Islamic financial system serve as a risk management function. For Islamic equity investors, one important attribute that affects their investment decisions is the prohibition of gharar, as it forbids investors to get involved in speculation and excessive risk taking. Companies involved in such activities (e.g., conventional financial institutions) are therefore not considered in the investment process. Similarly, Islamic investors must avoid investing in highly leveraged stocks. This conservative investment approach is therefore believed to limit the risk of Islamic indices in times of market turmoil (AHMED, 2010). Recent empirical evidence confirms this view. For instance, Hoepner et al. (2011) argued that the investment style of Islamic mutual funds, with low risk characteristics (such as low debt to equity ratios), may result in a hedging effect against stock price volatility. Furthermore, Arouri et al. (2013) found that the Islamic equity market was less affected than the conventional equity market during the financial crisis.

Table 1
Descriptive statistics of Islamic and Benchmark Indices

Index Name			Base Date	Launch Date	Mean		St. Dev.		Sharpe Ratio	
World	**Islamic**	**BM**			**Islamic**	**BM**	**Islamic**	**BM**	**Islamic**	BM
Dow Jones	DJIM World Index	Dow Jones Global	Dec-95	May-99	0.0029	0.0009	0.0513	0.0498	0.0572	0.0179
MSCI	MSCI ACWI Islamic	MSCI ACWI	Aug-08	Aug-08	0.0010	-0.0001	0.0581	0.0617	-0.0571	-0.0627
FTSE	FTSE Shari'ah All-World	FTSE All-World	Sep-03	Oct-07	0.0044	0.0041	0.0491	0.0510	0.0887	0.0805
Russell	Russell-Jadwa *Shari'ah* Global	Russell Global	Jul-07	Jun-09	0.0024	0.0003	0.0533	0.0581	0.0456	0.0057
S&P	S&P Global BMI *Shari'ah*	S&P Global BMI	Apr-08	Apr-08	0.0005	0.0016	0.0615	0.0633	0.0075	-0.0252
Developed										
Dow Jones	DJIM Developed Markets Index	Dow Jones Developed Markets	Dec-95	May-99	0.0024	0.0008	0.0506	0.0490	0.0470	0.0170
FTSE	FTSE *Shari'ah* Developed Index	FTSE Developed Index	Oct-07	Oct-07	-0.0026	0.0016	0.0589	0.0624	-0.0439	-0.0258
Russell	Russell-Jadwa *Shari'ah* Developed	Russell Developed	Jul-07	Jun-09	0.0036	0.0069	0.0785	0.0855	0.0459	0.0809
Emerging										
Dow Jones	DJIM Emerging Markets Index	Dow Jones Emerging Markets	Dec-95	May-99	0.0029	0.0007	0.0797	0.0795	0.0358	0.0094
MSCI	MSCI Emerging Markets Islamic	MSCI Emerging Markets	Aug-08	Aug-08	-0.0005	0.0003	0.0890	0.0880	-0.0894	-0.0876
FTSE	FTSE *Shari'ah* Emerging Index	FTSE Emerging Index	Oct-07	Oct-07	-0.0060	0.0010	0.0877	0.0874	-0.0683	-0.0111
Russell	Russell-Jadwa *Shari'ah* Emerging	Russell Emerging Markets	Jul-07	Jun-09	0.0025	0.0006	0.0558	0.0600	0.0448	0.0099
S&P	S&P Emerging BMI *Shari'ah*	S&P Emerging BMI	Jan-08	Jan-08	-0.0037	-0.007	0.0841	0.0872	-0.0441	-0.0079

The following table reports the descriptive statistics for the sample of Islamic indices and their corresponding conventional benchmarks. Column one displays the geographical region and respective index provider. Column two and three reports the name of the each Islamic index and corresponding conventional benchmark index (BM), respectively. Column four and five reports the base date and launch date for each Islamic index, respectively. The potential difference between the base date and the launch date represent the period of back-tested performance. Column six to seven, eight to nine and ten to eleven report the monthly mean excess return, standard deviation and Sharpe ratio for the Islamic and corresponding benchmark index, respectively.

To assess the downside risk management effect of Islamic indices we employ the Henriksson and Merton (1981) measurement of market timing ability. The measurement was developed to test the ability of investment strategies to adopt to market directions and hence reduce systematic market risk exposure when markets are facing losses. The Henriksson and Merton (HMt) dummy is set to minus one when the market return falls short of risk-free rate and to zero otherwise.

Incorporating it into our regression framework allows us to control for performance of Islamic indices during market downturns. Furthermore, to test the performance in times of continuing market drawdowns we also include a variable developed by Hoepner and Zeume (2014). Like the HM dummy, the Hoepner and Zeume variable (HZt) is set to zero when the market exceeds the risk-free rate. When the market excess return over the risk-free rate is negative for a given observation, however, it represents a measure of drawdown, which Hoepner and Zeume define as the absolute value of the sum of the negative excess return of the given observation plus all negative excess returns directly preceding the given observation (i.e., any uninterrupted series of directly preceding observations with negative excess returns). Hence, the HZ variable differs from the HM dummy as it captures the ability of fund managers or investment strategies to prepare for longer-term consecutive market losses, the so-called drawdowns.

$$R_{it} - R_{ft} = \alpha_i + \beta_i(R_{mt} - R_{ft}) + \gamma_i SMB_t + \delta_i HML_t + \zeta_i MOM_t + \delta_i BACKTEST_t + \theta_i HM_t + x_i HZ_t + \varepsilon_{it} \quad (2)$$

The results of the regressions are displayed in Table 2. Only a few significant HM coefficients and those are both positive and negative. Hence, these results are rather mixed but suggest that Islamic and conventional indices perform very similar during occasional market downturns. Similarly, there are not many significant HZ coefficients, there are, however, more positive than negative factors loadings, which implies that some Islamic indices seem to be superior their conventional counterparts during periods of consecutive market downturns. Potentially, this could be explained by the fact that the Islamic debt ratio screen excludes firms that rely too much on debt where excess leverage having been shown to be risky in long-term market downturns (OPLER; TITMAN, 1994). The alphas, however, remain reasonably consistent, suggesting that short-term market downturns do not explain the results.

Table 2
Results of Carhart (1997) estimations after controlling for back-testing bias and downside risk

Region	Provider	αi	βi	SMBi	HMLi	MOMi	BTi	HMi	HZi	Adj R2
World	Dow Jones	0.0039**	0.9540**	0.0848*	0.1701**	-0.0053	0.0041	0.0019	0.0046	0.96
	MSCI	0.0014	0.9931**	0.0903	0.0121	0.0703		0.0260	-0.0009	0.97
	FTSE	0.0031	0.9366**	0.0382	-0.0072	0.0403	-0.0020	-0.0046	0.0033	0.97
	Russell	0.0041*	0.9106**	0.0108	-0.0488	0.0511	-0.0002	0.0018	-0.0158	0.97
	S&P	0.0066**	0.8979**	0.0392	-0.0274	0.0467	-	0.0041	0.0156	0.98
Devp	Dow Jones	0.0031*	0.9507**	-0.0715	0.1451**	0.0000	0.0045	-0.0061	0.0043	0.95
	FTSE	0.0018	0.9421**	0.0774	0.0330	0.0554	-	0.0091	0.0020	0.97
	Russell	0.0023	0.9364**	0.0684	0.0129	0.0610	0.0008	-0.0020	-0.0010	0.96
Emerging	Dow Jones	0.0011	0.9824**	0.0888**	0.1104**	-0.0162	0.0107	0.0113	0.0005	0.94
	MSCI	0.0022	0.9621**	0.0136	-0.0196	-0.0110	-	-0.0273	0.0025	0.99
	FTSE	0.0005	0.9386**	0.0640	0.0122	-0.0087	-	-0.0330	0.0043	0.99
	Russell	0.0034	0.8673**	-0.0136	-0.0227	0.0771	-0.0038	0.0050	-0.0317	0.98
	S&P	0.0008	0.8922**	0.0186	0.0350	-0.0202	0.0034	-0.0013	0.0320	0.99

The following table displays the results of the Carhart (1997) estimations including the Henriksson & Merton (1981) and Hoepner & Zeume (2009) dummies. Column one shows the economic region and column two the respective index provider. Column three to seven shows the Carhart alpha, beta, smb, hml and mom factors and column eight displays the factor loading of the back-testing coefficient. Column nine and ten report the factor loadings of HM and HZ dummy coefficients, respectively. Finally, column ten shows the adjusted r-squared. Coefficient covariances and standard errors are made heteroscedasticity and autocorrelation are based on (NEWEY; WEST, 1987), *, **, *** represent a 10%, 5%, and 1% significant level, respectively.

How do Islamic Indices perform during financial crises?

A growing body of literature suggest that the principles underpinning Islamic financial products have a positive impact on the financial risk profile. Some studies even argue that several of the factors causing the recent credit crisis are prohibited in Islamic finance. For instance, one of the main factors trigging the Asian crisis was a growing presence of interest-based debt (RADELET; SACHS, 2000). Similarly, it has been argued that the most recent financial crisis was caused by excess risk-taking and the vast use of complex debt-based financial instruments, both of which are prohibited according to Islamic principles (Chapra 2011). One could, therefore, argue that Islamic indices would outperform the market in times of lending crisis and general market turmoil. To test the performance of Islamic indices after controlling for financial crises, we include dummy variables for three major crises; (i) The Asian Crisis in 1997-1998 (ii) the dot-com bubble in 2001 and (iii) the credit crisis in 2008-2009. Each dummy variable is equal to 1 in the period of financial crisis, 0 otherwise.

$$R_{it} - R_{ft} = \alpha_i + \beta_i(R_{mt} - R_{ft}) + \gamma_i SMB_t + \delta_i HML_t + \zeta_i MOM_t + \delta_i BACKTEST_t + \pi 1_i ACRIS_t + \pi 2_i ICRIS_t + \pi 3_i CCRIS_t + \varepsilon_{it} \quad (3)$$

As shown in Table 3, only a few indices included in the analysis are old enough to cover the Asian financial crisis and the Internet crisis. Several FTSE indices had to be excluded as the credit crisis occurred prior to their start date in 2009. The results suggest that Islamic indices still outperform on a global level and in developed markets. The underperformance in emerging markets also remains, which suggest that the effects of financial crises cannot explain the results entirely.

While Islamic indices seem to have underperformed during the Internet crisis, the large number of positive and significant CCRIS coefficients suggests a relatively better performance during the recent credit crisis. This is in line with Radelet and Sachs (2000) who pointed out excessive

leverage as one of the main aggravating factors of financial crises. A possible explanation for this outperformance could, therefore, be a result of the financial screening (where firms relying on excessive debt are excluded).

Table 3
Results of Carhart (1997) estimations after controlling for back-testing bias and financial crises

Region	Provider	□i	□i	SMBi	HMLi	MOMi	BTi	ACRISi	ICRISi	CCRISi
World	Dow Jones	0.0028***	0.9540***	-0.0848*	-0.1701**	-0.0053	0.0041	0.0019	0.0046	0.96
	MSCI	0.0013	0.9931***	0.0903	0.0121	0.0703		0.0260	-0.0009	0.97
	FTSE	0.0006	0.9366***	0.0382	-0.0072	0.0403	-0.0020	-0.0046	0.0033	0.97
	Russell	0.0026**	0.9106***	0.0108	-0.0488	0.0511	-0.0002	0.0018	-0.0158	0.97
	S&P	0.0034***	0.8979***	0.0392	-0.0274	0.0467	-	0.0041	0.0156	0.98
Developed	Dow Jones	0.0017	0.9507***	-0.0715	-0.1451**	0.0000	0.0045	-0.0061	0.0043	0.95
	FTSE	-0.0021	0.9421***	0.0774	0.0330	0.0554	-	0.0091	0.0020	0.97
	Russell	0.0032**	0.9364***	0.0684	0.0129	0.0610	0.0008	-0.0020	-0.0010	0.96
Emerging	Dow Jones	0.0037	0.9824***	-0.0888**	-0.1104**	-0.0162	0.0107	0.0113	0.0005	0.94
	MSCI	-0.0018	0.9621***	0.0136	-0.0196	-0.0110	-	-0.0273	0.0025	0.99
	FTSE	-0.0049**	0.9386***	0.0640	0.0122	-0.0087	-	-0.0330	0.0043	0.99
	Russell	-0.0012	0.8673***	-0.0136	-0.0227	0.0771	-0.0038	0.0050	-0.0317	0.98
	S&P	-0.0030**	0.8922***	0.0186	0.0350	-0.0202	0.0034	-0.0013	0.0320	0.99

The following table displays the results of the Carhart (1997) estimations including the Asian crisis (ACRIS), dot com crisis (ICRIS) and the credit crisis (CCRIS) dummies. Column one shows the economic region and column two the respective index provider. Column three to seven shows the Carhart alpha, beta, smb, hml and mom factors and column eight displays the factor loading of the back-testing coefficient. Column nine to eleven report the factor loadings of the ACRIS, ICRIS and CCRIS coefficients, respectively. Finally, column eleven shows the adjusted r-squared. Coefficient covariances and standard errors are made heteroscedasticity and autocorrelation are based on (Newey & West 1987). *, **, *** represent a 10%, 5%, and 1% significant level, respectively.

Ramadan Effect

Behavioural economists typically argue that stock prices can be substantially influenced by the mood of investors. For instance, researchers have found stocks prices to be positively affected by positive events such as sunshine and upcoming holidays (Kim and Park, 1994). Ramadan is one of the five pillars of Islam, which is the religious practice of fasting from dawn to sunset during the ninth month of the Islamic calendar. Several studies, such as (Białkowski et al. (2012), Al-Hajieh et al. (2011) and Al-Khazali (2014), have found stocks in Muslim countries to yield higher returns during Ramadan compared to the rest of the year. Their results were explained by the fact that Ramadan encourages Muslims optimism which has a positive effect on stock prices. We, therefore, expect Islamic indices to yield relatively higher return during periods of Ramadan, and we test this by estimating the following regression:

$$R_{it} - R_{ft}\alpha_i + \beta_i(R_{mt} - R_{ft}) + \gamma_i SMB_t + \delta_i HML_t + \zeta_i MOM_t + \lambda_i BACKTEST_t + v_i RAMADAN_t + \varepsilon it \quad (4)$$

Where RAMADANt is defined as the 'amount' of Ramadan days for a respective month. For instance, if Ramadan takes place from August 20 to September 20 for a given year, then the amount of Ramadan for August would be: 31-20=11 days divided by 31days = 0.3548. Similarly, the amount of Ramadan for September would be 20 divided by 30=0.6666 and all other months of the given year would have the value of 0. In contrast to what we predicted, we do not find any consistent results supporting a Ramadan effect as displayed in Table 4. The results could be explained by the fact that neither developed nor emerging markets as defined by the index providers are known for strong Muslim populations. Hence, a potential Ramadan effect might have disappeared due to the overwhelming influence of non-Muslim investors.

Full data history vs. common sample period

The rapid growth of the Islamic finance industry has resulted in an increased number of providers offering Islamic indices. In a multifamily index study, there are, however, two issues which are relevant from a research design perspective. First, the fact that screening practises differ widely among index providers raises a question of how different screens impact index performance. Second, all index families included in our analysis have different base dates, which makes it difficult to compare the results. In order to compare the relative performance across the providers, we, therefore, construct a common period sample. This sub-sample includes all indices that have a history of at least four years (September 2008 to September 2012), where all indices with short performance history are excluded.

We perform the Carhart regressions without a back-testing variable, as no back-tested data during this period exist. First, the results are very consistent with our estimations for the full data sample. The outperformance remains at a global and developed market level, while Islamic indices underperform in emerging markets. Second, the financial performance seems to vary some across the providers. For instance, the outperformance at a global level range from 3.6% per annum (MSCI) to 5.5% p.a. (Dow Jones). Despite being a very simple form of comparison, it suggests that different screening methodologies could lead to difference in financial performance.

Table 4
Results of Carhart (1997) regressions after controlling for back-testing bias and Ramadan Effect

Region	Provider	αi	βi	SMBi	HMLi	MOMi	BTi	Ramadani	Adj R2
World	Dow Jones	0.0017*	0.9882***	-0.0859*	-0.1716***	-0.0036	0.0045**	0.0010	0.96
	MSCI	0.0040**	0.9488***	0.0545	-0.0057	0.0619*		-0.0095*	0.97
	FTSE	0.0015*	0.9588***	0.0256	-0.0122	0.0367		-0.0089	0.97
	Russell	0.0033**	0.9404***	0.0234	-0.0401	0.0584**	-0.0005	-0.0055	0.97
	S&P	0.0047***	0.9386***	0.0670	-0.0054	0.0565**		-0.0071	0.98
Developed	Dow Jones	0.0009	0.9889***	-0.0698	-0.1451***	0.0014	0.0049**	0.0006	0.95
	FTSE	-0.0034*	1.0037***	0.1106**	0.0351	0.0283		-0.0040	0.98
	Russell	0.0038**	0.9220***	0.0683	0.0121	0.0610	0.0005	-0.0058	0.96
Emerging	Dow Jones	0.0015	0.9766***	-0.0930**	-0.1116***	-0.0169	0.0108***	-0.0033	0.94
	MSCI	-0.0010	1.0123***	0.0505	-0.0026	0.0168		0.0010	0.99
	FTSE	-0.0011	0.9436***	-0.0980	-0.1301	0.0687		-0.0100	0.97
	Russell	-0.0008	0.9315***	0.0270	-0.0043	0.1120***	-0.0043	-0.0005	0.98
	S&P	-0.0029*	0.9561***	0.0616	0.0541**	0.0201		-0.0024	0.99

The following table displays the results of the Carhart (1997) estimations including the Ramadan dummy. Column one shows the economic region and column two the respective index provider. Column three to seven shows the Carhart alpha, beta, smb, hml and mom factors and column eight displays the factor loading of the back-testing coefficient. Column nine displays the factors loadings for the Ramadan coefficient and column ten shows the adjusted r-squared. Coefficient covariances and standard errors are made heteroscedasticity and autocorrelation are based on (NEWEY; WEST, 1987). *, **, *** represent a 10%, 5%, and 1% significant level, respectively.

$$EXFIN_t = R_{mkt,t} + (R_{mkt,t} - R_{fin,t}) * (MV_{fin,t} / (MV_{mkt,t} - MV_{fin,t}) \quad (5)$$

Where $R_{mkt,t}$ is the return of the overall market, R_{mkt},$t$is the return of the financial services sector, $MV_{fin,t}$ is the market value of the financial services sector and $MV_{mkt,t}$ is the market value of the overall market. All Russell and S&P indices had to be excluded, as we could not obtain necessary market capitalization data. Two important findings are worth discussing. First, when we use the ex-financials variable as a market benchmark we witness a substantial increase in the adjusted R-squared values for nearly all estimations. For instance, the R-squared values for the global index regressions increased by 2,45% (Dow Jones), 2,17% (MSCI), 1,79% (FTSE) and we can observe a value as high as 99,45% (FTSE Emerging). This implies that our model explains more of the return variation compared to the standard Carhart (1997) model. Here, it should also be noted that the R-squared values in the standard Carhart regressions are quite high and typically range from 93% to 97%. An interesting topic for future research would be to develop an Islamic asset pricing model where conventional financial services stocks are excluded from market benchmarks.

A second interesting observation (related on Table 5) is related to the performance implications of applying an alternative ex-financials benchmark. In several cases, Islamic indices seem to perform similarly or worse when applying the new benchmark. For instance, the outperformance of the Dow Jones World Index found using the standard benchmark disappears almost completely. Similarly, the insignificant results of the FTSE world index turn into a significant underperformance, and the positive alpha of the Dow Jones Asia Pacific index gets reduced. This implies that the good performance of several Islamic indices is largely due to the exclusion of financial stocks. However, as the outperformance is not due to a bias but an integral part embedded in the indices, the alphas should be considered genuine.

Conclusions

This study analysed the financial performance of Islamic equity indices. The study distinguishes itself from most previous work by carefully addressing several methodological shortcomings that could explain the mixed results documented in the existing Islamic index literature. The steps towards a cleaner and more robust research approach can be summarized as follows. First, in contrast to many previous Islamic index papers, our data sample includes a large number of indices from multiple providers that together cover ten geographical markets. Second, throughout the analysis we maintain a strict matching approach which includes matched index pairs from the same provider and customized risk factors. Third, we account for possible back- testing biases that could be embedded in Islamic indices. Forth, we examine two sample periods length which allows us to (i) analyse potential performance implications of different screening practises currently used in the industry and (ii) better compare the performance of Islamic indices with different start dates. Fifth, we control for potential effects associated with market downturns and financial crises. Finally, we construct a refined market benchmark that excludes financials firms.

The findings presented in this paper could be seen as step towards a deeper understanding of the pricing of Islamic equity markets. Future research on Islamic equity investing is encouraged to further investigate the implications of constructing alternative market benchmarks in general and the DJIM in specific. The paper should also be considered highly relevant to investors and policymakers as it shows that the unique attributes embedded in Islamic equity investing could provide competitive investment strategies for both Muslim and non-Muslim investors alike.

Table 5

Results of Carhart (1997) estimations with standard and ex-financials benchmarks

Region	Provider	¤i	¤i	SMBi	HMLi	MOMi	Adj R2
World	Dow Jones standard benchmark	0.0026***	0.9905***	-0.0940*	-0.1785***	-0.0017	0.96
	Dow Jones ex-financials	0.0005*	1.0345***	-0.0873***	-0.1138***	-0.0030	0.98
	MSCI standard benchmark	0.0030*	0.9526***	0.0563	-0.0069	0.0590*	0.97
	MSCI ex-financials	0.0001	1.0154***	-0.0033	-0.0079	-0.0014	0.99
	FTSE standard benchmark	0.0006	0.9613***	0.0326	-0.0092	0.0358**	0.97
	FTSE ex-financials	-0.0014***	1.0134***	0.0169	0.0124	-0.0021	0,99
Developed	Dow Jones standard benchmark	0.0019*	0.9925***	-0.0759	-0.1505***	0.0054	0.95
	Dow Jones ex-financials	-0.0001	1.0447***	-0.0728**	-0.0945***	0.0064	0.98
	FTSE standard benchmark	0.0012	0.9427***	0.0654	0.0280	0.0521	0.97
	FTSE ex-financials	-0.0022*	1.0096***	-0.0064	0.0027	-0.0024	0.99
Emerging	Dow Jones standard benchmark	0.0031**	0.9702***	-0.0906**	-0.1099***	-0.0225	0.94
	Dow Jones ex-financials	0.0008	0.9814***	-0.1044***	-0.1039***	-0.0338**	0.96
	MSCI standard benchmark	-0.0009	1.0121***	0.0496	-0.0029	0.0171	0.99
	MSCI ex-financials	-0.0013	1.0306***	-0.0456*	-0.0357**	-0.0212	0.99
	FTSE standard benchmark	-0.0037**	1.0052***	0.1115**	0.0348	0.0273	0.98
	FTSE ex-financials	-0.0035***	1.0280***	0.0128	0.0030	0.0011	0.99

The following table displays the results of the Carhart (1997) regressions with standard and ex-financials benchmarks. Column one shows the region and column two the respective index provider. Column three to seven shows the Carhart alpha, beta, smb, hml and mom factors and column eight displays the adjusted r-squared value. Coefficient covariances and standard errors are made heteroscedasticity and autocorrelation are based on (NEWEY; WEST, 1987), *, **, *** represent a 10%, 5%, and 1% significant level, respectively.

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