Do Islamic Stock Indices Perform Better Than Their Conventional Counterparts?

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Abstract

Applying the Preference Ranking Organization Method for Enrichment of Evaluations (PROMETHEE II) method, this study attempts to rank Islamic and conventional indices from 20 developed and 18 emerging markets based on the performance of their MSCI conventional and Islamic country indices between 2002 and 2016. The study finds that the Danish Islamic index at the top of the ranking and the Hungarian Islamic index at the bottom. Moreover, conventional indices predominantly perform better than their Islamic counterparts in emerging markets and vice versa in developed markets.

JEL Classifications: G10, G11

***Keywords*:** Performance measurement; ranking; Islamic finance; equity indices; screening, portfolio management; decision making; PROMETHEE II

1. Introduction

The Islamic finance industry has been growing rapidly, with a double-digit asset growth rate over the past decade, from approximately US$ 800 billion in 2009 to an overall total value of US$ 2.19 trillion by the end of 2018 (IFSB 2019). Despite a series of global economic challenges, such as low energy prices, geopolitical conflicts, exchange rate depreciation, and an asset sell-off spree in the emerging markets; Islamic banking has outperformed conventional banking over the past decade. Over the same period, the Sukuk (Islamic bonds) market shows a remarkable growth coupled with a broadening of issuer base, with new issuances in Africa, East Asia, and Europe. Although the Islamic stock market, a major segment of the Islamic finance industry, has also experienced high growth, it is still unclear if Islamic stocks perform better than their conventional counterparts. This paper uses the Preference Ranking Organization Method for Enrichment of Evaluations (PROMETHEE) to develop a comprehensive ranking based on risk-adjusted performance measures of Islamic and conventional stock indices.

During the recent financial crisis, the Islamic finance industry substantiated its strength and existence. Researchers have concluded that excessive risk-taking, high leverage, and lack of adequate market discipline on the part of conventional finance led to the recent financial crisis. Islamic finance principles can impose better discipline on lending agents and prevent new crises. In line with this, Hasan and Dridi (2011) examine and compare the performance of Islamic banks and conventional banks during the recent global financial crisis in terms of the impact of the crisis on their profitability, credit and asset growth, and external ratings. They find that the crisis impacted the two business models differently. Dewi and Ferdian (2010) further argue that Islamic finance may be a solution to the financial crisis because it forbids the practice of interest. Arouri et al. (2013) examine diversified portfolios in which the Islamic stock markets supplement the conventional markets. Hoque et al (2016) find that Islamic and conventional equity markets move together despite their fundamental differences and the fact that the market microstructure, dividends, capital gains, taxation, and governance systems are different across the markets.

In recent years, the number of Islamic indices has rapidly increased in parallel with the globally growing interest in Islamic financial products. The first Islamic indices, DMI 150 (Dar al-Mal al-Islami) and SAMI (Socially Aware Muslim Index) were released in 1998. One year later, primary index providers Dow Jones and the Financial Times Stock Exchange Group created their own

indices called the Dow Jones Islamic market index (DJIMI) and the Global Islamic index series (GIIS), respectively. In the next few years, the other global integrated index providers, such as Standard and Poor's, Morgan Stanley Capital International, and Stoxx Group, launched their Islamic indices (El Khamlichi et al. 2014). Islamic stock indices have gained popularity due to the greater potential of growth and profitability (Hassan and Girard, 2011, Ho et al. 2014. Recent studies show that the literature comparing Islamic indices with their conventional peers has witnessed a parallel increase in volume and the used methodologies (Masih et al. 2018, Yildiz and El khamlichi 2017, Ben Rejeb and Arfaoui 2019, Tahir and Ibrahim 2020). However, to date, none of the studies examine the performance of Islamic stocks using the PROMETHEE method. We attempt to fill this research gap in this paper.

Hence, the contribution of the present study over the earlier ones lies in the methodology it employs. The values obtained for each of the examined indices over the period between 2002 and 2016 using 16 different risk-adjusted performance measurement (RAPM) measures were ranked using PROMETHEE II, a multiple-criteria decision-making method. The study advances methodologically with the use of other methods such as partial moments, drawdown, and extreme risk, in addition to conventional performance measurement methods. It is also important to enhance the number and group of countries included in the analysis of the study. Our study ranks the performances of a total of 76 indices, including the conventional and Islamic indices of 20 developed and 18 emerging markets. The study contributes to the literature and in particular to international investors and institutions in that it analyses a wide number of markets and involves individual and group comparisons of emerging and developed markets.

The remainder of the paper is organized as follows: Section 2 describes Shariah-compliant stocks and their performances. Section 3 presents a description of the data and methodology used in this study, Section 4 reports the empirical results and related discussion, and finally, Section 5 concludes the paper.

2. Shariah-compliant stock indices and their performance

The Islamic financial industry is grounded in a set of Islamic principles referred to as Shariah (Islamic law), such as risk-sharing; profit and loss sharing (PLS); the principle of asset backing; and the prohibition of riba (interest), excessive uncertainty, gambling, and other unethical sectors.

The Islamic financial industry offers a wide range of banking, Takaful (Islamic insurance), and capital market products, which are designed to cater to the needs of a wide range of investors and customers, irrespective of religious beliefs. The Islamic capital market offers several instruments, such as Sukuk, Islamic equities, Islamic mutual funds, and other types of funds. Islamic stocks are a subset of conventional stocks, and these stocks pass through two steps of screening, namely, qualitative and quantitative screening, to be Shariah-compliant. A qualitative screening process excludes stocks issued by firms whose core business activities are not in line with Shariah, such as conventional banks and other finance companies, winery, brewery, pornography, and weapons production. In addition, in the quantitative screening process, certain financial ratio requirements need to be satisfied. For example, the debt ratio cannot be more than 33%. Any violation of the threshold limit makes a stock non-Shariah compliant. The major global index providers, such as Dow Jones, Standard & Poor's, FTSE, MSCI, and Russell Investments, provide stock screening services. In addition, stock screening can be performed by the financial institutions, specialist Shariah firms, and even by regulators. The screening criteria may vary to a small extent from one organization to another depending on the specific objectives of the Shariah board, however, without any major disagreement. The Shariah screening process attempts to exclude those securities that violate Shariah principles, and the constructed Islamic indices could be seen as capacity-building experiments for the regulation of transnational Islamic financial flows (El Maknouzi and Jadalhaq 2019). The universe of Islamic indices is smaller than that of their conventional counterpart. Following the screening criteria, the majority of the Islamic stocks are offered by firms whose primary activities are permissible but which may be involved in unlawful transactions to some extent (depositing money in banks for interest, contracting interest-based loans, and conducting other non-permissible activities in their portfolios (El-Gamal, 2006; Usmani, 2000).

Since the inception of Islamic indices in 1998, the study by Atta (2000) is among the first studies that find that Islamic indices outperform their conventional benchmarks. However, other studies find that these two categories of indices are not significantly different from each other (Girard and Hassan 2008; Dewandaru et al. 2015), whereas others find that Islamic indices could generate higher returns than their conventional counterparts (Arouri et al., 2013; Mohammad and Ashraf, 2015). Additionally, Ho et al. (2014) find that Islamic indices outperform their conventional counterparts only during crisis periods, and their results are inconclusive for the non-crisis

periods. Other studies addressed the difference of performance in terms of size of the market and sector levels (Charles and Darné 2015), to regional factors (Yildiz and El khamlichi 2017), and index family (El khamlichi 2014).

Several studies address the issues of the performance, stability, riskiness, and globalization of Islamic equity market instruments. Ismail and Shakrani (2003) analyse 12 Malaysian Islamic mutual funds throughout May 1999-July 2001 and find that Islamic unit trusts have a lower level of risk. Elfakhani et al. (2005) investigate 46 Islamic funds classified into eight categories according to their regional or sector exposure from January 1997 to August 2002 and conclude that the behaviour of Islamic funds does not differ from that of conventional ones. Similarly, Hayat (2006) examines the performance of a diversified sample of 59 pairs of Islamic and conventional funds and finds no statistically significant difference between the two types on average. Some other studies focus on the performance of Islamic funds across economic cycles. Abdullah et al. (2007) find that Islamic mutual funds perform better during the recession, whereas Hayat and Kraeussl (2011) document that Islamic funds underperformed significantly during the last financial crisis. Mansor and Bhatti (2011) find no significant departure in the performance of Islamic and conventional funds in two bullish periods. The study finds that Islamic funds over-perform their benchmarks during the first but underperform them during the second. El khamlichi et al (2012) argue that the performance of these funds should be non-persistent, whereas Abdelsalam et al. (2014) find that performance persistence exists for both Islamic and socially responsible funds but only for the worst and best ones.

Much effort has been spent on figuring out the most appropriate measure of performance of investments (Eling and Schuhmacher, 2007). The Sharpe ratio may not be suitable for an investor who puts risky assets in more than one fund, for example, in a market index and an investment fund (Bodie et al., 2014). The use of the total risk of the asset as measured by the standard deviation of returns is another major problem of the Sharpe ratio. The use of the standard deviation may significantly understate the riskiness of negatively skewed return distributions and overstate the riskiness of positively skewed return distributions. Lower partial moment (LPM) based performance measures have been developed to avoid understating the riskiness of negatively skewed return distributions. LPM-based measures include Omega (Keating and Shadwick, 2002), the Sortino ratio (Sortino and van der Meer, 1991), and Kappa 3 (Kaplan and

Knowles, 2004). LPMs are a more appropriate measure of risk than the standard deviation because the former considers only a minimally acceptable return (Sortino and van der Meer, 1991). In contrast to LPM, the return can be measured by a higher partial moment (HPM), which measures positive deviations from the minimal acceptable return. Sortino et al (1999) developed the upside potential ratio, which combines the HPM of order 1 and LPM of order 2 (Eling and Schuhmacher, 2007). There is another group of performance ratios based on the drawdown. The drawdown of an investment is the loss incurred over a certain investment period. These ratios include the Calmar ratio (Young, 1991), Sterling ratio (Kestner, 1996), and Burke ratio (Burke, 1994).

Although most of the previous studies apply parametric methodologies, such as ratio-based performance measures, the mean-variance (MV) criterion, and the capital asset pricing model (CAPM). Parametric methodologies suffer from a few shortcomings, such as the normality assumption in the return distributions, dependence on the first two moments for portfolio performance, and the assumption of quadratic utility functions of investors. Al-Khazali et al (2014) apply the stochastic dominance (SD) approach to compare the performance of Islamic stock indices with their conventional counterparts. Some recent studies apply the SD approach to highlight the diversification opportunities offered by Islamic equity indices with gold portfolios (Hoang et al. 2019, Al-Khazali, and Zoubi 2020), as well as the effect between Islamic Stock Markets and Exchange rates (Erdogan et al. 2020).

The above discussion on earlier studies indicates indecisive findings on fund performance results applying different methods. Additionally, the discussion reveals that the findings of the earlier studies on the performance of Islamic funds and indices are inconclusive, and the debate concerning under- or over-performance of Islamic funds has yet to conclude. To bridge this research gap, we aim to analyse 76 indices using 16 different risk-adjusted performance measures and rank them using the PROMETHEE II method. To the best of our knowledge, our study is the first attempt to apply this method to ranking Islamic indices.

3. Data and Methodology

3.1. Data

The study period covers the period from May 2002, when the MSCI Islamic indices were first calculated, to February 2016 and consist of data for 165 months, which include the closing values on the last day of each month. We aim to rank 20 developed and 18 emerging markets based on the performance of their MSCI conventional and Islamic country indices. Hence, 76 indices were divided into four groups: developed market conventional, developed market Islamic, emerging market conventional, and emerging market Islamic. The study uses the one-month LIBOR rate as a risk-free interest rate and the MSCI ACWI index as a benchmark. The index values were obtained from the official website of MSCI, and the LIBOR data were obtained from the Global Financial Database. We categorize the developed and emerging markets in this study as follows: Developed Countries include Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Hong Kong, Italy, Japan, Netherlands, New Zealand, Norway, Singapore, Spain, Sweden, Switzerland, United Kingdom (UK), and United States of America (USA). Developing Countries include Brazil, Chile, China, Colombia, Czech Republic, Hungary, India, Indonesia, Korea, Malaysia, Mexico, Philippines, Poland, Russia, South Africa, Taiwan, Thailand, and Turkey.

3.2. Methodology

A. Performance Measurement

We compute the monthly returns of the indices with the formula below.

$$R_t = (P_t - P_{t-1})/P_{t-1}$$

where R_t denotes the return of the index during month t, P_t denotes the index at time t (this month's index), and P_{t-1} denotes the index at time $t-1$ (last month's index).

To rank the conventional and Islamic indices of 38 markets, initially, 16 different risk-adjusted performance measures were applied to the 5 different categories shown in Table 1.

Table 1: Risk-Adjusted Performance Measures

Method	Formula	Explanation
Absolute Risk-Adjusted Performance Measures		
Sharpe Ratio (SR) (Sharpe, 1966)	$SR = (\tilde{r}_i - \tilde{r}_f)/\tilde{\sigma}$	$\tilde{r}_i$: annualised index return $\tilde{r}_f$: annualised risk-free return $\tilde{\sigma}$: annualised index risk
Treynor Ratio (TR) (Treynor, 1965)	$TR = (\tilde{r}_i - \tilde{r}_f)/\beta_i$	β_i: index beta
Relative Risk-Adjusted Performance Measures		

Information Ratio (IR) (Kidd, 2011)	$IR = (\tilde{r}_i - \tilde{r}_b)/\tilde{\sigma}_{i-b}$ $\sigma_{i-b} = \sqrt{\frac{\sum_{i=1}^{i=n}(r_i - \bar{r})^2}{n}}$	$\tilde{r}_b$: annualised benchmark index return $\tilde{\sigma}_{i-b}$: annualised tracking error $\bar{r}$: mean of excess return n: number of observation
Jensen's Alpha (JA) (Jensen, 1968)	$\tilde{\alpha} = \tilde{r}_i - \tilde{r}_f - \beta_i x(\tilde{r}_b - \tilde{r}_f)$	α: annualised Jensen's alpha
Modigliani–Modigliani measure (M^2) (Modigliani and Modigliani, 1997)	$M^2 = (\tilde{r}_i - \tilde{r}_f)x\left(\frac{\tilde{\sigma}_b}{\tilde{\sigma}}\right) + \tilde{r}_f$	$\tilde{\sigma}_b$: annualised benchmark index risk
Drawdown Risk-Adjusted Performance Measures		
Calmar Ratio (CR) (Young, 1991)	$CR = (\tilde{r}_i - \tilde{r}_f)/D_{Max}$	D_{Max}: measures the largest single drop from peak to bottom in the value of an index (before a new peak is achieved)
Sterling Ratio* (StR_d) (Kestner, 1996)	$StR_d = (\tilde{r}_i - \tilde{r}_f)/\overline{D}_{Lar}$ $\overline{D}_{Lar} = \left\lvert \sum_{j=1}^{j=d} \frac{D_j}{d} \right\rvert$	$\overline{D}_{Lar}$: average largest drawdown D_j: j[th] drawdown over the entire period d: total number of drawdowns in the entire period
Modified Burke Ratio (MBR_d) (Burke, 1994; Bacon, 2012)	$MBR_d = (\tilde{r}_i - \tilde{r}_f)/\ DD$ $DD = \sqrt{\sum_{j=1}^{j=d} \frac{D_j^2}{n}}$	DD: drawdown deviation
Pain Ratio (PR) (Zephyr Associates, 2006)	$PR = (\tilde{r}_i - \tilde{r}_f)/\ PI$ $PI = \sum_{i=1}^{i=n} \frac{\lvert D_i' \rvert}{n}$	PI (pain index): mean value of the drawdowns over the entire analysis period
Martin Ratio (MR) (Martin and McCann, 1998)	$MR = (\tilde{r}_i - \tilde{r}_f)/\ UI$ $UI = \sqrt{\sum_{i=1}^{i=n} \frac{D_i'^2}{n}}$	UI (ulcer index): volatility measure that only captures continuous downside movements in index, and ignores upside volatility
Partial Moments Risk-Adjusted Performance Measures		
Omega Ratio (OR) (Keating and Shadwick, 2002)	$OR\ (\Omega) = \mu_u/\mu_d$ $\mu_u = \frac{1}{n} x \sum_{i=1}^{i=n} \max\ (r_i - r_t, 0)$ $\mu_d = \frac{1}{n} x \sum_{i=1}^{i=n} \max\ (r_t - r_i, 0)$	μ_u (upside potential): upside potential is the average sum of returns above the target μ_d (downside potential): downside potential is the average sum of returns below the target
Sortino Ratio (SoR) (Sortino and Van Der Meer, 1991)	$SoR = (\tilde{r}_i - \tilde{r}_t)/\tilde{\sigma}_d$ $\sigma_d = \sqrt{\sum_{i=1}^{n} \frac{\min\ [(r_i - r_t), 0]^2}{n}}$	$\tilde{\sigma}_d$: annualized downside risk r_t: annualized minimum target return
Kappa 3 (K_3) (Kaplan and Knowles, 2004)	$K_3 = \frac{(\tilde{r}_i - \tilde{r}_t)}{\sqrt[3]{\frac{1}{n} x \sum_{i=1}^{i=n} \max(r_t - r_i, 0)^3}}$	
Upside Potential Ratio (UPR) (Sortino et al, 1999)	$UPR = \frac{\frac{1}{n} x \sum_{i=1}^{i=n} \max\ (r_i - r_t, 0)}{\tilde{\sigma}_d}$	
Extreme Risk-Adjusted Performance Measures		
Reward to VaR** (R to VaR) (Alexander and Baptista, 2003)	$Reward\ to\ VaR = (\tilde{r}_i - \tilde{r}_f)/VaR_{1-\alpha}$	$VaR_{1-\alpha}$: the absolute of the worst-ranked return with (1-α) confidence
Conditional Sharpe Ratio (CSR) (Agarwal, Naik, 2004)	$CSR = (\tilde{r}_i - \tilde{r}_f)/CVaR$ $CVaR_{1-\alpha} = \frac{\lvert \sum_{i=1}^{i=n} < r_i \lvert r_i < VaR_{1-\alpha} > \rvert}{n_{VaR}}$	n_{VaR}: number of returns that more negative than the value at risk

*Average largest drawdown d=5 takes for Sterling Ratio and Modified Burke Ratio

**The probability of α takes a value of 5% equating to confidence levels of 95%

B. Ranking method

We rank the obtained values using the PROMETHEE (Preference Ranking Organization Method for Enrichment Evaluations) method, which is one of the multiple criteria decision-making methods developed to rank alternatives (76 MSCI indices in this study) based on particular criteria (16 RAPMs in this study). It is a quite simple ranking method in conception and application compared to other methods for multicriteria analysis. It is well adapted to the problems where a finite number of alternatives are to be ranked considering several, and sometimes conflicting criteria (Albadvi et al, 2007). The PROMETHEE method becomes more prominent and more efficient than other multiple criteria decision-making methods (Behzadian et al., 2010; Singh et al. 2020). It gives the decision-maker preference functions, providing convenience in the pairwise comparison of alternatives on a criterion-by-criterion basis. It assesses the alternatives to be ranked based on specified preference functions and determines their partial and full rankings using the pairwise comparison technique. The distinguishing aspect of the method lies not only in the fact that it allows for performing normalization but also in the fact that different types of functions can be used for each evaluation criterion in pairwise comparisons. This method is widely applied in Operational Research, but some studies suggested their use for decision making related to conventional stock trading (e.g. Albadvi et al., 2007).

The PROMETHEE method is applied using the following operations (Behzadian et al., 2010):

Step 1: Creating a data matrix including the alternatives (a, b,…m), criteria (f_1, f_2,…f_k), criteria weights (w_1, w_2,…w_3) and criteria values for each alternative [$f_1(a)$, $f_2(a)$,… $f_k(m)$]

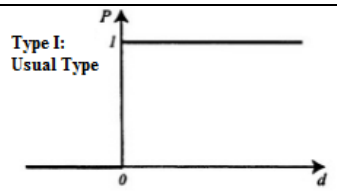
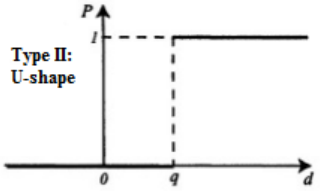
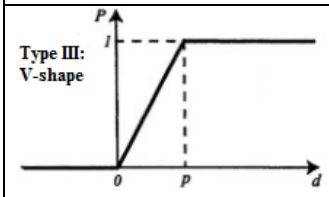
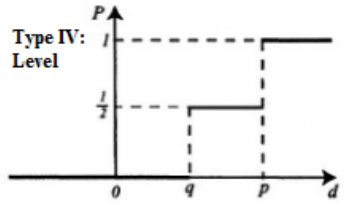
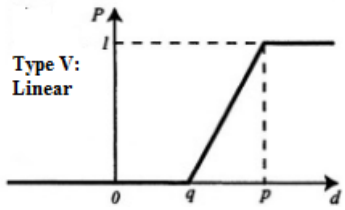
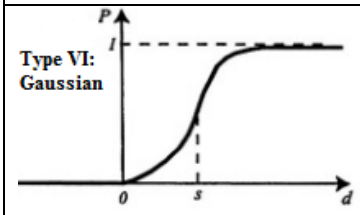
	$Criteria\ 1\ (f_1)$	$Criteria\ 2\ (f_2)$	…	$Criteria\ k\ (f_k)$
$Alternative\ a$	$f_1(a)$	$f_2(a)$	…	$f_k(a)$
$Alternative\ b$	$f_1(b)$	$f_2(b)$	…	$f_k(b)$
…	…	…	…	…
$Alternative\ m$	$f_1(m)$	$f_2(m)$	…	$f_k(m)$
$Weights$	w_1	w_2	…	w_k

The study considered the weights of the 16 criteria to be equal.

Step 2: Determining the preference functions

There are six different preference functions in the method: Usual, U-shape, V-shape, Level, Linear, and Gaussian.

$Type$	$Parameters$	$Function$

	–	$P(d) = \begin{cases} 0, d \leq 0 \\ 1, d > 0 \end{cases}$
	q	$P(d) = \begin{cases} 0, d \leq q \\ 1, d > q \end{cases}$
	p	$P(d) = \begin{cases} 0, d \leq 0 \\ d/p, 0 \leq d \leq p \\ 1, d > p \end{cases}$
	p, q	$P(d) = \begin{cases} 0, d \leq q \\ 1/2, q < d \leq p \\ 1, d > p \end{cases}$
	p, q	$P(d) = \begin{cases} 0, d \leq q \\ \dfrac{d-q}{p-q}, q < d \leq p \\ 1, d > p \end{cases}$
	s	$P(d) = \begin{cases} 0, d \leq 0 \\ 1 - e^{\frac{d^2}{2s^2}}, d > 0 \end{cases}$

Reference: Brans & Vincke, 1985: 650-651

In each case 0, 1 or 2 parameters have to be defined; their significance is clear:

• q is a threshold of indifference,

• p is a threshold of strict preference, and

• s is an intermediate value between p and q.

The q indifference threshold is the largest deviation that is considered as negligible by the decision maker, whereas the p preference threshold is the smallest deviation that is considered as sufficient to generate a full preference.

The V-shape (type III) and linear (type V) preference functions are best suited for quantitative criteria (actually, V-shape is a special case of the linear one); therefore, the study employed the V-shape preference function.

Step 3: Determining common preference functions and indices

Pairwise comparisons of decision points are performed for each evaluating factor concerning the preference functions and common preference functions, which are determined for all alternative pairs. The calculation of the common preference function for a and b alternatives is shown in Equation (1):

$$P(a,b) = \begin{matrix} f(a) \leq f(b) \\ P[f(a) - f(b)] \; f(a) > f(b) \end{matrix} \qquad (1)$$

Preference indices for the decision points compared using the common preference functions are determined using Equation (2):

$$\pi = (a,b) = \sum_{i=1}^{k} w_i P_i(a,b) \qquad (2)$$

Step 4: Calculating the positive ($\emptyset^+$) and negative ($\emptyset^-$) outranking flows

The positive outranking flow ($\emptyset^+$) expresses the extent to which the relevant alternative outranks other possible alternatives, whereas the negative outranking flow ($\emptyset^-$) expresses the extent to which it is outranked by other possible alternatives. Positive ($\emptyset^+$) and negative ($\emptyset^-$) outranking flows for decision points are determined using the formulae in Equation (3) and Equation (4), respectively:

$$\emptyset^+ = \frac{1}{m-1} \sum \pi(a,A) \quad A = (b,c,d,\ldots m) \qquad (3)$$

$$\emptyset^- = \frac{1}{m-1} \sum \pi(A,a) \quad A = (b,c,d,\ldots m) \qquad (4)$$

Step 5: Obtaining the partial ranking of the alternatives using PROMETHEE I

The PROMETHEE I method is used to perform pairwise comparisons for alternatives and thus determines the nature of the relationship between the alternatives. Relationships between the alternatives are referred to as preference, indifference, and incomparability relationships. The following applies in determining partial priorities for two alternatives such as a and b.

- If any of the following conditions are met, then alternative a is preferred to alternative b.

$$\emptyset^{+}(a) > \emptyset^{+}(b)\ ve\ \emptyset^{-}(a) < \emptyset^{-}(b) \qquad (5)$$

$$\emptyset^{+}(a) > \emptyset^{+}(b)\ ve\ \emptyset^{-}(a) = \emptyset^{-}(b) \qquad (6)$$

$$\emptyset^{+}(a) = \emptyset^{+}(b)\ ve\ \emptyset^{-}(a) < \emptyset^{-}(b) \qquad (7)$$

- If the following condition is met, then alternative a and alternative b are equally preferred.

$$\emptyset^{+}(a) = \emptyset^{+}(b)\ ve\ \emptyset^{-}(a) = \emptyset^{-}(b) \qquad (8)$$

- If any of the following conditions are met, then alternative a and alternative b cannot be compared.

$$\emptyset^{+}(a) > \emptyset^{+}(b)\ ve\ \emptyset^{-}(a) > \emptyset^{-}(b) \qquad (9)$$

$$\emptyset^{+}(a) < \emptyset^{+}(b)\ ve\ \emptyset^{-}(a) < \emptyset^{-}(b) \qquad (10)$$

Step 6: Obtaining the full ranking of the alternatives using PROMETHEE II

PROMETHEE II ranks the net outranking flows ($\emptyset^{net}$) calculated for the alternatives. The net outranking flow is calculated using the following formula:

$$\emptyset^{net}(a) = \emptyset^{+}(a) - \emptyset^{-}(a) \qquad (11)$$

A high net outranking flow for an alternative indicates high performance for that alternative. A complete ranking between alternatives can be performed after calculating net outranking flows. During complete ranking, two decisions can be made in the comparison of the net outranking flows calculated for two alternatives such as a and b.

$$If \emptyset^{net}(a) > \emptyset^{net}(b), then\ alternative\ a\ is\ preferred.$$

$$If\ \emptyset^{net}(a) = \emptyset^{net}(b), then\ alternatives\ a\ and\ b\ are\ equally\ preferred.$$

The obtained values were applied using the Visual PROMETHEE software.

4. Results

Table 2 presents the descriptive statistics of the MSCI Conventional and Islamic Country indices for 20 developed and 18 emerging markets over the period from May 2002 to February 2016. Among the 76 indices, the Danish Islamic index shows the highest average monthly return of 1.25%, followed by the Colombian and Indonesian conventional indices, with average monthly returns of 1.24% and 1.07%, respectively. Conversely, the Hungarian Islamic index ends up the worst performance, with a loss of -0.54%. The Italian conventional and Islamic indices as well as the Brazilian Islamic index also yielded negative monthly returns. For most of the emerging markets, the average monthly return of conventional indices shows higher performance than that of Islamic indices and vice versa for the developed markets.

In the entire sample, both the conventional and Islamic indices of Turkey, Brazil, and Hungary carry the highest risk levels. Among the developed markets, Norway and Austria stand out with the high standard deviations of their conventional and Islamic indices. The USA Islamic and USA conventional indices carry the lowest risk levels, with monthly standard deviations of 3.96% and 4.27%, respectively. The USA indices are followed by the Swiss and Japanese indices. Among the emerging markets, the two indices of Malaysia carry the lowest risk levels. Conventional indices for most of the emerging markets present a lower risk when compared to their Islamic indices. In the developed markets, the situation is similar, meaning that the risk for the conventional indices of ten markets is higher than that for their Islamic indices, and vice versa for the other ten.

An analysis of the extreme values indicates that the Turkish conventional and Islamic indices yielded the highest monthly returns, followed by the Indian conventional and Islamic indices, with monthly return rates of 36.63% and 33.69%, respectively. The highest monthly losses occurred in the Hungarian indices, followed by the Indonesian indices. Almost all of the indices yielded the lowest monthly returns in October 2008, when the global economic crisis was at its peak.

Table 2: Descriptive Statistics of the MSCI Conventional and Islamic Country Indices over May 2002-February 2016

COUNTRY (EM)	RETURN	STD DEV	MAX	MIN	COUNTRY (EMIS)	RETURN	STD DEV	MAX	MIN
BRAZIL	0.35%	10.26%	28.37%	-32.35%	BRAZIL	-0.04%	11.27%	30.14%	-35.05%
CHILE	0.56%	6.36%	20.05%	-25.66%	CHILE	0.63%	6.65%	19.37%	-29.40%
CHINA	0.67%	7.63%	19.31%	-22.78%	CHINA	0.47%	7.70%	20.44%	-23.08%

COLOMBIA	1.24%	8.52%	23.39%	-28.55%	COLOMBIA	1.01%	8.74%	24.72%	-27.61%
CZECH REP.	0.55%	7.57%	19.88%	-29.44%	CZECH REP.	0.48%	8.63%	21.88%	-29.79%
HUNGARY	0.34%	10.12%	27.26%	-43.35%	HUNGARY	-0.54%	10.84%	25.10%	-70.00%
INDIA	0.93%	8.52%	36.63%	-28.56%	INDIA	0.75%	8.26%	33.69%	-30.30%
INDONESIA	1.07%	9.01%	30.55%	-39.90%	INDONESIA	1.00%	9.32%	29.13%	-40.32%
KOREA	0.48%	7.87%	26.31%	-26.12%	KOREA	0.47%	7.62%	28.45%	-21.61%
MALAYSIA	0.39%	4.93%	15.92%	-17.65%	MALAYSIA	0.61%	5.29%	17.35%	-21.14%
MEXICO	0.64%	6.48%	16.75%	-30.72%	MEXICO	0.62%	7.42%	19.45%	-30.16%
PHILIPPINES	0.85%	6.58%	19.26%	-24.33%	PHILIPPINES	1.02%	8.74%	27.64%	-22.59%
POLAND	0.18%	9.33%	26.43%	-33.85%	POLAND	0.26%	9.10%	27.61%	-32.02%
RUSSIA	0.17%	9.83%	30.44%	-35.28%	RUSSIA	0.17%	9.83%	28.66%	-35.26%
SOUTH AFRICA	0.50%	7.34%	16.35%	-26.64%	SOUTH AFRICA	0.15%	7.57%	20.58%	-30.64%
TAIWAN	0.13%	6.66%	17.41%	-19.13%	TAIWAN	0.29%	6.69%	16.72%	-17.15%
THAILAND	0.80%	7.55%	30.96%	-33.10%	THAILAND	0.61%	8.45%	27.11%	-35.75%
TURKEY	0.65%	11.88%	40.93%	-34.33%	TURKEY	0.71%	11.86%	53.09%	-37.29%
COUNTRY (DM)	**RETURN**	**STD DEV**	**MAX**	**MIN**	**COUNTRY (DMIS)**	**RETURN**	**STD DEV**	**MAX**	**MIN**
AUSTRALIA	0.36%	6.50%	17.00%	-25.56%	AUSTRALIA	0.44%	7.11%	18.82%	-29.18%
AUSTRIA	0.03%	8.33%	24.65%	-37.34%	AUSTRIA	0.34%	9.08%	28.11%	-36.33%
BELGIUM	0.23%	6.78%	17.54%	-36.56%	BELGIUM	0.31%	5.78%	17.11%	-19.84%
CANADA	0.40%	5.86%	21.01%	-27.16%	CANADA	0.37%	6.87%	23.89%	-29.55%
DENMARK	0.96%	6.11%	18.29%	-25.67%	DENMARK	1.25%	6.31%	14.00%	-23.79%
FINLAND	0.09%	7.95%	23.77%	-24.01%	FINLAND	0.07%	8.47%	26.88%	-25.45%
FRANCE	0.14%	6.32%	15.31%	-22.43%	FRANCE	0.13%	5.89%	14.10%	-19.84%
GERMANY	0.27%	7.16%	22.39%	-24.35%	GERMANY	0.42%	7.03%	20.73%	-26.38%
HONG KONG	0.42%	5.98%	17.04%	-21.46%	HONG KONG	0.35%	5.21%	14.06%	-20.50%
ITALY	-0.24%	7.17%	18.48%	-23.63%	ITALY	-0.05%	6.51%	24.30%	-19.27%
JAPAN	0.13%	4.67%	12.94%	-14.79%	JAPAN	0.11%	4.56%	11.08%	-15.97%
NETHERLANDS	0.18%	6.31%	14.33%	-25.16%	NETHERLANDS	0.27%	6.89%	19.80%	-24.76%
NEW ZEALAND	0.31%	6.01%	15.10%	-22.60%	NEW ZEALAND	0.31%	6.85%	22.27%	-22.18%
NORWAY	0.30%	8.85%	18.49%	-33.36%	NORWAY	0.40%	9.00%	21.03%	-31.59%
SINGAPORE	0.37%	6.26%	23.84%	-29.18%	SINGAPORE	0.40%	5.98%	19.92%	-30.67%
SPAIN	0.11%	7.54%	21.42%	-25.52%	SPAIN	0.76%	6.81%	23.60%	-26.54%
SWEDEN	0.55%	7.10%	22.16%	-26.66%	SWEDEN	0.65%	7.25%	25.09%	-26.74%
SWITZERLAND	0.40%	4.67%	11.12%	-12.27%	SWITZERLAND	0.52%	4.39%	11.36%	-14.91%
UK	0.06%	5.04%	13.24%	-19.13%	UK	0.15%	5.13%	13.22%	-17.64%
USA	0.37%	4.27%	10.83%	-17.25%	USA	0.39%	3.96%	11.24%	-15.40%

The table demonstrates monthly returns, standard deviations as well as minimum and maximum returns. EM represents Emerging Markets, EMIS represents Emerging Market Islamic Indices, DM represents Developed Markets, and DMIS represents Developed Market Islamic Indices.

Table 3 shows the rankings of the MSCI Conventional and Islamic Country indices for 20 developed and 18 emerging markets calculated using the PROMETHEE II method, as well as

their net outranking flows ($\emptyset^{net}$) and their best and worst rankings obtained by 16 risk-adjusted performance measures (RAPM). During this period, the Danish Islamic index is at the top of the list, followed by the Colombian conventional and Danish conventional indices. The best performer of the EMIS Group, the Philippines ranked fourth in the overall rankings. The last three ranks of the list belong to the Italian conventional and Islamic indices as well as the Hungarian Islamic index. The bottom rank of the EM group is occupied by the Russian conventional index, which ranks 61st in the overall rankings. Among the top ten indices in the list, five falls in the emerging market conventional index group, two are in each of the developed and emerging market Islamic indices groups and one is in the developed market conventional index group. In contrast, the bottom ten ranks are occupied by five developed markets conventional, three developed market Islamic, and two emerging market Islamic indices.

Concerning the rankings we obtain by using the 16 RAPM measures, the Colombian conventional and Philippine and Danemark Islamic indices ranked first at least once, whereas the Italian conventional and Hungarian Islamic indices ranked last at least once.

A comparison of the four examined groups (EM-EMIS-DM-DMIS) revealed the following results: The conventional indices for 11 of the 18 emerging markets ranked higher than their Islamic indices. The Islamic indices for 14 of the 20 developed markets ranked higher than their conventional indices. These results are similar to those reported by Walkshausl and Lobe (2012).

The screening involved in creating Islamic indices generally had a negative impact on the Islamic indices for emerging markets and a positive impact on developed markets. Islamic screening further reduced the investment universe, which is already smaller in emerging markets compared to developed markets. It also reduced the opportunities for diversification. This is believed to be the reason the performance of emerging market Islamic indices was lower than that of their conventional peers. In contrast, in developed markets, risky businesses with a high leverage ratio are avoided using Islamic screening, which is considered to be the reason Islamic indices display better performance when compared to their conventional peers.

Table 3: Net Flow Values and Rankings of the MSCI Conventional and Islamic Country Indices

COUNTRY (EM)	Ranking	$\emptyset^{net}$	Min Ranking	Max Ranking	COUNTRY (EMIS)	Ranking	$\emptyset^{net}$	Min Ranking	Max Ranking
BRAZIL	49	-0.0350	32	51	BRAZIL	73	-0.0947	49	73
CHILE	21	0.0402	16	26	CHILE	16	0.0548	12	28

CHINA	19	0.0476	14	29	CHINA	34	0.0017	28	42
COLOMBIA	2	0.1905	1	3	COLOMBIA	7	0.1208	4	9
CZECH R.	27	0.0164	19	39	CZECH R.	37	-0.0055	12	45
HUNGARY	50	-0.0372	40	53	HUNGARY	76	-0.1571	74	76
INDIA	8	0.1051	4	16	INDIA	14	0.0670	8	25
INDONESIA	5	0.1304	4	9	INDONESIA	11	0.0973	6	13
KOREA	31	0.0044	18	39	KOREA	32	0.0031	16	38
MALAYSIA	30	0.0069	21	38	MALAYSIA	12	0.0800	8	22
MEXICO	15	0.0647	8	23	MEXICO	20	0.0412	17	23
PHILIPPINES	6	0.1282	4	8	PHILIPPINES	4	0.1469	1	11
POLAND	59	-0.0636	37	65	POLAND	55	-0.0498	25	56
RUSSIA	61	-0.0655	39	64	RUSSIA	60	-0.0650	35	62
SOUTH AFRICA	25	0.0221	22	29	SOUTH AFRICA	62	-0.0680	47	62
TAIWAN	57	-0.0598	45	68	TAIWAN	48	-0.0345	31	55
THAILAND	10	0.1001	7	12	THAILAND	22	0.0384	17	25
TURKEY	26	0.0214	10	36	TURKEY	24	0.0269	15	29
COUNTRY (DM)	**Ranking**	$\emptyset^{net}$	**Min Ranking**	**Max Ranking**	**COUNTRY (DMIS)**	**Ranking**	$\emptyset^{net}$	**Min Ranking**	**Max Ranking**
AUSTRALIA	42	-0.0204	40	54	AUSTRALIA	35	-0.0045	31	42
AUSTRIA	72	-0.0911	66	74	AUSTRIA	51	-0.0378	41	54
BELGIUM	56	-0.0542	53	75	BELGIUM	44	-0.0277	41	51
CANADA	40	-0.0092	28	45	CANADA	43	-0.0242	40	48
DENMARK	3	0.1518	2	11	DENMARK	1	0.2470	1	3
FINLAND	68	-0.0806	62	69	FINLAND	70	-0.0836	64	71
FRANCE	64	-0.0717	61	67	FRANCE	65	-0.0743	61	70
GERMANY	53	-0.0418	51	61	GERMANY	39	-0.0084	35	57
HONG KONG	33	0.0021	24	43	HONG KONG	38	-0.0075	32	58
ITALY	75	-0.1478	73	76	ITALY	74	-0.1162	70	75
JAPAN	66	-0.0774	55	71	JAPAN	69	-0.0819	57	72
NETHERLANDS	58	-0.0621	55	72	NETHERLANDS	52	-0.0411	47	59
NEW ZEALAND	45	-0.0288	42	52	NEW ZEALAND	46	-0.0304	44	52
NORWAY	54	-0.0464	46	74	NORWAY	47	-0.0321	34	72
SINGAPORE	41	-0.0146	35	64	SINGAPORE	36	-0.0048	28	65
SPAIN	67	-0.0775	63	67	SPAIN	9	0.1015	6	14
SWEDEN	23	0.0275	19	33	SWEDEN	17	0.0546	13	30
SWITZERLAND	28	0.0164	22	36	SWITZERLAND	13	0.0756	7	27
The UK.	71	-0.0891	60	73	UK	63	-0.0681	55	69
USA	29	0.0093	23	55	USA	18	0.0490	14	50

The table demonstrates the net flow values and rankings obtained using the PROMETHEE II method. Minimum and Maximum Rankings display the best and worst rankings of the indices obtained with the 16 RAPM measures.

This part of the analysis involves the examination of the economic growth of the countries and the performance of their stock markets. Investors track the growth rate of countries partly because

they know that a country's stock performance will eventually be affected by its growth rate. This could be illustrated as such: a country's growth rate leads to an increase in the individual companies in the country; then, corporate earnings increase the stock owners' earnings per share, which, in turn, results in increases in stock prices and stock market indices.

5. Conclusion

The present study ranks 20 developed and 18 emerging markets based on the performance of their MSCI Conventional and Islamic indices using 16 different risk-adjusted performance measures. Since different risk-adjusted performance measures rank different indices differently, we use the PROMETHEE II method to provide a single comprehensive ranking for 76 indices using the data throughout 2002-2016. The results from PROMETHEE II indicate that the Danish Islamic index performs the best, followed by the Colombian and Danish Conventional indices. The Italian conventional and Islamic indices and the Hungarian Islamic index place at the bottom three ranks. The conventional indices of emerging markets made up half of the top ten, whereas the conventional indices of developed markets made up half of the bottom ten.

When examined on a group basis, the conventional indices for 11 out of the 18 emerging markets and 6 out of the 20 developed markets rank higher than their Islamic counterpart indices. The Islamic screening system has an inverse effect on the Islamic indices of emerging markets, which consists of a narrower investment pool than developed markets. In contrast, avoiding shares that have a higher leverage ratio has a positive effect on the Islamic indices of developed markets with wider investment pools.

Among the markets under review, our findings place the Danish Islamic index at the top of the ranking and the Hungarian Islamic index at the bottom. Also, one of the insights derived from our results is that the performance of emerging market Islamic indices was lower than that of their conventional peers. In contrast, in developed markets, Islamic indices display better performance when compared to their conventional counterparts. The findings of our study have managerial implications related to investment decisions and portfolio allocation since some markets could be more attractive to investors than the others. In terms of future research directions, future works should go for in-depth analysis to look into the impact of the recent COVID-19 crisis on both Islamic and conventional indices, to obtain an accurate view of their financial resilience. Also, In addition to PROMETHEE II applied in this paper, researchers could use different multi-criteria

decision-making methods (TOPSIS, VIKOR, ARAS, MOORA, etc) while making portfolio allocation in their future studies.

References

Abdelsalam, O., Duygun, M., Matallín-Sáez, J. C., & Tortosa-Ausina, E. (2014). Do ethics imply persistence? The case of Islamic and socially responsible funds. *Journal of Banking & Finance*, 40, 182-194.

Abdullah, F., Hassan, T., & Mohamad, S. (2007). Investigation of performance of Malaysian Islamic unit trust funds: Comparison with conventional unit trust funds. *Managerial Finance*, 33(2), 142-153.

Albadvi, A., Chaharsooghi, S. K., & Esfahanipour, A. (2007). Decision making in stock trading: An application of PROMETHEE. *European Journal of Operational Research*, 177(2), 673-683.

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

Al-Khazali O. M. & T.A. Zoubi (2020) "Gold and portfolio diversification: A stochastic dominance analysis of the Dow Jones Islamic indices", *Pacific-Basin Finance Journal*, Vol 60, https://doi.org/10.1016/j.pacfin.2020.101264

Arouri, M. E., Ben Ameur, H., Jawadi, N., Jawadi, F., & Louhichi, W. (2013). Are Islamic finance innovations enough for investors to escape from a financial downturn? Further evidence from portfolio simulations. *Applied Economics*, 45(24), 3412-3420.

Atta, H. (2000). Ethical rewards: An examination of the effect of Islamic ethical screens on financial performance and of conditioning information on performance measures. *Master of Science Dissertation). University of Durham.*

Behzadian, M., Kazemzadeh, R. B., Albadvi, A., & Aghdasi, M. (2010). PROMETHEE: A comprehensive literature review on methodologies and applications. *European journal of Operational research*, 200(1), 198-215.

Ben Rejeb, A. & Arfaoui, M. (2019), "Do Islamic stock indexes outperform conventional stock indexes? A state space modeling approach", *European Journal of Management and Business Economics*, 28(3), 301-322.

Bodie, Z., Kane, A., Marcus, A. J. (2014). Investments, 10th ed. McGraw Hill, New York. (Book)

Brans, J. P., & Vincke, P. (1985). Note—A Preference Ranking Organisation Method: (The PROMETHEE Method for Multiple Criteria Decision-Making). *Management science*, 31(6), 647-656.

Burke, G. (1994). A sharper Sharpe ratio. *Futures*, 23(3), 56.

Charles. A., & Darné, O. (2015) ”Are the Islamic indexes size or sector oriented? Evidence from Dow Jones Islamic indexes” Economics Bulletin 35(3), 1897-1905.

Dewandaru, G., Bacha, O. I., Masih, A. M. M., & Masih, R. (2015). Risk-return characteristics of Islamic equity indices: Multi-timescales analysis. *Journal of Multinational Financial Management*, 29, 115-138.

Dewi, M. K., & Ferdian, I. R. (2012). Evaluating performance of islamic mutual funds in Indonesia and Malaysia. *Journal of Applied Economics and Business Research*, *2*(1), 11-33.

El Khamlichi, A., Laaradh, K., Arouri, M., & Teulon, F. (2012). Performance Persistence of Islamic Equity Mutual Funds. *In International Islamic Capital Market Conference (pp. 19-20).*

El Khamlichi, A., Sannajust, A., & Sarkar, H. K. (2014). Islamic equity indices: insight and comparison with conventional counterparts. *Bankers, Markets & Investors,* (130), 69-80.

El Maknouzi M.E.H. & Jadalhaq I.M. (2019). Where are Islamic finance indices pointing towards? *Journal of Financial Regulation and Compliance*, 28(2), 267-281

Elfakhani, S., Hassan, M. K., & Sidani, Y. (2005, December). Comparative performance of Islamic versus secular mutual funds. *In 12th Economic Research Forum Conference in Cairo, Egypt (pp. 19-21).*

El-Gamal, M. A. (2006). *Islamic finance: Law, economics, and practice.* Cambridge University Press.

Eling, M., & Schuhmacher, F. (2007). Does the choice of performance measure influence the evaluation of hedge funds?. *Journal of Banking & Finance*, *31*(9), 2632-2647.

Elroy, D., Paul, M., & Mike, S. (2002). *Triumph of the Optimists: 101 Years of Global Investment Returns.*

Girard, E. C., & Hassan, M. K. (2008). Is there a cost to faith-based investing: Evidence from FTSE Islamic indices. *The Journal of Investing*, 17(4), 112-121.

Erdogan, S., Gedikli, A. & Çevik, E.İ. (2020).Volatility Spillover Effects Between Islamic Stock Markets And Exchange Rates: Evidence From Three Emerging Countries, *Borsa Istanbul Review*, In Press. https://doi.org/10.1016/j.bir.2020.04.003

Hasan, M., & Dridi, J. (2011). The effects of the global crisis on Islamic and conventional banks: A comparative study. *Journal of International Commerce, Economics and Policy*, *2*(02), 163-200.

Hassan, M. K., & Girard, E. (2011). Faith-Based Ethical Investing: The Case of Dow Jones Islamic Indexes. *Networks Financial Institute Working Paper*, *2011-WP:06*, 1–41.

Hayat R. (2006), An Empirical Assessment of Islamic Equity Fund Returns, VU University, Amsterdam

Hayat, R., & Kraeussl, R. (2011). Risk and return characteristics of Islamic equity funds. *Emerging Markets Review*, 12(2), 189-203.

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

Hoang T-H.V, Z. Zhu, A. El khamlichi, W-K. Wong (2019), "Does the Shari'ah screening impact the gold-stock nexus? A sectorial analysis", *Resources Policy*, 61, 617-626.

Hoque, H., Kabir, S. H., El khamlichi A., & Manahov, V. (2016), Islamic and Conventional Equity Market Movements During and After the Financial Crisis: Evidence from the Newly Launched MSCI Indices, Financial Markets, Institutions and Instruments, 217-252.

IFSB (2019), Islamic Financial Services Industry Stability Report, available at: https://www.ifsb.org/download.php?id=5231&lang=English&pg=/index.php [accessed Janauary 2020]

Ismaila, A. G., & Shakranib, M. S. (2003). The conditional CAPM and cross-sectional evidence of return and beta for Islamic unit trusts in Malaysia. *International Journal of Economics, Management and Accounting*, 11(1).

Jensen, M. C. (1968). The performance of mutual funds in the period 1945–1964. *The Journal of finance*, 23(2), 389-416.

Kaplan, P. D., & Knowles, J. A. (2004). Kappa: A generalized downside risk-adjusted performance measure. *Journal of Performance Measurement*, *8*, 42-54.

Keating, C., & Shadwick, W. F. (2002). A universal performance measure. *Journal of performance measurement*, 6(3), 59-84.

Kestner, L.N. (1996). Getting a handle on true performance, *Futures*, 25 (1), 44–46.

Mansor, F., & Bhatti, M. I. (2011). Islamic Mutual Funds Performance for Emerging Market, During Bullish and Bearish: The Case of Malaysia. *In 2nd International Conference on Business and Economic Research (pp. 14-16).*

Masih, M., Nazrol K. M. Kamil & Obiyathulla I. Bacha (2018) Issues in Islamic Equities: A Literature Survey, *Emerging Markets Finance and Trade*, 54:1, 1-26

Mohammad, N., & Ashraf, D. (2015). The market timing ability and return performance of Islamic equities: An empirical study. *Pacific-Basin Finance Journal*, 34, 169-183.

Sharpe, W. F. (1966). Mutual fund performance. *The Journal of business*, 39(1), 119-138.

Sharpe, W. F. (1994). The sharpe ratio. *The journal of portfolio management*, *21*(1), 49-58.

Singh, A., Gupta, A. & Mehra, A. (2020). Best criteria selection based PROMETHEE II method. *OPSEARCH*. https://doi.org/10.1007/s12597-020-00464-7

Sortino, F. A., & Van Der Meer, R. (1991). Downside risk. *The Journal of Portfolio Management*, 17(4), 27-31.

Tahir, M. & Ibrahim, S. (2020), "The performance of Shariah-compliant companies during and after the recession period – evidence from companies listed on the FTSE All World Index", *Journal of Islamic Accounting and Business Research*, 11(3),573-587

Treynor, J. L. (1965). How to rate management of investment funds. *Harvard business review*, 43(1), 63-75.

Usmani, M.T. (2000). Principles of Chari'a covering Islamic investment funds. available at: www.accountancy.com.pk/docs/islam_investment_funds.pdf

Walkshäusl, C., & Lobe, S. (2012). Islamic equity investing: Alternative performance measures and style analysis. *The Journal of Investing*, 21(4), 182-189.

Young, T. W. (1991). Calmar ratio: A smoother tool. *Futures*, *20*(1), 40.
Yildiz S.B., & A. El khamlichi, (2017), "The Performance Ranking of Emerging Market Islamic Indices Using Risk-Adjusted Performance Measures", *Economics Bulletin*, 37(1), 63-78.