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The Impact Of Islamic Finance On The Structure Of Stock Returns Of A Diversified Sample Of Indices

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ABSTRACT
Whether they are Muslim or not, investors interested in the stock market indices wonder about the performance of their investments. This study attempts to provide some answers to guide the decision process. This is of practical interest especially with the development of financial products in which Islamic market indices are the underlyings. In general, we study the impact of Islamic Finance on the structure of stock returns of a diversified sample of indices. Data were collected over a period of 11 years (January 2004 to December 2014). The results show the interest brings the use of such indices.

Keywords: Islamic Indices, performance, Wilcoxon test, cointegration test.
JEL classification: G11

INTRODUCTION

Muslims represent about a fifth of the world population and have more than $ 800 billion to invest. This amount increases by 15 percent annually. Only a small portion of available funds is invested in Islamic products, indicating that this market is still untapped.

According to a report by the McKinsey management consulting firm, "Islamic Finance is the new force in the financial market".In fact, the recent accumulation of liquidity in the Middle East countries attracts national and international fund managers who covet this market by offering products that comply with Sharia. For example, many Western financial institutions (such as Citibank, Barclays, Morgan Stanley, Merrill Lynch and HSBC) now sell Islamic financial products. In addition, the New York and London stock exchanges have launched Islamic indices whichretrace the performance of companies whose businessis comply with the rules of Islam.

Such a trend is likely to facilitate the integration of Islamic Finance to Conventionalone. Except for a few studies (Hakim, S., andRashidian, M. (2004),Hussein, K. (2007),Elfakhani, S., Hassan, M. K., andSidani, Y. (2005)), research on Islamic investment is still in its beginnings.

Our present article adds new knowledge to the field of Islamic investment based on faith. In particular, we conduct a thorough examination of the advantages of performance and diversification in this group of indices compared to those of their Conventional counterparts.

LITERATURE REVUE

The vast majority of work faced in Islamic Finance is of theoretical orientation and devoted to explain the principles and concepts related to the practice of the discipline. Empirical studies, few in Islamic Finance, relate mainly to mutual funds and banks. The most common themes refers to the stability or performance of Finance Islamic indices. The Islamic Finance has always been studied independently of the Conventional Finance, which does not reflect the reality of the financial markets. Indeed, we can reasonably think that the two systems will be affected, probably at different levels, by the same shocks. These may be due to some factors such as changes in economic conditions, investment behavior of market participants or just geographic proximity.

We therefore believe that these common factors are likely to influence the structure of stock returns in a "mixed"market. Kouser, R., and Saba, I. (2012) considered, in their analysis, joint banks, Conventional banks with Islamic windows, in addition to Islamic and Conventional entirely without motivate this choice. They sought to measure the financial performance of Pakistani banks through the CAMEL model and an analysis of variance (ANOVA).

In financial markets, studies such as Ho, C. S. F., and al. (2014) have concluded that Islamic index outperformed their counterparts in times of crisis but this result is not conclusive for the case of non-crisis periods.

Parallel to the studies mentioned above, some authors are also interested to Islamic indices by studying the effect of the composition Sharia-compliant or "screening" of such indices about the structure of their yields. Thus, analyzing the performance of 7 indices of the DJ3between 1996 and 2005, Hassan, M. K., and Girard, E. (2011) did not detect any significant difference in performance between Islamic indices and Conventional ones. They achieve the same result as for the indices FTSE (Hassan M. K. and Girard E. (2011)): Investors do not suffer from a cost associated with the selection criteria of Islamic indices.

Based on performance measures of Sharpe, Treynor, Jensen and those of selectivity and diversification (Fama, E. (1972)), authors generally conclude that there is a reward for the risk as well as a diversification benefit the two groups of indices considered. Hakim, S., and Rashidian, M. (2004) arrive at the same conclusion when they wonder about the cost of Sharia compatibility and competitiveness of Islamic indices in general.

Islamic Indices are not penalized by restrictive criteria considered in their composition and the same conclusion extends to Islamic mutual funds (Elfakhani, S.and al. (2005)). Moreover, distinguishing between bullish and bearish periods, it turns out they provide abnormal performance during bullish periods when the trend reverses in situations of bear market (Hussein, K. (2004),Hassan, M. K., and Girard, E. (2011)).

Despite the clarification provided by the works of these authors in the field of Islamic investment, we see that the considered indices are mostly the same, but simply analyzed at different times. Moreover, these works include only indices 100% Islamic or 100% Conventional. Unlike those studies that focus only on the indices, we aim to study the stock markets of several countries through their representative indices and taking into account the interaction that may exist between Islamic indices and their Conventional counterparts.

DATABASE

The sample of this study is composed of 57 Islamic market indices. Indeed, the indices families we selected are the following:

- The family of Dow Jones Islamic Market (DJIM) which groups Islamic indices calculated by Dow Jones;
- The family of Islamic indices calculated by Standard and Poor's which the benchmark index is SP500 Sharia;
- The Islamic index of Malaysia, Kuala Lumpur Sharia Index (KLSE);
- The Islamic index of Indonesia, Jakarta Islamic Index (JII);
- Islamic indices calculated by Morgan Stanley Capital International (MSCI);
- The Islamic market indices calculated by Financial Times Stock Exchange (FTSE).

Thus, all the historical data start from the date of launch of the index or the first data available, and go up to the date of data collection, December 31, 2014.

METHODOLOGY

Cointegrationof indices

With the aim to know whether Islamic indices are more or less efficient in the long-term, we conducted cointegration tests between each Islamic market index and its benchmark. The methodology followed is that proposed by Mignon, V. (2008)and Lardic, S., and Mignon, V. (2002).

Let x_ta series of Islamic market indices and y_ta series of its benchmark. If the two series are integrated of order d, the linear combination may also be part of the same order (d) or of a lower order than d.

We used the Augmented Dickey-Fuller test (ADF) and we proceed in two steps according to the approach of Engle, R. F., and Granger, C. W. (1987):

- Testing the order of integration with an ADF test and verify that the two series are integrated with the same order. If this is the case, the two sets may be cointegrated, and we will check it in the next step.
- Estimate, at first, the long-term relationship by performing linear regression of Islamic market index on its benchmark ($y_t = ax_t + b + \varepsilon_t$)and check, secondly, if the estimated residue at the end of this regression is stationary.

If this is the case, the two series are said to be cointegrated, allowing to estimate the following error correction model:

$$\Delta y_t = \gamma \Delta x_t + \lambda\ (y - a\ x_{t-1} - b) + \mu_t$$

Where the expression (y_t – a x_{t-1} - b) represents the deviation or error of period t-1 relative tothe equilibrium relationship, andλ the parameter that measures the intensity with which the variable corrects this error. λ must be negative and significant so that there is restoring force to long-run equilibrium.

The presence of cointegration illustrates the existence of a relationship between the Islamic index and its benchmark and the absence of a diversification potential risk of long-term market. On the contrary, the lack of cointegration is synonymous of a presence of opportunities to diversify this risk.

Efficiency of indices

To test the weak form of informational efficiency of markets, various approaches are possible. We propose to use a classical one based on the test of the random walk hypothesis. The market is more efficient when the returns follow a random walk (Malkiel, B. G. (2003)), that is to say, it is impossible to predict the future returns based on past one. To perform this test, we chose the approach of Lo, A. W., andMacKinlay, A. C. (1988) based on the variance ratio (VR) and its recent amendments proposed by Wright, J. H. (2000).

We propose the time series: $x_t = a + bt + cx_{t-1}$.

If the series follows a random walk, c = 1 and the above equation is reduced to:

$$x_t = a + b_t + x_{t-1}$$

Under the null hypothesis of random walk, the variance of returns changes proportionally to the sample interval. Thus, the variance of a period "k" should be equal to "1 / k" times the variance of returns for the period. In other words, dividing the ratio of "1 / k" times the variance of returns of a period "k" by the variance of the period of profitability, gives 1 for all values of "k". It is this ratio that represents the VR and which can be formalized as follows:

$$VR(k) = \frac{Var\ (x_t + x_{t-1} + \cdots + x_{t-k+1})}{Var\ (x_t)} = \frac{\delta^2(k)}{\delta^2(1)}$$

Cases that may occur are:

- If VR = 1, the pricesof indices of our sample follow a random walk, the returns are unpredictable based on the historical data.
- If VR<1, this is synonymous of a mean reversion process, which means that returns areex-ante predictable.
- The returns are said autocorrelated if this ratio is significantly different from 1.

To test this hypothesis (H0: VR (k) = 1), we use a non-parametric test (Wright, J. H. (2000)) for various time periods (k = 2, k = 5, k = 10 and k = 30). This test based on the ranks and signs is an extension of that of Lo, A. W., andMacKinlay, A. C. (1988). Recent studies comparing the various random walk tests (Hoque, H.and al.(2007),Guidi, F., and Gupta, R. (2011)) confirmed that this test is by far the most used by researchers and give robust results. We estimate the VR (k) sets of our sample of Islamic indices and then we calculate the Z (k) which implies that the residuals are asymptotically homoskedastic and follow a normal distribution N (0,1):

$$Z(k) = \frac{VR(k) - 1}{[\emptyset\ (k)]^{1/2}} \overset{a}{\sim} N(0,1)$$

Knowing that:

$\emptyset\ (k) = \frac{2\ (2k-1)(k-1)}{3kT}$With "T" sample size

This random walk test is also suitable for series returns even in the presence of heteroscedasticity and non-normality (Smith, G., andRyoo, H. J. (2003)). Also, the rejection of the random walk null hypothesis can result either from a heteroscedasticity or autocorrelation of price indices. That's why we calculate the Z*(k) proposed by Lo, A. W., andMacKinlay, A. C. (1988) and which tests the robustness even in the presence of heteroscedasticity.

In terms of applications on Islamic market indices, our approach is complementary to that adopted by Hassan, M. K. (2001) and Guyot, A. (2011) who worked on the indices of the Dow Jones family. We offer a global study that covers six major index families in our sample (Dow Jones, S&P, FTSE, MSCI, Malaysian indices and those of the financial center of Indonesia).

Establishment of a composite index of Islamic market indices

In this step, we calculated an index of indices. In terms of index calculation, we opted for an equally-weighted index for two reasons. First, the choice of a price-weighted index was excluded because it would over-weighted indiceswith significant value to the detriment of others and so would bias our calculation. Then, weighting by market capitalization was not possible either because of the lack of information regarding the number of shares outstanding of all indices at all times since we work on daily data.

The calculation of the composite index was realized in two stages. First, we calculated theportfolio returns average based on indices within it. Then, we calculated the value of the index as follows:

$$I_j = I_{j-1}(1 + \sum_{i=1}^{n} \frac{1}{n} r_{i,j})$$

with:
I_j: the index value in the day "j";
I_{j-1}: the value of the index in the day before "j-1";
n: the number of indices in the portfolio;
$r_{i,j}$: the profitabilityaverage of the index the day "j".

Calculation of returns and volatilities

We proceeded to calculate the daily return of Islamic and Conventional stock indices from their respective closing prices. Our choice involved the calculation of logarithmic returns (in continuous time) which have two main advantages.

Firstly, the fact that they are additives, a handy property that will serve us later in the calculation, and secondly because the arithmetic returns (single or discrete time) fail to properly test the existence of relations between profitability and risk, as demonstrated Aftalion, F. (2003).

The profitability is calculated by taking the natural logarithms of the daily closing prices of each index:

$$R_t = Ln(\frac{I_t}{I_{t-1}})$$

Calculated daily, the annualized returns are going to beannualized using the actuarial profitability. The annual profitability R_a is given by:

$$R_a = (1 + R_p)^p - 1$$

"p" is the number of periods corresponding to the number of trading days in the year (p = 250).

To calculate the profitability average $\overline{R}$, we use the approximation by the arithmetic mean of the returns (Williams, B. (2010)). This is justified by the high frequency of our observations, since we work on daily data.

Thus, the profitabilityaverage$\overline{R}$will be calculated as follows:

$$\overline{R} \approx \frac{1}{n} \sum_{t=1}^{n} R_t$$

The calculation of historical volatility $\sigma_t(n)$ is done by using the unbiased standard deviation:

$$\sigma_t(n) = \sqrt{\frac{1}{n-1} \sum_{t=1}^{n} (R_t - \overline{R})^2}$$

The annualized volatility σ_a is calculated as follows:

$$\sigma_a = \sigma_p \sqrt{p}$$

"p" is the number of periods matching to the number of trading days in the year (p = 250).

For each Islamic index, we chose a Conventional counterpart that serves as reference. The correspondence between the index and the benchmark was made in view of the investment universe of each of the indices, the geographical area covered and the size of the companies included therein. As it is known, the computation of any Islamic index obeys a logical filtering from a benchmark called often “starting universe”, it is this one which serves as an Islamic counterpart to the index.

Mean comparison test

The comparing means can be performed by using a Student's test on matched data.The test rests on the following assumptions:

- The data are normally distributed, otherwise the p-values are lower than they should be and the confidence interval is reduced. Non-compliance of this condition may lead to biased conclusions. This is true for samples whose size is less than 30 and do not follow a normal distribution. In our study we do not have this problem because we work on daily data and we have an average of 250 data per year.
- The homogeneity of variances which states that the variances of the two samples are assumed equal. According to Box, G. E. (1953), this hypothesis can be ignored if the sample both have the same size. In this case Student test strength is not affected.

In our case, the test covers the two means comparison for each pair of indices. The hypotheses to be tested are then as follows:

$$\begin{cases} H(0): \overline{X}_i = \overline{X}_j \\ H(1): \overline{X}_i \neq \overline{X}_j \end{cases}$$

The chosen decision rule is that we reject the null hypothesis of equality of two means if the p-value is less at the threshold of 5%.

Furthermore, researchers who have worked on monthly data (Albaity, M., and Ahmad, R. (2008),Hashim, N. (2008)) resorted to the alternative which consists in the signed rank test (Wilcoxon, F. (1945)). This is a nonparametric test that is adapted for failure and normality when the sample size is less than 30. The test of Wilcoxon signed ranks (Wilcoxon, F. (1945)) begins by computing the absolute value of the difference between each observation and the mean of the sample.Then, the observations are classified to determine their respective ranks. The sum of the ranks of the observations situated above the median must be equal to the sum of the ranks below.

The Wilcoxon test, denoted W, is performed by calculating the sum of the positive ranks:

$$W = \sum_{i=1}^{n} R_i^{+}$$

Thus, the two hypotheses to be tested are the following:

$$\begin{cases} H(0): \text{Médiane} = 0 \\ H(1): \text{Médiane} \neq 0 \end{cases}$$

To the extent that the realization of the parametric test assumptions may not be met for a pair of indices in our sample, we used the two measures namely the Student and Wilcoxon tests. Thus, as suggested Hussein, K., andOmran, M. (2005), the joint use of parametric and non-parametric tests allow us to have more robust results.

Variances Comparison Test

To compare the volatilities of different pairs of indices, we used an analysis of their variances. For this, we will use the test of the variation of two populations correlated with observations (Kanji, G. K. (2006)). This test, denoted F',is to compare the variances of two populations when the correlation between each pair is not zero.

Consider a random sample of size "n". the observation of two variables x and y with their averages$\bar{x}$and $\bar{y}$it gives several pairs (x_1, y_1), (x_2, y_2) ... (x_n, y_n).

The three steps of the test are the following:

- Calculate the correlation coefficient r between the variables X and Y: $r = \frac{\sum_{i=1}^{n}(x_i - \bar{x})(y_i - \bar{y})}{[\sum_{i=1}^{n}(x_i - \bar{x})^2 \sum_{i=1}^{n}(y_i - \bar{y})^2]^{1/2}}$
- Calculate the variance ratio statistic called F:$F = \frac{S_1^2}{S_2^2} = \frac{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n-1}}{\frac{\sum_{i=1}^{n}(y_i - \bar{y})^2}{n-1}} = \frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{\sum_{i=1}^{n}(y_i - \bar{y})^2}$
- Calculate$\gamma_F$quotient:$\gamma_F = \frac{F-1}{[(F+1)^2 - 4r^2F]^{1/2}}$

This quotient gives a statistical test to n-2 degrees of freedom. Both hypotheses to be tested are the following :

$$\begin{cases} H(0): \sigma_i^2 = \sigma_j^2 \\ H(1): \sigma_i^2 \neq \sigma_j^2 \end{cases}$$

Calculation of risk-adjusted profitability

After analyzing separately the profitability and risk of Islamic market indices and their Conventional counterparts, we analyzed the risk-adjusted performance. For this, we calculated the standard performance measures of Sharpe (Sharpe, W. F. (1966)), Treynor (Treynor, J. L. (1965)) and Sortino (Sortino, F. A., and al. (1991)). The calculation is performed for each year for all indices constituting our sample. The risk-free rate at which we compare the profitability of each of the studied index is the rate of US treasury bonds of (T-Bills) at 3 months in daily data.

The market portfolio is supposed to represent all of the market shares, that is why the choice was to take the broadest index of each market. Thus, for each family, we retain the broad index, this is obviously a Conventional stock index which is, by definition, more diverse than its Islamic counterpart.

Table 1 presents the broad indices may represent the market portfolio for each family of indices:

Table 1: The broad indices index families

Indices family	Largesindices
FTSE	Dow Jones Global – Price index (W1DOW)
FTSE FTSE	FTSE All Shares – Price index (FAWRLD)
Standard and Poor's	S&P500 – Price index (SP500)
MSCI	MSCI World – Price index (MSWRLD)

Then, we used the Wilcoxon test (Wilcoxon, F. (1945)) to refine our performance analysis. This allowed us to check the level of significance of the performance differences between each pair of indices. Le Maux, J., and Le Saout, E. (2004)used this test for socially responsible stock indices and concluded that the performance of the latter, measured by the Sharpe and Treynorratios, is not significantly different from that of Conventional stock indices regardless of the study period. Hussein, K. (2004)found similar results on Islamic market indices of the FTSE family.

RESULTS

The study of cointegrationof the leadingIslamic Indices

The series of stock indices in our sample are not stationary in levels, they are all integrated of order 1 (I1), as shown by the results of the stationarity of the series produced using the ADF test (see Table 2). This led us to check for cointegration between each Islamic Index and its benchmark.

The application of the ADF test on the residues of the relationship between each Islamic stock index and its benchmark shows that the null hypothesis of a unit root is rejected at the 10% level for couples of indices of MSCI and FTSE Family (FSAWRD and FAWRLD one side and MSACWS and MSWRLD on the other side). Indeed, the estimated residue is stationary and these series are cointegrated as shown in Table 2. This leads us to estimate an error correction model for these series of indices.

The estimationof error correction model for the FTSE and MSCI indices families was made by considering the Islamic index as the dependent variable. The results show that the error correction terms associated with the restoring force is negative and significant (see Table 3). Indeed, there is a catch to the equilibrium value, and imbalances between the indices FAWRLD and FSAWRD one hand, and between MSACWS and MSWRLD secondly compensating and leading to similar long-term developments.

The coefficient associated with the restoring force toward long-run equilibrium for Islamic FTSE indices is significantly different from zero, it is in the range of -0.0249. For the MSCI Islamic Index, the restoring force is -0.1154.It adjusts more quickly saw the error correction intensity is higher.Table 2 summarizes the results for the six pairs of indices:

Table 2: Cointegrationtest between the main Islamic indices and benchmarks

Index families	Indices	Stationarity of the series in level		Stationarity of the series in first difference		Stationarity of the residue of the long term relationship	
		ADF test	Stationarity	ADF test	Stationarity	Test ADF	Cointegration
Dow Jones	DJIMKT	-1.2135 (0.5213)	No	-39.02*** (0.0000)	Yes	-1.632 (0.1234)	No
	WDOW	-1.2175 (0.6257)	No	-40.23*** (0.0000)	Yes		No
FTSE	FSAWRD	-1.6685 (0.4415)	No	-19.88 (0.0000)	Yes	-3.522* (0.0505)	No
	FAWRLD	-1.6674 (0.2851)	No	-32.44 (0.000)	Yes		No
S P	SP500S	-1.1070 (0.7914)	No	-26.11*** (0.0000)	Yes	-2.599 (0.3351)	No
	SP500	-1.1884 (0.6391)	No	-26.33*** (0.0000)	Yes		No
MSCI	MSACWS	-2.1377 (0.4111)	No	-22.13 (0.0000)	Yes	-2.021* (0.1005)	No
	MSWRLD	-1.6311 (0.1171)	No	-20.47*** (0.0000)	Yes		No
Indonesia	JII	-0.1624 (0.8815)	No	-45.22*** (0.0000)	Yes	0.111 (0.9058)	No
	JKSE	0.8114 (0.3124)	No	-44.24*** (0.0000)	Yes		No
Malaysia	KLSI	-1.0082 (0.8117)	No	-29.14*** (0.0000)	Yes	-1.231 (0.1241)	No
	KLCI	-0.8224 (0.9924)	No	-23.55*** (0.0000)	Yes		No

* ** *** Indicate, respectively, the 10% significance levels, 5% and 1%. Parenthetically p-values

The profitabilities of Islamic indices FTSE and MSCI family behave the same vis-a-vis theirpast values (see Table 3). Thus, their profitabilities in a period (t) depend:

- Positively and significantly on their profitability recorded during the past period(t-1);
- Positively and significantly on the profitability of their benchmarks in period (t);
- Negatively and significantly on their respective benchmarks in the period (t-1).

Table 3: Error-Correction Models estimated for indices FTSE and MSCI family

Dependentvariable:FSAWRD

Variable	Coefficient	St.Error	p-value
RESIDU (-1)	-0.0281*	0.0142	0.0559
FAWRLD (-1)	-0.2851***	0.0124	0.0000
FSAWRD (-1)	1.1324***	0.0136	0.0000
FAWRLD	0.2891***	0.0107	0.0000

Dependent variable: MSACWS

Variable	Coefficient	St.Error	p-value
RESIDU (-1)	-0.1021***	0.0142	0.0001
MSACWS (-1)	-0.9851***	0.0081	0.0000
MSACWS (-1)	1.0327***	0.0036	0.0000
MSACWS	0.9088***	0.0087	0.0000

* ** *** Indicate, respectively, the 10% significance levels, 5% and 1%.

In terms of managerial implications, lack of co-integration of the four families of indices (Dow Jones, Standard and Poor's, Indonesian and Malaysian index), is synonymous of existence of opportunities for diversification as reported by Kok, S.and al. (2009) which reveals exploitable earnings opportunities (Serre, J-M. and Williams, B. (2003)). These opportunities are long term absent for two families of cointegratedindices with their benchmarks (MSCI and FTSE) because of the existence of long-term adjustment mechanism.

Indices efficiency

We calculated the variance ratios for the leading indices in our sample to test their efficiency. The calculation was made by considering a delay of 2, 5, 10 and 30 days as proposed Wright, J. H. (2000). Table 4 summarizes the results.

We note that the variance ratio test allowsthe reject of the null hypothesis of random walk (VR = 1) assuming homoscedasticity.This is true for all indices couples when we take a number of delays k = 2 as shown in the Z(K). Table 4 also shows that Islamic and Conventional indices of MSCI and FTSE families represent a low degree of inefficiency compared to other indices, while the Malaysian indices seem to be less efficient.

For the robust test for heteroscedasticity, the random walk null hypothesis is not rejected for two Conventional indices (MSWRLD and FAWRLD). They are therefore characterized by a VR = 1 and can be considered efficient in the sense of the weak form of informational efficiency. We can deduce that the returns of stock market indices in our sample are not predictable, with the exception of Conventional families FTSE indices and MSCI. The other pairs of indices behave similarly. Islamic and Conventional leading indices Dow Jones, Standard and Poor's of Malaysia and Indonesia have the same level of inefficiency.

Table 4: Variance ratios of the main Islamic market indices and their benchmarks k = {2,5,10,30}

	K	VR(k)	Homoscedasticity		Heteroscédasticity	
			Z(k)	p-value	Z*(k)	p-value
DJMKT	k=2	1.123651	7.1251***	0	7.0213	0
	k=5	1.13627	3.2522***	0.0001	2.3114	0.01
	k=10	1.089257	1.9221*	0.0826	1.3244	0.1824
	k=30	1.170052	1.325114	0.2147	1.5021	0.15
W1DOW	k=2	1.105771	4.23722	0.0000	7.13342***	0.00212
	k=5	1.24839	2.36432	0.00022	2.42352*	0.00212
	k=10	1.201377	2.03422	0.19472	1.43652	0.29452
	k=30	1.282172	1.437234	0.12682	1.61422	0.26212
FSAWRD	k=2	1.147891	-1.34934*	0.**424	1.24554***	0.00424
	k=5	1.16051	-2.47644**	0.02434	2.53564*	0.20424
	k=10	1.113497	-1.14634	0.30684	1.54864	0.40664
	k=30	1.194292	-1.549354	0.03894	-1.72634	0.17424
FAWRLD	k=2	0.460011	-1.46146*	0.03636	**-1.35766**	**0.13636**
	k=5	0.47260	-2.58856**	0.30046	**-0.64776**	**0.14636**
	k=10	0.425617	-2.25846	0.41096	**-1.66076**	**0.21876**
	k=30	0.506412	-1.661474	0.00106	**-1.83846**	**0.48636**
SP500	k=2	0.572131	-3.57358***	0.0000	-2.46978***	0.00048
	k=5	0.58475	-3.70068***	0.0002	-2.75988***	0.45048
	k=10	1.537737	-2.37058***	0.0008	-1.77288**	0.00088
	k=30	1.618532	-1.773594	0.0018	-1.95058	0.09848
SP500	k=2	0.684251	-4.6857***	0.0000	-3.5819***	0.0006
	k=5	0.69687	-3.8128***	0.0007	-2.8721***	0.0006
	k=10	0.649857	-2.4827***	0.0032	-1.8852**	0.0743
	k=30	0.730652	-1.8814	0.7753	-2.0627	0.7106
MSACWS	k=2	1.19631	2.79782***	0.67072	1.69402*	0.07272
	k=5	1.00899	0.92092	0.67282	2.98412	0.68272
	k=10	1.26197	0.59402	0.00532	0.90712	0.80512
	k=30	1.42772	0.90834	0.48742	0.17402	0.82272
MSWRLD	k=2	1.908491	1.90994**	0.78484	**1.80614**	**0.78484**
	k=5	1.92111	0.03704	0.78494	**0.09624**	**0.79484**
	k=10	1.874097	0.70094	0.86744	**0.10924**	**0.96724**
	k=30	1.954892	0.10990	0.99954	**0.28694**	**0.93484**
JII	k=2	1.020611	4.02206***	0.0000	2.91826**	0.80196
	k=5	1.03323	4.14916***	0.0001	1.20836	0.10696
	k=10	1.98017	0.81906	0.9056	0.22136	1.07936
	k=30	1.06702	2.20074**	1.01166	0.39906	1.04696
JKSE	k=2	1.132731	4.10412***	0.00908	2.0303**	0.00903
	k=5	1.14535	4.26121***	0.00911	1.3200	0.01901
	k=10	0.098337	0.90110	0.09160	0.33348	0.19142
	k=30	1.179132	2.33409**	0.00370	1.51118	0.15900
KLSI	k=2	1.24081	4.2463***	0.0012	2.1225**	0.0212
	k=5	1.25707	4.3734***	0.0013	3.4326***	0.1002
	k=10	1.00040	3.0433**	0.0008	2.4056**	0.0036
	k=30	1.20122	2.4464***	0.0009	2.0233*	0.2712
KLCI	k=2	1.35601	3.35842***	0.0212	2.25462**	0.0212
	k=5	1.30059	3.48552***	0.1013	2.54472**	0.1402
	k=10	1.32077	3.15542***	0.0007	2.55772*	0.0406
	k=30	1.00372	1.50434**	0.0000	1.73542	0.2232

* ** *** Indicate, respectively, the 10% significance levels, 5% and 1%. Parenthetically p-values

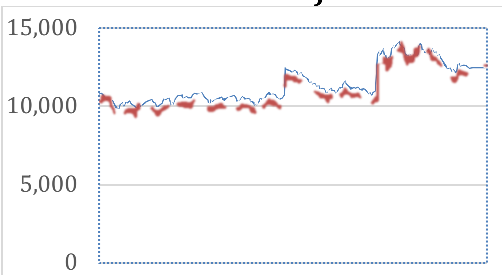
Establishment of a composite index of Islamic market indices

To form our composite index comprised of the principal Islamic market indices, we followed the logic of an investor willing to invest in these indices. The portfolio is made up of six major Islamic market indices whose calculation method used is that of an equally weighted composite index. We also performed the constitution of a second portfolio with Conventionalcounterparts Islamic indices used in the first portfolio.

Initially, we studied the descriptive statistics and stationarity and normality tests from the two portfolios. Thus, we can see that the processes of the two portfolios are not stationary in levels, and that both are integrated of order 1. The normality test of JarqueBera (Jarque, C. M., and Bera, A. K. (1980)) shows that the null hypothesis is rejected and distribution is asymmetrical.

In order to compare the evolution over time of the two portfolios made, we have represented them graphically by making a change of base (base 100) on December 31, 2003. The P-Islamic curves (continuous line) and P-Conventional (in broken line) in Figure 1 correspond to the Islamic portfolio and its Conventional counterpart.

Figure 1: Evolution of Islamic portfolio (in continued line) and P-Conventionnel (in discontinued line)P: Portfolio



When reading the chart, we see that both portfolios are evolving in the same direction either upward or downward. There is thus a strong correlation between the two, the correlation coefficient is 0.993.

We also note, that starting from the same base at December 31, 2003, the curve representing the Islamic portfolio is always above the one representing the Conventional portfolio. This suggests that Islamic portfolio could be more profitable than Conventionalone, but what about their respective performance?

To answer this question, we analyzed in detail the series of logarithmic returns of the two portfolios, which will allow us to calculate the returns and average annualized volatilities of the two portfolios.

Table 5: Descriptive Statistics of composite indices (Islamic and Conventional Portfolios)

	CONVENTIONAL_POTFOLIO	ISLAMIC_PORTFOLIO
Mean	0.000296	0.000320
Median	0.000361	0.000360
Maximum	0.340764	0.338243
Minimum	-0.272639	-0.270565
Std. Dev.	0.016933	0.017157
Skewness	-0.575563	-0.382939
Kurtosis	183.2074	171.8383
Jarque-Bera	3576279.	3140488.
Probability	0.000000	0.000000
Sum	0.779239	1.842447
Sum Sq. Dev.	0.753524	0.773612

In terms of profitability, the portfolio of Islamic market indices is more profitable than its Conventional counterpart. Thus, the Islamic portfolio logarithmic return average is 0.3%, whereas it is 0.2% for the Conventional portfolio. As for the risk, the annualized volatility average of Islamic portfolio is 10.17%, it is higher than that of Conventional portfolio that is only 8.94%.

The additional profitability of Islamic composite index is explained by a risk level higher than that of the Conventional portfolio.

This leads us to question about the profitability and risk of all Islamic indicescomposing our sample in the purpose of comparison with their Conventional counterparts. The question that arises at this level is whether the profitability of Islamic indices is significantly different from that of traditional indices and if the additional risk taking is rewarded with a significant difference in profitability according to financial theory.

Measure of risk-adjusted profitability

For the calculation of risk-adjusted returns, we used the Sharpe ratio (Sharpe, W. F. (1966)), theTreynorratio (Treynor, J. L. (1965)) and that of Sortino (Sortino, F. A., and al. (1991)).There are three Conventional performance measures, which, despite their limitations, remain the most widely used in the literature. The differences between the Sharpe ratios of each Islamic market index and its Conventional counterpart were tested using the nonparametric Wilcoxon test (Wilcoxon, F. (1945)).

The indices of the Dow Jones family

Sharpe ratios of the different indices were calculated annually for all pairs of indices. Each pair includes Islamic market index and its Conventional counterpart. Table 6 shows that differences of Sharpe, Treynor and Sortinoratios, calculated over the entire period, are negative in 20 cases out of 31. This means that Conventionalindices outperform on average in 64.5% of casesregardless of the performance measure.

However, the signed ranks test of Wilcoxon (W test) and the accompanying critical probability (p-value) allow us to see that no difference was significant (see Table 6).

Table 6: Wilcoxon test on Sharpe, Treynor and Sortinoratios of Dow Jones indices

Pairs of indices	Sharpe Ratio			Treynor Ratio			Sortino Ratio		
	Gap	W test	p-value	Gap	W test	p-value	Gap	W test	p-value
DJIMKT vs W1DOW	0.045	0.062	0.871	0.021	1.19	0.249	0.197	0.267	0.809
DJIMCN vs DJCNDA	0.022	0.062	0.97	-0.078	0.934	0.367	0.06	0.062	0.97
DJIMJAP vs DJPAN	0.141	0.011	1.01	0.976	1.242	0.229	0.72	0.011	1.01
DJIMUK vs DJUKN	0.196	0.185	0.873	0.396	1.17	0.258	1.026	0.185	0.873
DJIMUS vs DJUSM	0.015	0.165	0.889	0.049	0.319	0.769	0.032	0.216	0.849
DJIULC vs DJULC	-0.032	0.216	0.849	0.038	0.319	0.769	-0.23	0.267	0.809
DJIUMC vs DJUMC	0.054	0.114	0.929	-0.105	0.267	0.809	0.26	0.011	1.01
DJIUSM vs DJUSM	0.133	0.114	0.929	-0.06	0.319	0.769	0.713	0.114	0.929
DJIU50 vs DJTIT50	0.112	0.011	1.01	0.248	1.806	0.083	0.555	0.062	0.97
DJIWDD vs DJWDEV	0.033	0.267	0.809	0.047	0.729	0.484	0.129	0.011	1.01
DJIWEM vs DJWEM	0.033	0.421	0.693	0.338	1.601	0.123	-0.545	0.319	0.769
DJIXUS vs DJWXUS	0.084	0.267	0.809	0.117	1.293	0.211	0.413	0.267	0.809
DJIWS vs DJGWS	-0.016	0.049	0.981	-0.012	-0.027	0.981	-0.146	0.049	0.981
DJIWM vs DJWM	-0.007	0.351	0.745	-0.022	0.124	0.921	-0.094	0.2	0.861
DJIWL vs DJWL	-0.006	0.2	0.861	-0.012	0.049	0.981	-0.088	0.276	0.802
DJIBM vs DJBM	-0.076	0.276	0.802	-0.1	0.2	0.861	-0.478	0.276	0.802
DJICG vs DJCG	-0.153	0.351	0.745	-0.157	0.2	0.861	-0.913	0.276	0.802
DJICS vs DJCS	-0.044	0.276	0.802	-0.037	0.049	0.981	-0.292	0.2	0.861
DJIFI vs DJIND	-0.035	0.956	0.356	-0.013	0.049	0.981	-0.253	0.956	0.356
DJIIND vs DJND	-0.09	0.427	0.689	-0.075	0.351	0.745	-0.545	0.502	0.634
DJIOG vs DJOG	-0.043	0.502	0.634	-0.043	0.2	0.861	-0.284	0.502	0.634
DJITEC vs DJTEC	-0.054	0.276	0.802	-0.062	0.88	0.396	-0.343	0.351	0.745
DJITEL vs DJTEL	-0.137	0.276	0.802	-0.102	0.351	0.745	-0.829	0.276	0.802
DJIUT vs DJUT	-0.085	0.567	0.571	-0.116	1.021	0.308	-0.551	0.567	0.571
DJIGWE vs DJGWE	-0.042	0.718	0.473	0.067	0.643	0.521	-0.279	0.718	0.473
DJIGNO vs DJGNO	0.009	0.34	0.734	-0.027	0.794	0.427	-0.01	0.265	0.791
DJIGLA vs DJGLA	-0.162	1.172	0.241	-0.273	0.038	0.97	-0.979	1.172	0.241
DJIGAU vs DJGAU	-0.147	0.038	0.97	-0.252	0.567	0.571	-0.889	0.038	0.97
DJIGAP vs DJGAP	0.186	0.34	0.734	0.24	-0.038	0.97	0.946	0.265	0.791
DJIGAM vs DJGAM	-0.075	0.038	0.97	-0.075	0.265	0.791	-0.48	0.038	0.97
DJIMCN vs DJCNDA	0.009	0.038	0.97	-0.01	0.189	0.85	-0.012	0.189	0.85

The indices of the MSCI family

Using the ratios of Sharpe and Sortino, differences in performance between 8 pairs of MSCI family indices are negative for 3 pairs of indices and positive for the 3 others as shown in Table 7. With the ratio of Treynor, only one Islamic index (MSUSIS) underperformed relative to its benchmark index while Islamic indices of that family outperform.However, the differences are not significantly different from zero, confirming the results found for the indices of the Dow Jones family.

Table 7: Wilcoxon test on Sharpe, Treynor and Sortinoratios of the family of MSCI indices

Pairs of indices	Sharpe Ratio			Treynor Ratio			Sortino Ratio		
	Gap	W test	p-value	Gap	W test	p-value	Gap	W test	p-value
MSACWS vs MSWRLD	0.241	0.255	0.996	0.198	0.544	0.776	0.807	0.255	0.996
MSBRCS vs MSWBRC	0.035	0.833	0.582	1.81	0.255	0.996	0.693	0.544	0.776
MSCAIS vs MSCA	-0.001	-0.033	0.996	2.389	0.255	0.996	-0.479	0.255	0.996
MSCHIS vs MSCHI	-0.043	0.833	0.582	0.702	0.255	0.996	-0.273	1.121	0.423
MSJPIS vs MSJP	-0.006	0.833	0.582	4.801	-0.033	0.996	-0.425	0.833	0.582
MSNAIS vs MSAM	0.133	0.255	0.996	0.132	0.544	0.776	0.223	0.255	0.996
MSUSIS vs MSUS	0.166	0.255	0.996	-0.933	0.255	0.996	0.406	0.255	0.996

The indices of the FTSE family

Among the 13 pairs of indices of the FTSE family, the gapof the Sharpe ratio is negative for 8 couples and positive for the 5 remaining ones. The difference seen with the Sortino ratio shows that only 3 indices underperform their benchmarks while the Treynor ratio highlights 3 different indices underperforming their benchmarks and 10 are more successful. Table 8 shows that the performance differences are not significant after applying the Wilcoxon test on the gap recorded.

Table 8: Wilcoxon test on Sharpe, Treynor and Sortinoratios of FTSE indices family

Pairs of indices	Sharpe Ratio			Treynor Ratio			Sortino Ratio		
	Gap	W test	p-value	Gap	W test	p-value	Gap	W test	p-value
FSAWRD vs FAWRLD	0.080	0.529	0.787	0.155	0.320	0.946	5.088	0.111	1.110
FTGWDS vs FTGWAD	-0.216	0.738	0.642	0.120	0.947	0.514	4.853	0.320	0.946
FSAPXJ vs FWAPXJ	-0.060	0.320	0.946	0.209	0.111	1.110	-.535	0.111	1.110
FTSCHNL vs WICINAL	-0.139	0.111	1.110	0.119	0.529	0.787	1.675	0.111	1.110
FTSDEV vs AGDVLPL	-0.272	0.320	0.946	-0.196	0.111	1.110	4.115	0.320	0.946
FSEMER vs AWALEGL	-0.092	0.320	0.946	0.201	0.529	0.787	3.649	0.111	1.110
FSDXUS vs FADXUS	0.188	0.738	0.642	-0.042	0.529	0.787	4.066	0.320	0.946
FTSIND vs FWAIND	0.005	0.529	0.787	0.371	0.738	0.642	-0.036	0.111	1.110
FSJP10L vs FTWAJP	-0.155	0.320	0.946	0.616	1.364	0.321	-3.137	0.738	0.642
FSMULT vs FTAMLT	0.164	0.111	1.110	0.048	0.111	1.110	0.477	0.111	1.110
FTSUSA vs FWAUSA	0.201	0.529	0.787	-0.120	0.111	1.110	0.145	0.529	0.787
FTJSASH vs FTJASH	-0.122	0.255	0.996	0.294	0.255	0.996	5.734	-0.033	0.996
FTJST40 vs FTJT40	-0.082	0.255	0.996	0.190	0.833	0.582	5.204	-0.033	0.996

Standard and Poor's indices Family

For the indices of the family Standard and Poor's, the deviations calculated for the whole period show that only Islamic stock index of Canadian companies (SPTS60S) underperforms its Conventional counterpart (SPTS60).This result is the same regardless of the performance measurement used. However, the differences were not significant as shown by theWilcoxontest results detailed in Table 9.

Table 9: Wilcoxon test on Sharpe, Treynor and Sortino ratios of S & P indices family

Pairs of indices	Sharpe Ratio			Treynor Ratio			Sortino Ratio		
	Gap	W test	p-value	Gap	W test	p-value	Gap	W test	p-value
SP500S vs SP500	0.319	0.32	0.946	0.153	0.32	0.946	1.249	0.32	0.946
SPBRICS vs SPBRC40	0.432	0.111	1.11	3.793	0.547	0.774	1.96	0.111	1.11
SPJAPS vs SPJAP	0.403	0.111	1.11	2.001	0.547	0.774	1.941	0.111	1.11
SPTS60S vs SPTS60	-0.316	0.547	0.774	-0.916	0.984	0.494	-2.313	0.984	0.494

The study of the Sharpe ratio (see Table 9) shows us that the performance of Islamic indices is not significantly different from that of Conventionalones and no difference was significant.This result is surprising in view of financial theory, as reportLe Maux, J., and Le Saout, E. (2004)because a lack of diversification in Islamic indices should leadto a lower performance as well asthe impact of additional constraints imposed on indices.

CONCLUSION

The empirical literature has shown that, when compared to their Conventional counterparts, Islamic indices do not suffer restrictive criteria imposed on their composition. It, therefore, was not detected any significant difference in terms of performance between the Conventional indices and Islamic ones. However, as we pointed out, studies on which we refer, have always been the implicit assumption that the two financial systems were entirely independent. In our study we released this hypothesis of independence in order to assess the impact that this could have at the level of stock markets

Moreover, the preliminary analysis of data on the entire period and on each of the sub-periods allowed us to draw the following conclusion: For the same level of risk, represented by the standard deviations, indices of countries with Muslim predominance have provided a return average higher than the indices of conventional markets. Therefore, the question that arises is to know whether this difference in performance results could be due to the Islamic Finance. This brings us back to the purpose of our study that has been to detect the presence and the influence, if any, of Islamic Finance on the returns on the regarded indices.

These results are also to be nuanced since they do not cover the totality of Islamic markets or with Islamic predominance. Our data sample could then be extended so as to include a larger number of markets. Finally, we believe that future studies that take into account the interaction between the Islamic and Conventional Finances should greatly contribute to improving our knowledge of Islamic stock markets in general.

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