The Volatility of Islamic and Conventional Stock Prices: Is There a Difference?

Achouak BENKADDOUR [1,*]

[1] Faculty of Economics, Commercial and Management Sciences ,Tamanrasset University ,(Algeria)
(achouakbenkaddour@yahoo.fr)

Received:08/09/2020 ; **Revised:** 10/09/2020 ; **Accepted:** 11/10/2020

Summary: This study examines the characteristics of the volatility of the Islamic index versus the conventional index of the financial market. Daily data for the Dow Jones Islamic Index (DJIM) and the conventional DJ index (DJI) were used from January 2014 to December 2018.
The results of the t-test to verify the difference of the average return between both indicators showed that there is no significant difference in the average between the Islamic and conventional index. The results of the EGARCH model estimate showed that there was no leverage risk in both indicators. The risk-adjusted performance of the Islamic index versus its conventional index using the Sharp Variations and CAPM pricing model, showed that there was no difference between performance between the two indices in the rate of return risk. Muslim investors can therefore pursue negative equity investments in line with their religious beliefs without sacrificing financial performance.

Keywords: Volatility; Return; EGARCH; CAPM; Sharp ratio; Islamic index.
Jel Classification Codes : C32 ; G12 ; N2.

* Achouak BENKADDOURachouakbenkaddour@yahoo.fr

I-Introduction:

The financial systems in the world have witnessed during recent decades rapid developments and qualitative shifts, whether at the level of their business systems or their activities and products, and in light of openness and economic and financial globalization, the movement of these systems has accelerated, especially the financial markets. Under these circumstances, Islamic capital markets witnessed an unprecedented expansion. The reason for this expansion may be the significant growth in the capital value of Muslim investors and their demand to invest their capital in financial products that comply with the provisions of Islamic law. The most prominent feature that can distinguish the Islamic capital market from its traditional counterpart is that the activities of the former are carried out in ways that do not contradict the principles of Islam. There is no room to invest in futures, options, and other speculative derivatives. This makes the effects of investing in the Islamic financial market different from investing in the traditional financial market, especially those related to risks, and the behavior of investors during periods of financial instability, as they are not subject to the same types of risks.

Investors in the financial market are interested in tracking risks as one of the main conditions that must be taken into account to form a good investment portfolio. It is in this context thatvolatility modeling has received interest from academics and practitioners over the past three decades. There are many different studies and models that deal with financial data volatility.
However, observers of the abundant studies in this aspect will find a shortage and delay in those that study the characteristics of the Islamic financial market (such as volatility, risk premium and the effect of financial leverage) are weak compared to their traditional counterparts despite the emergence of dealing in Islamic stocks in many countries.

A- The problem of the study:

The problem of the study lies in the searching for differences in investment risks in the Islamic financial market and the traditional financial market, and the volatility of their performance in light

of the different financial instruments of the two markets and the investors' distancing from interest and traditional financing.

Whereas, perceptions of whether or not a difference is sufficiently clear. Accordingly, the research problem can be formulated under the following question:

Are there fundamental differences between the volatility characteristics of the Islamic and the conventional stock indices?

B- Importance of the study:

The importance of the study is evidenced by the fact that comparing the behavior and fluctuation of Islamic stock prices with their traditional counterparts in a quantitative framework provides opportunities to deepen the analysis and to know whether the behavior of investors in the Islamic market is based on risk analysis or on religious beliefs that have nothing to do with the scientific analysis of the movement of stock returns.

C- Objectives of the study:

This paper aims to assess the performance of the Islamic stock market experience through the practical reality of the Islamic stock market, highlighting the differences between it and the traditional stock market. And providing the most important statistical and standard methods for studying and modeling stock price volatility.

D- Literature Review

The majority of studies on the performance of the stock market have been concerned with the financial performance of traditional indices. However, there is little empirical literature available on the performance of Islamic stock market indices. Two sets of studies can be considered. One group investigated the performance of Islamic funds and compared the performance of conventional funds. The other group examined the performance of Islamic indices as an alternative to traditional indices. Some of these studies are reviewed as follows :

- (Farooq &Roza study, 2014)) study: In this study, he applied some basic technical analysis tools to the Dow Jones Islamic Market Index in the United States compared to the three main market indices: the Dow Jones Industrial Average, the S&P 500 and the Nasdaq 100 Index (NDX) . As for technical analysis, this paper also explored some issues related to Islamic law in applying effective technical analysis.

One of the most important results is that comparative analysis made it possible to find potentials for improving the performance of the Islamic index, when applying technical analysis. The successful application of basic technical analysis tools to the Islamic index will encourage Islamic finance practitioners to research and explore further uses and effectiveness of technical analysis on other Islamic products.

- (Kabir Hassan & Girard, 2010) study: This paper examines the performance of seven indices selected from the Dow Jones Islamic Market Index (DJIM) versus their non-Islamic counterparts using a variety of measures such as Sharp, Trainor, Jensen and Fama selectivity, net selectivity and diversification. Consistency has been studied using the four factor pricing models. The researchers also used the co-integration approach to study how Islamic indicators are compared to their non-Islamic counterparts. For the period from January 1996 to December 2005. One of the most important findings of the study is that there is no difference between Islamic and non-Islamic indicators. The outperformance of the Dow Jones Islamic Indexes over their conventional counterparts was recorded from 1996 to 2000 and from 2001 to 2005. In general, there is a similar reward for the benefits of risk and diversification for both Islamic and conventional indices.

- (Al-Nadjar, 2005) study: This study aimed to identify the mechanism of building Islamic stock indices by comparing the traditional and Islamic Dow Jones indices in order to show the factors of difference and their impact on the performance of these indices in terms of the mechanisms of building these indices. The study followed the inductive approach and the descriptive approach to achieve a comparison between the mechanism of building Islamic indicators and its requirements

in relation to the requirements of the traditional global indicators, especially the traditional and Islamic Dow Jones indices. One of the most important results of the study is that the Islamic stock market indices are considered an effective product in the global financial markets, with a variety of investor classes increasing over them, and that the construction of stock indices takes place within the framework of the stock community in which the investment requirements are met in accordance with the principles of Islamic law. Building indicators for the Islamic stock market in terms of the basic rules for building indicators in terms of the sample representation of the stock community and choosing weights that express the components of stocks.

II. Theoretical Analysis

II.1. Islamic capital market indicators

Islamic indices are subsets of traditional indices that only include companies that comply with the provisions of Islamic law. As with all Islamic financial products, it has established a Council of Sharia Scholars in Islam to oversee the rules governing Sharia-compliant indicators. He is represented on the Board of Directors responsible for defining and maintaining the rules governing the Sharia vetting process. However, the parent company (such as S&P Dow Jones Indices) reserves the right to oversee all other index methodological issues, including company selection rules for benchmarking, weighting, and index maintenance.

A. The most important factors that contributed to the emergence and spread of Islamic stock market indices

The emergence of Islamic institutions, including the Islamic financial market, was in the context of the renewed needs of investors, which were the result of multiple factors, and among those factors (Al-Nadjar, 2005, pages 1376-1379):

- Social responsibility for investment and the resulting avoidance of a large number of stock categories such as tobacco companies and weapons ...
- The increased interest of investors in linking their assets to indices instead of relying entirely on the strategy of active management of their money. For example, the assets of pension funds that are linked to stock indices in the United States of America increased from 682 billion dollars to 810 billion dollars, i.e. 30% between 1998 and 1999.
- The geographical spread of Muslim investors who live in Western countries
- The emergence and spread of Islamic banks that provide Islamic financing and investment services, and the increasing demand for Islamic financial services.

On February 9, 1999, the Dow Jones Islamic Market Index was announced in Manama, capital of Bahrain. Which consists of 600 international companies that respond to the beliefs of Muslims, and these companies that formed the index were not only from Islamic countries, but from 30 countries around the world, including the United States of America. These companies were chosen on the basis of 2,700 shares of companies that enter the global Dow Jones indexes and excluded It responds to the beliefs of Muslims, i.e. does not comply with the laws of Islamic law.

After removing the non-compliant companies, Islamic indices typically represent about half of the total market value adjusted for traditional float benchmark indices. Figure 01 shows the coverage of the Dow Jones Islamic Market by sector.

As expected, it varies widely, with the highest representation typically found in information technology, healthcare, industries, and energy, and the lowest in financial services, utilities, and telecom services.

The Dow Jones family indexes for the Islamic stock market currently include nearly 50 indices at its core, including the Dow Jones index in the expanded Islamic market that covers all major regions in the world, the leading companies 'sectors, the global indexes group and the giants' group

of companies harming with the industrial group of states, the European group and the European Union The Asia and the Basi Vic Group and a group for other countries including Canada, the United Kingdom and Japan (El-Nadjar, 2005, page 1381)

Among the most important indices of the Dow Jones family of the Islamic stock market in Islamic countries is the Dow Jones Turkish Stock Market Index, which was announced on September 28, 2004 at the International Forum of Islamic Finance in Istanbul. Turkey represents a good and developed partnership ground within emerging countries, especially for Muslim investors, as more than 60 Islamic indicators in Arab and Islamic countries are included in the index. (Al-Nadjar, 2005, page 1382)

The following is a summary of the most important differences between the Dow Jones Islamic Index and the traditional Dow Jones:

B. Performance characteristics

In the long term, Islamic indicators tend to perform similar to traditional standards. For the 15-year period through July 31, 2019, the S&P 500 Shariah achieved total annual revenues of 10.2%, while the S&P 500 index increased by 9.1%. During the same period, the Dow Jones Islamic Market Global Index and the Dow Jones Global Index rose 8.4% and 7.7%, respectively (Orzano& Welling, 2019, p. 5)

However, differences in performance can occur in periods of significant underperformance or outperformance in sectors that have large differences in assignment between Islamic and traditional standards. For example, as shown in Exhibit 02, the S&P 500 Shariah outperformed the S&P 500 in the period following the onset of the financial crisis in 2008, as the financial sector performed significantly poorly overall, and IT and healthcare outperformed the broader market .

In fact, between October 31, 2007 (monthly peak of the S&P 500) and December 30, 2011, the S&P 500 Financial sector declined about 58% on a total return basis, while the S&P 500 Information Technology sector only fell 3%, achieving the S&P. 500 Medicare gains of 5% over the same period. Due to the wide variation in the performance of these major sectors, the overall performance of the S&P 500 was significant during this period, with the total annual returns for the S&P 500 Shariah and S&P 500 -0.1 and -2.7%, respectively.

Notably, these performance levels are reversible, as shown in 2016, when the financial sector returned in the S&P 500 by nearly 23%, and the healthcare and IT sectors returned -3% and 14%, respectively. Partly due to the relative performance of the financial sector, the S&P 500 underperformed the S&P 500 was 3.5% lower in 2016.

(Figure 2)

Similar trends also occurred in global stock markets during the period 2007-2011. The performance of the Dow Jones Global Market Index was greater than the performance of the Dow Jones Islamic World Index in the period preceding the financial crisis, but it outperformed over the following years.

It should be noted that Islamic standards experienced much less volatility during the global financial crisis due to their limited exposure to financial data. This resulted in lower volatility over a 15-year period (Orzano& Welling, 2019, p. 7).

II.2. Method and tools

This section discusses the statistical tools for analyzing volatility focusing on the conditional variance modeling

Several scientific contributions have been proposed that research the conditional variation in time, as they have created a group of models derived from each other, the first model being the ARCH (q) model presented by (Engle, 1982, pp. 987-1008). Conditional variance is a linear function of previous innovations (residues) as follows:

$$h_t = a_0 + \sum_{i=1}^{q} a_i . u_{t-i} \; ; \; a_0 > 0, a_i \geq 0; i = 1, \dots q$$

In experimental applications of ARCH (q) models, a long lag length and a large number of parameters are required. Thus, Bollerslev (1986) generalized the ARCH (q) model and introduced the conditional self-regression (q, p) GARCH model with heterogeneity. Conditional variance is a linear function of previous square innovations q and earlier conditional changes p:

$$h_t = a_0 + \sum_{i=1}^{q} a_i . u_{t-i}^{\,2} + \sum_{j=1}^{p} \beta_j . h_{t-j} \; ; \; a_0 > 0, a_i \geq 0; a_0 > 0; i = 1, q; j = 1, \dots p$$

At the level of applied studies, an estimate $\sum_{i=1}^{q} a_i + \sum_{j=1}^{p} \beta_j$ was made and it was concluded that this total is very close to one.

(Bollerslev, Engle, RF and Nelson, DB, & Nelson, ARCH Models, 1994) indicated that if $\sum_{i=1}^{q} a_i + \sum_{j=1}^{p} \beta_j = 1$ the GARCH model becomes integral, i.e. (q, p) IGARCH, and the unconditional variance of ut is not bound, so it does not satisfy ut and ut2 define the process of static variance.

GARCH models are suitable for capturing some of the characteristics of financial markets. It captures well the fluctuations in asset yields that Mandelbrot (1963) observed for the first time.

Where large fluctuations are followed by large fluctuations, small fluctuations follow small fluctuations ... However, the structure of the GARCH model imposes important limitations.

One of the problems with GARCH models is that it treats any volatility shocks as if they were symmetrical. This problem has been the subject of controversy in previous studies such as (Black, 1976) and (Engle & Ng, 1993) that volatility responds asymmetrically to news, especially bad news.

Financial markets are characterized by the "leverage effect," referred to by Black (1976). The "leverage effect" refers to the tendency of changes in stock prices to be negatively correlated with changes in stock volatility. in another meaning. Volatility tends to rise in response to "bad news" (lower than expected returns) and falls in response to "good news" (higher than expected returns.(

) Nelson, 1991, pp. 347-370) proposed the following model for the evolution of conditional variance of u_t

$$\log(h_t) = a_0 + \sum_{j=1}^{\infty} \pi_j \left\{ \left| \frac{u_{t-j}}{\sqrt{h_{t-j}}} \right| - E\left| \frac{u_{t-j}}{\sqrt{h_{t-j}}} \right| + \delta \frac{u_{t-j}}{\sqrt{h_{t-j}}} \right\}$$

This model is known as the exponential GARCH or the EGARCH model. In this model, ht is dependent on both the magnitude and the tag of the delay remainder. The parameter δ enables the asymmetric effect. If $\delta = 0$ it is, then a positive surprise has the same effect on volatility as a negative surprise. If $0 < \delta < 1$ it is, the positive surprise increases volatility more than the negative surprise. If $\delta < -1$ it is, then the positive surprise actually leads to volatility while the negative surprise increases volatility. For each $\delta < 0$ "leverage effect" there is. Since EGARCH describes ht, ht will be positive regardless of whether the coefficients of π j are positive. Thus unlike the GARCH model, no restrictions are required on the estimation model. We can express the representation of an infinite moving average of the model as the ratio of two polynomials. The ARMA process provides a simpler description of the model. We refer to it as the (q, p) model EGARCH (Panaretos, 2001, p. 3)

$$\log(h_t) = a_0 + \sum_{j=1}^{p} \left\{ a_j \left| \frac{u_{t-j}}{\sqrt{h_{t-j}}} \right| - a_j E\left| \frac{u_{t-j}}{\sqrt{h_{t-j}}} \right| + \delta_j \frac{u_{t-j}}{\sqrt{h_{t-j}}} \right\} + \sum_{i=1}^{q} \left(\beta_i \log(h_{t-i}) \right)$$

III- Empirical Analysis

After the theoretical presentation in which the methods were carried out, a brief presentation of the most important differences between the Islamic and traditional Dow Jones Index and the reasons for the emergence of the Islamic Index, with the aim of answering the study problem and then formulating conclusions. Within the practical aspect of the study, we present the statistical methods that distinguish between the fluctuation of the two indicators, relying on statistical tests and appropriate models on the 10 EVIEWS program. But before that, it is necessary to define the data used and the steps for comparison between the two indicators.

III.1. Data and Methodology

A. Data

This study uses data from the DJIM and the traditional DJI. The daily price data for Islamic indices was obtained from https://www.advfn.com/ and the traditional Dow Jones index from Yahoo Finance .. The sample period extends from January 2014 to December 2019, in fact there is a justification for choosing DJIM Being the most widely used and most comprehensive of Islamic stocks. Also, the Dow Jones Indexes are the first in terms of origin and the largest in terms of number and diversity.

B. Methodology

To assess the performance of Islamic indices against their traditional counterparts, this study examines the return and volatility characteristics of each index as well as the risk adjusted return. We start by running a "difference in the middle" test to see if there is a difference between the average initial returns for the two indices in each market. Then we use the GARCH model, developed by Bollerslev (Generalised autoregressive conditional heteroscedasticity, 1986), to estimate the specific volatility of the index. The idea of the GARCH model is to simply include the lagged value of the variance in the variance equation. To study the effect of financial leverage for asymmetric fluctuations we use Nelson's (1991) EGARCH model.

To estimate the risk-adjusted return of Islamic indices compared to traditional standards, we run Sharp's ratio of differences tests. Sharpe ratio was derived by Sharpe (1966) as an absolute risk adjustment measure. The formula for the calculated Sharpe ratio for each market is as follows (Boujelbene Abbes, 2012, p. 4):

$$SR = \frac{R - R_f}{\sigma}$$

Where SR is the calculated Sharpe ratio for the Islamic and conventional index, R is the return on the Islamic index (conventional index), Rf is the risk-free rate measured as the Treasury Bills rate and is the standard deviation of the Islamic Market Index (the conventional index). The difference in the ratio of Sharpe ΔSR in each is expressed in the following relationship (Boujelbene Abbes, 2012, p.5):

$$\Delta SR = SR_I - SR_m$$

Where SRi and SRm are respectively the ratio of Sharpe to Islamic Index and Traditional Index respectively.

To provide more insights into the performance of Islamic indices, we use the Capital Asset Pricing Model (CAPM) of Sharp (1964) and Lintner (1965). An empirical representation of the CAPM is as follows (Boujelbene Abbes, 2012, p. 5):

$$R_{it} - R_f = \alpha + \beta R_{MKT} + e_i$$

Where, Rit is the return on the Islamic index, RMKT is the market excess return (the return on the conventional index in excess of the risk-free rate), which β measures the sensitivity of the Islamic index to market movements. An index with more than one beta is more sensitive to movements in

the market, and therefore more risky than an index with less than one beta, α is the risk-adjusted return of an Islamic index versus the traditional index.

III.2. Summary Statistics

This part provides summary or descriptive statistics for our main variables namely DJ and DJIM.

Our sample analysis includes the DJIM, as well as its conventional counterpart, the DJI. As Figure 03 shows the development of the performance of both indicators, as it appears that both indicators knew a highly volatile movement during the study period, and what is observed from the figure, the growth of the two indicators is very similar during the study period, which calls for resorting to statistical methods to differentiate between them:

As it is known, investors pay more attention to the index or stock returns that can be achieved from investing in the financial markets more than their prices. Therefore, a series of daily returns Rt was used, which was calculated according to the following formula:

$$R_t = \log(\frac{X_t}{X_{t-1}})$$

Figure 04 shows that the yield is highly volatile and takes the form of cluster volatility. Hence the parameters cannot be estimated using the normal least squares method.

A. Descriptive statistics the statistical distribution function of the returns of the two indicators

Both series consist of 1,304 daily views from 1/1/2014 - 31/12/2018

Starting from Figures 05 and 06, we note that the value of the Skewness coefficient, which measures the degree of torsion from the normal distribution of the returns of both indicators, reached positive values, which means that the distinction tends to the right and therefore the distribution of the returns of both the traditional Dow Jones and Islamic Dow Jones indexes is asymmetric around its arithmetic mean and is The right tail is larger in length compared to the normal distribution. In principle, the lack of moderation of the two strings indicates an excuse for the sin of the two index returns series, which may be due to the conditional disparity of errors.

The shape of this distribution is also characterized as being hyperbolic, as the value of the Kurtosis coefficient exceeded the value 3, which corresponds to the flatness of the normal distribution, and this indicates that the values of the returns are concentrated more around the average.

The presence of tails thicker than the normal (leptukurtic) distribution helps to measure the level of risk in the two chains, as the large fluctuations are within the fat tails and this confirms the presence of risk. Therefore, financial analysts use it to determine the extreme returns (losses) in the future, if the results of stock data In the past in a leptukurtic situation they expect more fluctuations in returns, meaning that there is a greater than usual probability of extreme price movements for the two indicators (Bendob, A., &chikhi, M. 2017, p. 330).

The Jarque-Bera statistic confirms that neither series was distributed naturally. As it is greater than the tabular value of the chi-squared distribution at degree of freedom of 2, which is 5.99.

To verify the hypothesis that there is no difference in crude returns in both indicators, we use the mean difference test.

B. Mean difference test. For the two index returns differences

Table 03 displays the results of the t-test used to check for a difference between the returns of the Islamic and conventional index. The results showed that there was no significant difference in the mean between the two indicators. This means that returns on Islamic investments are not significantly different from returns on traditional investment.

C. Testing the stability of the two indicators

Many standard studies (Stock, 1988) and (Hendry, 1986) have proven that time series related to macroeconomic variables are characterized by instability that results in the problem of spurious regression, and this is shown by the misleading results obtained, where R2 values are high until In the absence of a real relationship between the variables, it is necessary to ensure the stability of the study variables by relying on the unit root test, according to the augmented Dickey–Fuller method (ADF) and Phillips–Perron method (PP).

Based on the results of Table (04) the developed Dickey-Fuller unit root test and the Philip and Peron PP test clearly show that the price chain of the Dow Jones Islamic Index and its conventional counterpart is not stable at the level, but the dividends of the two indexes' returns are stable at the 1% confidence level, since the calculated value decreases Exactly about critical values.

D.Testing the existence of a problem of heterogeneity of the two indicators returns

The results of the assessment in Table 05 indicate that the self-regression model of the first degree has an overall statistical significance that differs from zero at the level of the two indicators studied at a significant percentage of 1% according to Fisher's statistic, and this is evidence of an impact of historical information on the behavior of dealers who take into account what stocks have achieved in yesterday. It also seems to us that the beta coefficient is significant at 5% for the traditional Dow Jones index and significant at the level of 10% for the Islamic Dow Jones Index. With the basic assumptions of the regular least squares method, we must use the self-regression models conditional on the non-homogeneity of variance.

IV- Results and discussion:The characteristics of volatility of the two indicators

A. GARCH model estimate for the two indicators

Based on the results of Table 06, we conclude that it fulfills all the hypotheses on which the model is based, as the constant in the mean equation is positive and small, and the beta value is positive, which indicates the conditional volatility. Therefore, the conditional self-regression model with the non-homogeneity of variance will allow the improvement of the simple linear self-regression model, by solving the problem of the heterogeneity of variance that characterizes most of the models in finance, and that there is a direct relationship between return and risk.

We notice when comparing the value of the ARCH effect and the GARCH effect, we find that the latter is greater with both indicators. This is evidence that modern information is more influential than old information, which means that market participants take new information into consideration more than historical information.

We also note that the value of $\alpha+\beta$ corresponds to 1, which means that there is always fluctuation. This requires dealing with a special type of these models, namely the EGARCH model.

B. GARCH model appreciation

To test evidence of asymmetric responses to news, indicating the effect of leverage and differential financial risk depending on the direction of price movements, we use the EGARCH model. Table 7 provides the results of estimating the EGARCH model for the two indicators.

The estimated value of δ was 0.939 for the traditional Dow Jones Index and 0.951 for the Dow Jones Islamic Index, and in both cases it is positive and significant at the level of 1%, and this reflects the absence of the leverage effect, and this means that there is an asymmetric relationship between returns and volatility for the traditional index as well as for the Islamic index. Negative shocks have less impact on volatility than positive return shocks.

To highlight the contrast movement in light of the EGARCH (1,1) models, we use the figure 07.

As is evident, the figure there is an accumulation of fluctuations (that is, large changes in stock returns are followed by other changes corresponding to them) in certain periods where we notice accumulation in the years 2015 and 2018 for the traditional Dow Jones index, while it is clear that the accumulation was between 2015 and 2016 for the Dow Jones index Islamic.

C.Risk-adjusted return (Sharp Ratio Tests)

Table 08 shows the Sharpe ratio to the Islamic and conventional index during the study period along with the Sharpe ratio differences (DSR) and the Z-statistic. As well as the results of the estimation of the Capital Asset Pricing Model (CAPM) by Sharp (1964) and Lintner (1965)

This result confirms the results of the Sharpe Ratio test, which indicates that the Islamic index does not show significantly different performance according to risk compared to its conventional counterpart.

As for the results of the Capital Asset Pricing Model (CAPM) by Sharp (1964) and Lintner (1965), it appears that the sensitivity of the Islamic index to market movement is less than one, which concludes that the Islamic index is less risky and sensitive to market movement than the traditional index. The risk adjusted return for the Islamic index versus the traditional index α is not significant.

V-Conclusion:

This study investigated the fluctuations characteristics of Islamic indicators versus traditional financial market indicators. The daily data of the Dow Jones Islamic Global Index and the Dow Jones Industrial Average between January 2014 - December 2018 was used.

Analysis reveals the yield pattern during the study period characterized by cluster variability. The statistical study and volatility modeling resulted in the following:

- The t-test was used to check the difference between the average return between the two types of indicators. The results show that there is no significant difference on average between the Dow Jones Islamic Index and the traditional Dow Jones Index.
- The absence of the effect of leverage has been found, and the existence of an asymmetric relationship between returns and volatility for the traditional index as well as for the Islamic index, and negative shocks have less impact on volatility than positive return shocks.

The Sharpe ratio test reveals that there is no significant difference between the returns of the Islamic index and their traditional counterparts.

-The results of the Capital Asset Pricing Model (CAPM) by Sharp (1964) and Lintner (1965) show that the sensitivity of the Islamic index to market movement is less than one, which concludes that the Islamic index is less risky and sensitive to market movement than the traditional index.

In conclusion, it can be said that the Islamic index does not significantly outperform the traditional index on a risk-adjusted return basis, and as such, Muslim investors can pursue negative equity investments in line with their religious beliefs without sacrificing financial performance.

- Appendices:

Table (01): The most important differences between the Dow Jones Islamic Index and Dow Jones global index

	Dow Jones global index	Dow Jones Islamic market world Index
Established year	1896	1999
Domain	All industries except	Broad-based, subject to Sharia compliance guidelines
Number of listed companies	Transportation and facilities	533
Selection criteria	30	Shares traded in the United States of America that comply with investment rules and guidelines derived from Islamic Sharia
Weighting	Stock selection is not subject to quantitative rules, it is	Adjusted floating market value

	only added if the company has an excellent reputation, which indicates sustainable growth and is of interest to a large number of investors.	
Circulation	Weighted price	Products under development

Source: (Farooq&Roza, 2014, p. 399)

Table (02): Comparison of performance characteristics

PERIOD	S&P 500 SHARIAH	S&P 500	DOW JONES ISLAMIC MARKET WORLD INDEX	DOW JONES GLOBAL INDEX
RETURNS (%)				
1-Year	9.4	8.0	5.5	2.6
3-Year	14.0	13.4	11.4	10.2
5-Year	11.6	11.3	8.2	6.7
10-Year	13.8	14.0	10.3	9.6
15-Year	10.2	9.1	8.4	7.7
RISK (STANDARD DEVIATION, %)				
1-Year	19.2	18.8	18.1	17.2
3-Year	12.4	12.1	11.7	11.2
5-Year	12.2	12.0	11.9	11.7
10-Year	12.5	12.6	13.2	13.3
15-Year	13.2	13.8	14.6	15.1

Source: (Orzano& Welling, 2019, p. 5)

Table (03): Descriptive statistics and T-test for the average differences between Islamic and conventional Dow Jones Islamic Index returns

Descriptive statistics									
	Mean	Median	Maximum	Minimum	Std.Dev.	Skewness	Kurtosis	Jarque-era	Prob
RDJ	-0.000326	-0.00067	0.05070	-0.03813	0.008039	0.6179	7.2752	1075.215	0.000
RDJIM	-0.000247	0.00000	0.04203	-0.02459	0.006101	0.7629	8.5427	1794.315	0.000
T test of mean differences between returns of Islamic index and conventional index									
Mean-diff	**-0,000079**								
t-Statistic	**-0.734841**								
Probability	**0.4626**								

Source: The author

Table (04): Stability test results

	Augmented Dickey–Fuller test (ADF), Phillips–Perron test (PP)				critical values		
	prices		Returns				
	ADF	PP	ADF	PP	%1	% 5	% 10
DJ	2.412-	2.499-	16.741***-	35.226***-	3.965-	3.413-	3.128-
DJIM	1.511-	1.390-	***15.764-	***31.44-			

Note: ***, **, and * represent 1%, 5%, and 10% levels of significances.

Source: The author

Table (05): Results of estimating AR model (1) for daily data of returns of the two indices by the normal least squares method

Index	Constant	β	F_stat	ARCH effect test	
				Obs*R-squared	Prob
DJ	0.000328-**	**0.022161	0.639447	109.2649	0.0000
DJIM	0.000219-	*0.128422	21.80764	49.47786	0.0000

Note: ***, **, and * represent 1%, 5%, and 10% levels of significances.

Source: The author

Table (06): Results of GARCH Model Estimation of the Daily Data of the Two Indicators

Index	Constant	β	F_stat	Constant	z-stat	ARCH	z-stat	GARCH	z-stat	ARCH+GARCH
DJ	-0.000328**	0.022161**	0.639447	2.54E-06	6.281	0.182	9.306	0.788	39.028	0.97
DJIM	-0.000219	0.128422*	21.80764	1.62E-06	5.94	0.143	10.60	0.821	47.30	0.964

Note: ***, **, and * represent 1%, 5%, and 10% levels of significances.

Source: The author

Table (07): Results of estimating EGARCH (1, 1) model for daily data of the two indicators returns

Index	Constant	z-stat	ABS(RESID(-1)/@SQRT(GARCH(-1)))	z-stat	RESID(-1)/@SQRT(GARCH(-1))	z-stat	**δ**	z-stat
DJ	-0.777***	-10.95	0.220***	10.88	0.166***	12.80	**0.939*****	143.03
DJIM	-0.621***	-10.28	***0.161	9.41	0.160***	12.36	***0.951**	176.47

Note: ***, **, and * represent 1%, 5%, and 10% levels of significances.

Source: The author

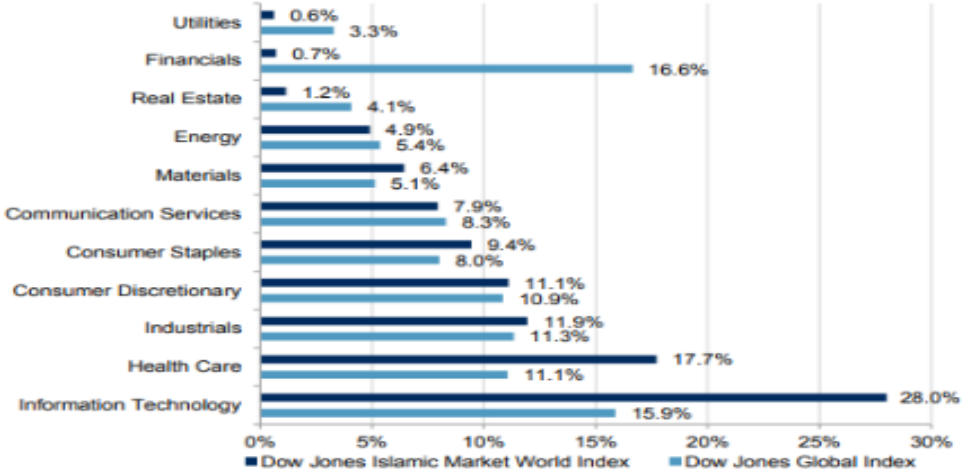
Table (08): Results of Sharp Ratio Estimation and Capital Asset Pricing Model (CAPM) by Sharp (1964) and Lintner (1965)

	Sharpe Ratio	**Capital Asset Pricing Model (CAPM) by Sharp and Lintner**		
SR_{isla}	0.0572	α	β	R^2
SR_{conv}	0.0356	8.48E-05	***0.86483	0.641
ΔSR	0.0216			
Z-stat	1.539			

Note: ***represent 1%, level of significance.

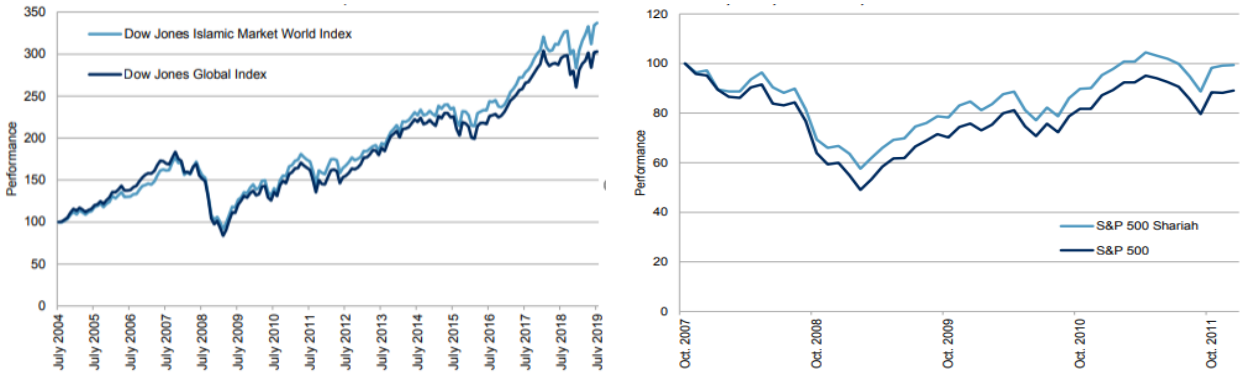
Source: The author

Figure (01): Dow Jones Islamic Market Index components by sectors



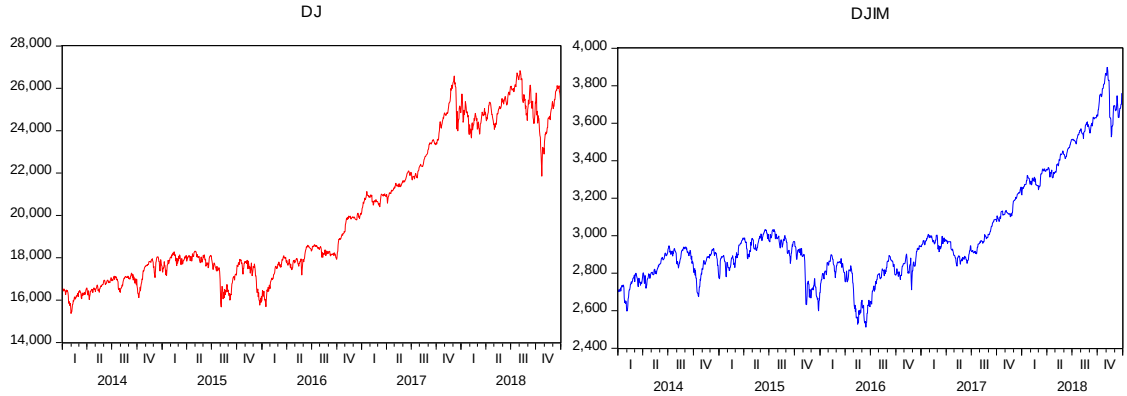
Source :(Orzano & Welling, 2019, p. 6)

Figure (02): Performance levels of Islamic indicators with the performance of their conventional counterparts



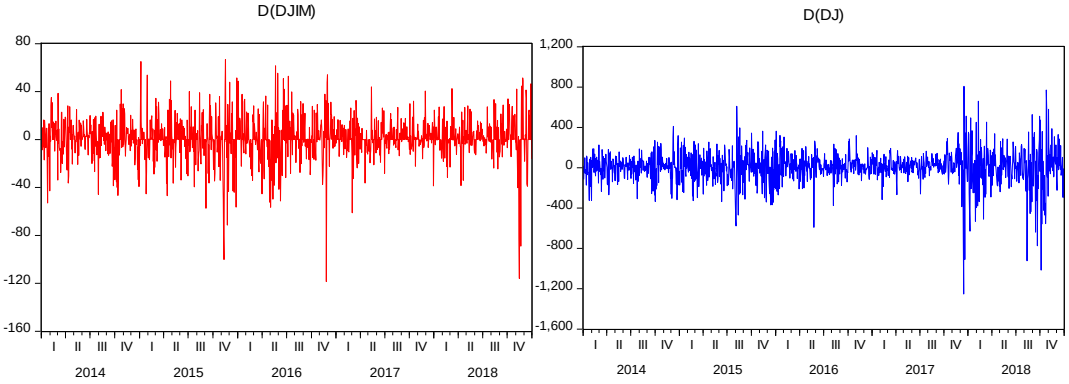
Source: (Orzano& Welling, 2019)

Figure (03): Evolution of the performance of the two indicators for the period between 1/1/2014-31/ 2/2018



Source: the author from the study data

Figure (04): Evolution of first-order spreads (returns) for the two indexes



Source: The author from the study data

Figure (05): Distribution of the Global Dow Jones Index Series returns)

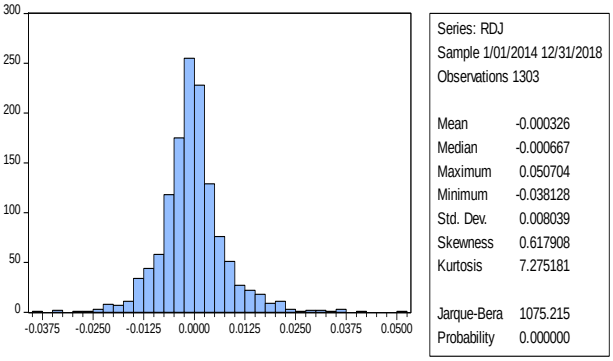
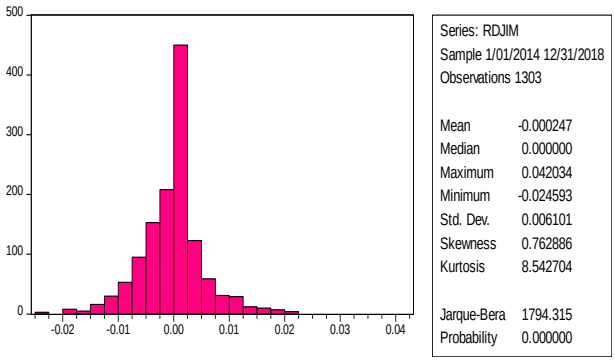
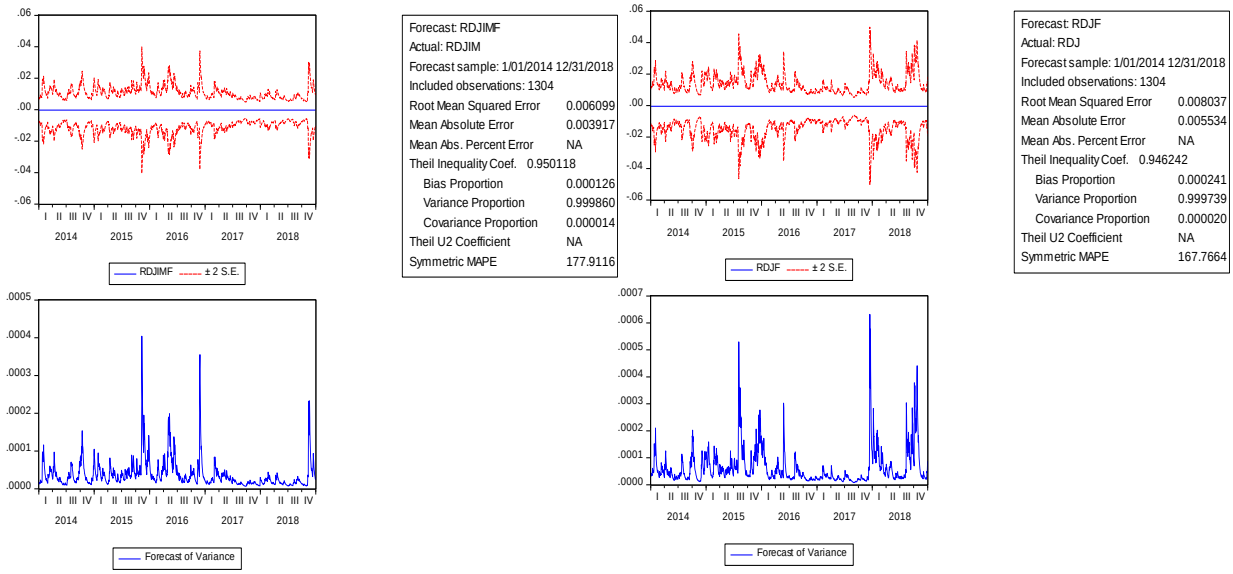


Figure (06): Distribution of the Dow Jones Islamic Index (Series of Returns)



Source: The author from the study data

Figure (07): Motion of contrast under EGARCH patterns (1,1)



Source: The author

References

Al-Nadjar, H. a. (2005). **Mechanisms for building Islamic stock market indices and its requirements in global financial markets**. The Fourteenth Annual Scientific Conference on Islamic Financial Institutions (pp. 1373-1403). United Arab Emirates: Sharia and Law faculty.

Bendob, A., &chikhi, M. (2017). **Financial econometrics and its applications in financial markets**. Jordan: Dar Al-Hamid.

Farooq, M., &Roza, M. (2014). **Dow Jones Islamic Market U.S. Index: Applying Technical Analysis from a Comparative Perspective**. International Journal of Middle Eastern Islamic Finance and Management, 7(3), pp. 395-420.

Kabir Hassan, M., & Girard, E. (2010). Faith-Based Ethical Investing: **The Case of Dow Jones Islamic Indexes**. ISLAMIC ECONOMIC STUDIES, pp. 1-31.

Panaretos, J. (2001). **Autoregressive Conditional Heteroskedasticity Models and the Dynamic Structure of the Athens Stock Exchange**. Repec, pp. 1-13.

Black, F. (1976). **Studies of Stock Market Volatility Changes**. In B. a. Section, Proceedings of the American Statistical Association (pp. 177-181). Business and Economic Statistics Section.

Bollerslev, T. (1986). **Generalised autoregressive conditional heteroscedasticity**. Journal of Econometrics, pp. 307-327.

Bollerslev, T., Engle, R.F. and Nelson, D.B, R., & Nelson, D. (1994). **ARCH Models**. In Handbook of Econometrics (p. chapter 49). North-Holland.

Boujelbene Abbes, M. (2012). **Risk and Return of Islamic and Conventional Indices**. Int J Euro-Mediter Stud, pp. 1-23.

Engle, R. (1982). **Autoregressive Conditional Heteroskedasticity with Estimates of the Variance of U.K. Inflation**. Econometrica.

Engle, R., & Ng, V. (1993). **Measuring and testing the impact of news on volatility**. 48:. journal of Finance, pp. 1749–1778.

Hendry, D. (1986). **Econometric Modeling with Cointegrated Variables: An Overview**. Oxford Bulletin of Economics and Statistics, pp. 201-212.

Mandelbrot, B. (1963). **The Variation of Certain Speculative Prices**. Journal of Business. pp. 394-419.

Nelson, D. (1991). **Conditional Heteroskedasticity in Asset Returns: A New Approach**. econometrica.

Orzano, M., & Welling, J. (2019). **How Indexing Affects Shariah Compliant Investing?**. U.S.A: spglobal. Retrieved from https://www.spglobal.com/en/research-insights/articles/how-indexing-affects-shariah-compliant-investing

Stock, J. H. (1988). **Testing for Common Trends**. Journal of American Statistical Association, pp. 1097-1107.

How to cite this article by the APA method:

Achouak BENKADDOUR, (2020), **The Volatility of Islamic and Conventional Stock Prices: Is There a Difference?,** Algerian review of economic development, Volume 07 (Number 02), Algeria: KasdiMarbah University Ouargla, pp. 369-382.