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An Empirical Investigation of Islamic Calendar Effect in Global Islamic Equity Indices

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Abstract

This study aims to explore the effect of Islamic Months specifically Ramadan and Zil-Haj on the stock returns and volatility of the Islamic Global Equity Indices. For the said purpose, the data on three Global Equity Islamic Indices including; Dow Jones Islamic Market World Index, MSCI ACWI Islamic Index, and S&P Global BMI Shariah Index are collected from 5th Jan 2011 (1st Muharram 1432 A.H.) to 12th November 2015 (30th Muharram 1437 A.H.). Ordinary Least Square (OLS) and GARCH (1,1) regression methods are applied to analyze the impact of the Islamic months on global stock returns and volatility respectively. Empirical results reveal significant negative impact of Zil-Haj on returns and volatility of Islamic Global Equity Indices. However, no significant impact of Ramadan on returns and volatility of Islamic Global Equity Indices are revealed. These findings will be fascinating and of utmost interest amidst the researchers, investors and practitioners.

Keywords: islamic global equity indices, MSCI ACWI islamic index, dow jones islamic market world index, S&P global BMI shariah index islamic, calendar effects

1. Introduction

In Efficient Market Hypothesis Fama (1970) proposed that the stock markets are efficient, therefore all the information available inside and outside the market is fully reflected in the stock prices and it is impossible for any investor to outperform the market. If an investor becomes successful in generating abnormal returns by exploiting market information, that evinces the presence of market anomaly (Stulz & Williamson, 2003).

Numerous finance researchers have proved that calendar anomalies generate seasonal patterns that cause inconsistent abnormal high/low returns. Wachtel (1942), French (1980), Gibbons and Hess (1981) and Keim and Stambaugh (1984) revealed significantly negative average stock returns on Monday and positive returns on Friday in the Unites States, this pattern is named 'Day of the week effect'. Similarly, Rozeff and Kinney (1976) noticed high abnormal returns in January by studying New York Stock Exchange, phenomenon named 'The January Effect'. Ariel (1987) found the stock returns are higher on turn of the month trading days or 'Turn of the Month Effect'.

Behavioral finance argues that various psychological factors including emotions, mood, religious beliefs and herding behavior of investors drive an inefficient market. These factors result in cognitive biases and irrational decision making by the investors. Anomalies also occur as a result of spiritual beliefs (Bialkowski et al., 2010). The spiritual beliefs shape some investors' mood and herding behavior of investors shake the whole market. Various calendars are based on religious beliefs for example; the Hebrew calendar (based on luni-solar) followed by the Jewish community, Gregorian (based on Solar) calendar followed by Christians, the Hindu Chinese calendar, and the Islamic or Hijri calendar (based on lunar) followed by the Muslim. The religious events of these calendars influence the returns of stocks. Some studies on religious calendar effects include Lakonishok and Smidth (1988) who inspected the impact of Christian holy days of Good Friday and Christmas on stock returns. Husain (1998) and Al-Ississ (2010) who researched the impact of Islamic months like Ramadan, Muharram and Zil-Haj. Frieder and Subrahmanyam (2004) who found the effect of Rosh HaShanah and Yom Kippur (Jewish sacred days) in U.S equity market.

Literature highlighted that the studies on Calendar effects are not only pursued in stock markets, but are also extended to bond markets, foreign exchange markets, future markets, and mutual funds market (Carl & Jakob, 2010). Studies are conducted on effects of Jewish, Christian, Islamic, Hindu and other religious calendar events.

The studies on Islamic calendar effects are limited to Muslim countries only. It is argued that Muslims not only invest in particular Muslim countries but also in global indices. Therefore, this anomaly is no more a country specific phenomenon. Islamic calendar anomaly can be present in any market where a significant proportion of Muslim investors are present. By assuming that a significant portion of Muslim investors invests in global Islamic indices, this study is first to test the Islamic calendar anomalies in Global Islamic Indices. This study aims to identify the impact of Islamic months of Ramadan and Zil-Haj on the returns and volatility of Islamic Global Equity Indices. In the Islamic calendar, Ramadan and Zil-Haj are two most important holy months cerebrated by Muslim community around the world. Amid Ramadan, the Muslim community is involved in numerous religious activities, including fasting, prayers, recitation of Holy Quran and social welfare. Some people also observe "Aitekaf" (residing in one place) during the last ten days of Ramadan. In addition, Muslims also offer "Tarawih" prayers at nights in Ramadan which increases mosque-going. Muslims also believe that the 'Lailat-al-Qadar' The Night of Destiny occur as one of the five odd nights of Ramadan, i.e from 21 to 29th of Ramadan. Likewise, two important religious activities are performed in the month of Zil-Haj. One is that Muslims from all over the world visit Saudi Arabia to perform Hajj (Pilgrimage) during the first ten days of Zil-Haj. Second, on the 10th of Zil-Haj Muslim community slaughter cattles to remember the sacrifice of Prophet Ibrahim named as 'Sunnat-e-Ibrahimi'.

In both Islamic months, Muslims tend to allocate more time for their spiritual development and hence slowing down investing activity. Moreover, the activities in these months generate new short period business opportunities, attracting more investors. These new investment avenues result in cash outflow from the stock markets. Thus the market activity slow downs, which result in lower return and volatility. Following the herding behavior, other investors also reduce the investment in markets. This herding behavior will result in overall reduced returns during the months of Ramadan and Zil-Haj. Thus buying stocks before these months and selling after these months may result in abnormal high returns for investors.

1.1 Literature Review

Calendar Effects (or anomalies) are the tendency of systematic patterns in returns of financial asset at certain periods of time like a day, a week, a month or a year (Brooks, 2004). These patterns indicate market inefficiency or inadequacy in the underlying asset pricing models (Bildik, 2004). However, these patterns tend to reverse, fade or disappear over time (Schwert, 2001). These anomalous behaviors allow the investors to earn abnormal returns. However, the anomaly can be said to be statistically and economically significant only if the return behavior provide a definite chance to a rational trader to make profits in trading it (Bildik, 2004). According to Brooks (2004) calendar anomalies does not necessarily represents stock market inefficiency. He supported his argument with two reasons. First, some times the returns might be too small that they are off-set against the transaction cost. Second, the difference in returns might be the result of time varying risks. Therefore, according to Modern definition of market efficiency given by Jensen in 1978 these markets are not classified as inefficient.

The works on calendar effects dates back to 1970s. Since then, the work has tremendously evolved from the traditional seasonal patterns, like day, week, month or year effect, to the other religious calendar events including Jewish (Rosh Hashana and Yom Kippur), Islamic (Muharram, Ramadan, Shawwal and Zil-Haj), Hindu (Holi, Raksha Bandhan, Navaratri, janmasthami, Dushera, Shiva-Ratri, and Diwali).

The stock market is considered as a vivid indicator of social mood. It depicts the collective optimism or pessimism of general public at a certain time (Prechter, 1985, 1999; Green, 2004). The social mood strongly influences investors' and business executives' decisions; that directs the level and nature of business actions. Social mood also influence the stock prices (Edmans et al., 2007). According to research conducted by Hong et al., (2004) in U.S, people who go to church have higher tendency to invest in stocks (Hong et al., 2004). Brown and Taylor (2010) obtained similar results in a British panel survey. Studies have pointed out that in Ramadan Muslims are more indulged in religious activities and spend less time on trading. This behavior reduces the stock market returns and volatility. These results are evinced by Husain (1998) and Seyyed et al. (2005) in Pakistani and Saudi Arabian stock market respectively. Adopting the same logic, it can be said that the greater social interaction during religious events could affect the activities of stock market.

Numerous studies investigated the effect of religious events (including Jewish, Christianity, the Hindu and Chinese, and the Islamic events etc) on financial markets. Mehta (2014) studied the effect of Hindu festivals Makar-Sakranti, Holi, Raksha Bandhan, Navaratri, Vasant-Panchami, Rama Navami, janmasthami, Dushera, Shiva-Ratri, Akshay –Tritiya, Ganesh-Chaturthi, and Diwali on the return of S&P CNX Nifty and S&P BSE SENSEX from January 2003 to December 2012 by applying paired t-test on daily return series. The study found significant influence of festivals like Holi, Janmashthami and Diwali on the mean return of selected indices.

Yatrakis and Williams (2010) investigated the applicability of old Wall Street saying "Sell Rosh Hashana, Buy Yom Kippur" by examining daily returns of Dow Jones Industrial Average Index from 1907 to 2008. They assessed trading strategies of selling short before Rosh Hashanah and covering the short sale after Yom Kippur by using one-tailed t-test. Findings revealed that the adage still hold true and investors can earn high returns by following the aforementioned strategy. Frieder and Subrahmanyam (2004) examined that impact of Rosh Hashanah (Jewish day) and Yom Kippur by taking daily returns of S&P 500 index and using regression method. They concluded that returns tend to remain positive after around Rosh Hashanah and negative around Yom Kippur. However, the volume turned down around both events. Wong et al. (1990), Tong (1992) and Lee et al. (1992) witnessed the presence of Chinese New Year in Southeast Asian countries and explained considerable high returns on the preceding days of Chinese New Year. Lakonishok & Smidth (1988) found that stock returns tend to increase before public holidays like Christmas and Good Friday. There is a great chance of significant effect of religious holidays on stock market (Noland, 2003).

There are also studies on the impact of Islamic months on the stock return and its volatility. Ali et al. (2015) explored the impact of religious holy days on stock returns in Pakistan by taking a sample of 30 individual stocks from 6 sectors for a period of five years from 2008 to 2012. Findings conclude the sacred days of Ramadan are associated with higher returns; the magnitude is highest on 27th Ramadan that is considered as the most sacred day of Ramadan. Shah et al. (2015) studied Islamic calendar effect in India and Pakistan by examining daily returns of KSE-100 and BSE-Sensex index from 1997 to 2013 using OLS and GARCH (1,1) regression. The findings concluded positive Rabi-ul-Awwal and Shawwal effect in stock returns of KSE and BSE respectively. However, the stocks were found less volatile in Rabi-ul-Awwal and Ramadan in KSE, and more volatile in Muharram and Shawwal in BSE. Alrashidi et al. (2014) investigated the impact of Ramadan on stock returns and volatility by analyzing the monthly data of globally selected Islamic mutual funds from January 2004 to December 2009. Results concluded that the volatility of returns decline during the month of Ramadan. However, the returns remain unaffected. Iqbal et al. (2013) witnessed significant Ramadan effect in Karachi Stock Exchange (KSE) by taking into account daily and weekly data for the period of 20 years from 1992 to 2011 and applying Ordinary Least square (OLS) technique. Akrami et al. (2012) concluded significantly different returns before, during and after Ramadan in the Tehran Stock Exchange. They examined returns of stocks of 199 companies listed in the Tehran Stock Exchange from 2005 to 2010 by using Variance analysis and repetitive measures. Bukhari et al., (2011) searched for the impact of Ramadan and Zil-Haj on economic factor of Pakistan including total deposits, currency in circulation, consumer price index, industrial production index, international oil prices lending rates, public sector borrowings, and remittances by using co-integration technique. Findings revealed that both the months have negative impact of total deposits and positive impact on currency holdings. Al-Hajieh et al. (2011) examined the impact of Ramadan in Islamic Middle Eastern stock markets by using GARCH model. Empirical results revealed significant positive Ramadan effect in the majority of the countries due to positive investor sentiments during this month. Similarly, Bialkowski et al. (2010) found nine times higher and less volatile returns in Ramadan in stock returns of fourteen predominantly Muslim countries over the years 1989-2007. However, findings attested no significant Ramadan effect on the volume of trading. Al-Ississ (2010) revealed positive Ramadan and negative Ashoura effect in the financial markets of seventeen Muslim countries by running pooled fixed effects panel regression on daily returns. Carl and Jakob (2010) investigated Eid al-Fitr effect in Kuala Lumpur Stock Exchange by studying daily returns of Kuala Lumpur Composite Index from 2000 to 2003 and employing OLS regression. Findings conclude no statistically significant impact of Eid al-Fitr in Malaysian stock market. Seyyed et al. (2005) observed Ramadan effect in Saudi Arabian stock market from 1985 to 2000 using GARCH model. Findings revealed no impact on returns but decrease in volatility of returns during Ramadan. Similar result was witnessed by Husain (1998) in Pakistani Stock Market. Studies have pointed out that in Ramadan Muslims are more indulged in religious activities and spend less time on trading. This behavior reduces the stock market returns and volatility. These results are evinced by Alrashidi et al. (2014), Seyyed et al. (2005), and Hussain (1999). Although, Ali et al. (2015) Al-Hajieh et al. (2011) Al-Ississ (2010), Bialkowski et al. (2010) found positive investor valuation effect of Ramadan. Moreover, Al Rjoub (2010) concluded that daily stock returns during the first half of Ramadan is relatively higher than the second half of the month. Therefore, it can be said that in specific Holy months, Muslims tend to allocate more time for their spiritual development and hence slowing down economic activity.

1.2 Hypotheses

Following hypotheses are tested in this study:

H_1: Islamic month of Ramadan has negative impact on the returns and volatility of Islamic Global Equity Indices.

H_2: Islamic month of Zil-Haj has negative impact on the returns and volatility of Islamic Global Equity Indices.

2. Method

2.1 Sample

This study undertakes quantitative analysis on a sample comprising of following three Islamic Global Equity Indices including; MSCI (Morgan Stanley Capital International) ACWI (All Country World Index) Islamic Index, Dow Jones Islamic Market World Index, and S&P (Standard & Poor's) Global BMI (Broad Market Index) Shariah Index. The reason for including aforementioned Global Islamic Indices in the sample is that these indices represent both developed and emerging countries. Hence, these indices can best serve as the representative of the Islamic Global Equity Market.

2.1.1 Dow Jones Islamic Market World Index (Note 1)

The Dow Jones Islamic Market World Index is a float adjust market capitalization index developed in May 24, 1999 to serve as standard for measuring stock market performance for Islamic investors on a global basis. As of February 2016, Dow Jones Islamic Market World Index comprises of 2629 components having market capitalization of 21,239.5 Billions USD (McGraw Hill Financial Inc., 2016). To be included in for the Dow Jones Islamic Market Index, stocks are screened on the basis of financial ratios and business guidelines (McGraw Hill Financial Inc., 2016).

2.1.2 MSCI ACWI Islamic Index (Note 2)

The MSCI ACWI Islamic Index comprises of large and mid cap companies evaluated on the basis of MSCI Islamic Index Series Methodology approved by MSCI's Sharia advisors' committee. Following Sharia investment principles, MSCI excludes securities using two types of criteria: business activity and financial ratios. As per March 2016, MSCI ACWI Islamic has 804 constituents and market capitalization of 11,377,489.08 Million USD (MSCI Inc., 2016).

2.1.3 S&P Global BMI Shariah Index (Note 3)

The S&P Global BMI Shariah is a float-adjusted market cap weighted index that offers a comprehensive global Shariah compliant benchmark. It was launched on April 8, 2008. The S&P Global BMI consists of more than 10,000 companies across 26 developed and 20 emerging that are screened for Shariah compliance. The S&P Global BMI Shariah is constituted of 4203 small, large and mid cap companies having total market capitalization of 539,078.75 Million USD. A Shariah Supervisory Board comprising of five Islamic scholars ensure the Shariah compliance. All the constituents of S&P Global BMI are screened for shariah compliance on sector and accounting basis (McGraw Hill Financial Inc, 2016).

2.2 Data

The data on daily closing prices of Dow Jones Islamic Market World Index, MSCI ACWI Islamic Index, and S&P Global BMI Shariah Index were sourced from official website of MSCI, Google Finance, official website of S&P Dow Jones Indices respectively from 5th Jan 2011 (1st Muharram 1432 A.H.) to 12th November 2015 (30th Muharram 1437 A.H.). During this five years period, Muslims Celebrated Ramadan and Zil-Haj five times.

2.2.1 Calculation of Daily Returns

The daily returns on Islamic Global Equity Indices (GEIR) are computed based on the log transformation formula.

$$GEIR_{i,t} = ln\ GEI_{i,t} - ln\ GEI_{i,t-1} \quad (1)$$

Where, $GEIR_{i,t}$ represents the continuously compounded return of Islamic Global Equity Index i at time t, $GEI_{i,t}$ represents the daily closing points of Islamic Global Equity Index i at time t, and $GEI_{i,t-1}$ represents the daily closing points of Islamic Global Equity Index i at time $t-1$.

2.2.2 Augmented Dickey Fuller Test (Unit Root Test)

The prerequisite of working with time series data is to test for stationarity in the series. The ADF (Augmented Dickey-Fuller) test of unit root is applied to test the stationarity. The optimal lag length based on Schwartz Info Criterion (SIC) is automatically selected by eviews. The null hypothesis of ADF test is that unit root is present and the series is non-stationary. The alternative hypothesis is that the series is stationary. If the series is stationary, there is possibility of occurrence of calendar effects in the indices.

2.2.3 Ordinary Least Square (OLS) Technique

The impact of Islamic months on returns of Islamic Global Equity Indices is tested using Ordinary Least Squared

(OLS) technique following Chan et al. (1996). The model is presented in the following equation:

$$GEIR_{i,t} = \sum_{i=0}^{h} \beta_{i,t} D_t + \varepsilon_t \quad (2)$$

Where, $GEIR_{i,t}$ represents the continuously compounded return of Islamic Global Equity Index i at time t; $\beta_{i,t}$ is the excess return on Islamic Global Equity Index i in corresponding month t; D_t represents the dummy variable for each Islamic month t. These Dummy variables take the value 1 for the corresponding month's return otherwise 0; ε_t is the error term.

2.2.4 Generalized Autoregressive Conditional Heteroskedastic (GARCH) Technique

The impact of Islamic months on volatility of Islamic Global Equity Indices is tested using Generalized Autoregressive Conditional Heteroskedastic (GARCH) technique proposed by Bollerslev (1986). The model is presented in the following equation: The time varying volatility in residuals is estimated using ARCH-LM test. GARCH (1,1) model is applied to test the following equation:

$$GEIR_{i,t} = \sum_{i=0}^{h} \beta_{i,t} D_t + \varepsilon_t \quad (3)$$

$$h_{i,t} = \sum_{i=0}^{h} \vartheta_{i,t} D_t + \propto \varepsilon_{i,t-1}^2 + \beta h_{i,t-1} \quad (4)$$

Equation 3 is the mean equation and Equation 4 is the variance equation. In equation 4, $h_{i,t}$ is the conditional variance of index i, $v_{i,t}$ are the coefficients of dummy variables representing the size and direction of the effect of corresponding Islamic Month t on the volatility of index i, $\varepsilon_{i,t-1}^2$ and $h_{i,t-1}$ are the ARCH and GARCH terms of index i.

3. Results

3.1 Descriptive Statistics

The descriptive statistics of the Islamic Global Equity Indices Returns are reported in table 1. The results show that all the indices generate returns below 0.02 percent. The standard deviation of all the indices is approximately same. According to the values of skewness and kurtosis, all the index series are slightly left skewed and leptokurtic. The Jarque-Bera test confirms at 1% level that all the series have non-normal distribution. The histograms of indices are shown in Figure 1, 2 and 3.

Table 1. Descriptive statistics for daily islamic global equity index returns

	DJIMI Index	MSCI ACWI Islamic Index	S&P Global BMI Shariah Index
Min	-0.0526941	-0.050497	-0.052131
Max	0.042649	0.038320	0.036481
Mean	0.000184	0.00000425	0.000202
Standard Deviation	0.008961	0.008771	0.008451
Skewness	-0.473832	-0.516712	-0.562156
Kurtosis	7.253062	7.374981	7.422995
Jarque-Bera	983.3476	996.1067	1099.490
Prob.	0.000000	0.000000	0.000000

Source: Authors' Calcuations.

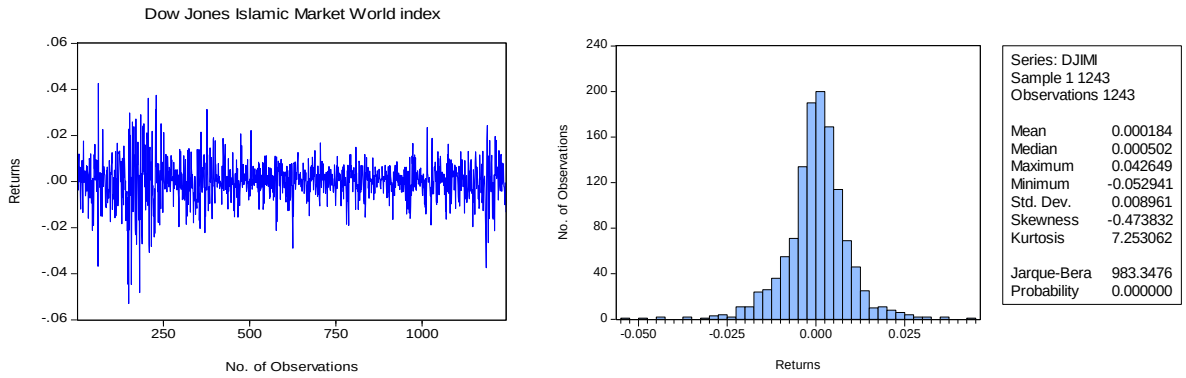

Figure 1. Line chart and histogram of Dow Jones Islamic market world index returns

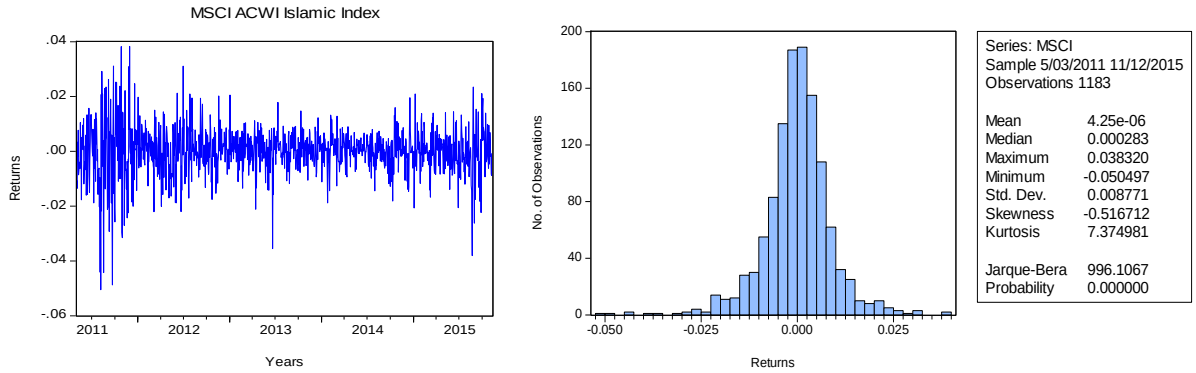

Figure 2. Line chart and histogram of MSCI ACWI Islamic index returns

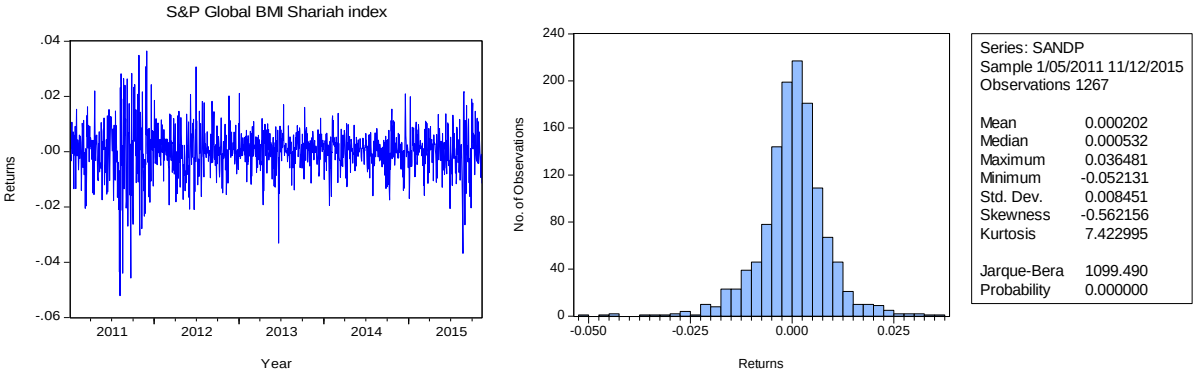

Figure 3. Line chart and histogram of S&P global BMI Shariah index returns

3.2 Augmented Dickey Fuller Test

The empirical findings of ADF test for Islamic Global Equity Index Return Series are presented in table 2. The ADF statistics of all indices are greater than the test critical values at 1%, 5% and 10% levels. This indicates that all the indices are stationary at level. Therefore, we reject the null hypothesis of unit root at 1% significance level for all the indices. Hence, there is possibility of presence of Islamic calendar effects in the indices. Figure 1, 2 and 3 illustrates the variations in the daily returns of Islamic Global Equity Indices for the sample period. Although all the series are stationary, the spikes in the figures indicate the presence of calendar effect.

Table 2. Results of Augmented Dickey-Fuller test

Global Equity Indices	ADF Test Stat.	P-Value	Test critical values			Remarks
			1% level	5% level	10% level	
DJIMI Index	-31.51027	0.0000	-3.435402	-2.863659	-2.567948	Stationary at Level
MSCI ACWI Islamic Index	-20.67139	0.0000	-3.435677	-2.863780	-2.568013	Stationary at Level
S&P Global BMI Shariah Index	-21.49950	0.0000	-3.435311	-2.863619	-2.567926	Stationary at Level

Source: Authors' Calcuations.

3.3 Ordinary Least Square (OLS) Results

The impact of Islamic months on the return series of Islamic Global Equity Indices, presented in equation 2, is estimated using OLS technique in eviews 9. The results of all indices are presented one-by-one.

3.3.1 Dow Jones Islamic Market World Index

The estimated results for DJIMI are reported in table 3. Findings reveal that Ramadan does not have significant impact on the returns of DJIMI since the p-value (0.6529) is greater than 10% of significance. However, the beta value of Zil-Haj (-0.001841) suggests decrease in returns of DJIMI in the month. This impact is significant at 10% level. The value of Durbin-Watson statistics 1.78181 is within the acceptable range of (1.5-2.5) that proves no autocorrelation in the series.

Table 3. Results of OLS method of Dow Jones Islamic market world index

Dependent Variable: DJIMI				
Method: Least Squares				
Sample: 1 1243				
Included observations: 1243				
White Heteroskedasticity-Consistent Standard Errors & Covariance				
	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000384	0.000260	1.475963	0.1402
RAMADAN	-0.000561	0.001246	-0.449808	0.6529
ZILHAJ	-0.001841	0.001047	-1.759306	0.0788
R-squared	0.003359	Mean dependent var		0.000184
Adjusted R-squared	0.001751	S.D. dependent var		0.008961
S.E. of regression	0.008953	Akaike info criterion		-6.591134
Sum squared resid	0.099405	Schwarz criterion		-6.578764
Log likelihood	4099.390	Hannan-Quinn criter.		-6.586482
F-statistic	2.089435	Durbin-Watson stat		1.781841
Prob(F-statistic)	0.124193			

Source: Authors' Calculations.

3.3.2 MSCI ACWI Islamic Market Index

In MSCI ACWI Islamic Index, Zil-Haj is the only significant regressor explaining the variation in the returns of index. The coefficient of Zil-Haj (-0.001631) and p-values (0.1047) proves significant negative impact at 10% level. Moreover, Durbin-Watson statistics (1.7673309) is within the acceptable range of (1.5-2.5). The results are presented in table 4.

Table 4. Results of OLS method of MSCI ACWI Islamic index

Dependent Variable: MSCI ACWI Islamic Index				
Method: Least Squares				
Sample: 5/03/2011 11/12/2015				
Included observations: 1183				
White Heteroskedasticity-Consistent Standard Errors & Covariance				
	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000193	0.000260	0.742694	0.4578
RAMADAN	-0.000490	0.001223	-0.400261	0.6890
ZILHAJ	-0.001631	0.001033	-1.578392	0.1047
R-squared	0.002909	Mean dependent var		4.25E-06
Adjusted R-squared	0.001219	S.D. dependent var		0.008771
S.E. of regression	0.008766	Akaike info criterion		-6.633345
Sum squared resid	0.090674	Schwarz criterion		-6.620473
Log likelihood	3926.624	Hannan-Quinn criter.		-6.628493
F-statistic	1.721196	Durbin-Watson stat		1.673309
Prob(F-statistic)	0.179301			

Source: Authors' Calculations.

3.3.3 S&P Global BMI Shariah Index

Table 5 portrays the results of impact of Islamic months on S&P Global BMI Shariah Index. The coefficient of Zil-Haj (-0.001756) shows that the Zil-Haj effect is negative and significant at 10% level (p-value = 0.0778). The Durbin-Watson statistics (1.693309) is also within the acceptable range of (1.5-2.5).

Table 5. Results of OLS method of S&P Global BMI Shariah index

Dependent Variable: S&P Global BMI Shariah Index
Method: Least Squares
Sample: 1/05/2011 11/12/2015
Included observations: 1267
White Heteroskedasticity-Consistent Standard Errors & Covariance

	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000395	0.000240	1.643489	0.1005
RAMADAN	-0.000560	0.001217	-0.460303	0.6454
ZILHAJ	-0.001756	0.000995	-1.764747	0.0778
R-squared	0.003454	Mean dependent var		0.000202
Adjusted R-squared	0.001877	S.D. dependent var		0.008451
S.E. of regression	0.008443	Akaike info criterion		-6.708618
Sum squared resid	0.090101	Schwarz criterion		-6.696437
Log likelihood	4252.909	Hannan-Quinn criter.		-6.704041
F-statistic	2.190449	Durbin-Watson stat		1.693309
Prob(F-statistic)	0.112291			

Source: Authors' Calculations.

3.4 GARCH Results

The impact of Islamic months on the return series of Islamic Global Equity Indices, presented in equation 2, is estimated using OLS technique in Eviews 9. The results of all indices are presented one-by-one.

3.4.1 Dow Jones Islamic Market World Index

The results for DJIMI presented in table 6 depict that the coefficient of Zil-Haj (-0.001108) is significant at 10% level. It proves that the volatility of DJIMI significantly decreases in the month of Zil-Haj. The Durbin-Watson statistics (1.778171) is also found within the acceptable range of (1.5-2.5) that proves no autocorrelation in the series. The student's t-distribution statistic (5.988147) is significant at 1% level.

Table 6. Results of GARCH method of Dow Jones Islamic market world index

Dependent Variable: DJIMI
Method: ML - ARCH (Marquardt) - Student's t distribution
Sample: 1 1243
Included observations: 1243
Convergence achieved after 17 iterations
Presample variance: backcast (parameter = 0.7)
GARCH = C(4) + C(5)*RESID(-1)^2 + C(6)*GARCH(-1)

	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000622	0.000207	3.000474	0.0027
RAMADAN	0.000244	0.000703	0.347517	0.7282
ZILHAJ	-0.001108	0.000733	-1.513016	0.1003
	Variance Equation			
C	2.24E-06	8.22E-07	2.729618	0.0063
RESID(-1)^2	0.122688	0.024757	4.955662	0.0000
GARCH(-1)	0.854110	0.027572	30.97694	0.0000
T-DIST. DOF	5.988147	1.184934	5.053571	0.0000
R-squared	0.000668	Mean dependent var		0.000184
Adjusted R-squared	-0.004183	S.D. dependent var		0.008961
S.E. of regression	0.008980	Akaike info criterion		-6.881218
Sum squared resid	0.099673	Schwarz criterion		-6.852355
Log likelihood	4283.677	Hannan-Quinn criter.		-6.870364
F-statistic	0.137658	Durbin-Watson stat		1.778171
Prob(F-statistic)	0.991330			

Source: Authors' Calculations.

3.4.2 MSCI ACWI Islamic Market Index

Empirical findings of GARCH (1,1) model for MSCI ACWI Islamic Index, reported in table 7, reveals that the coefficient of Ramadan is insignificant. However, the coefficient of Zil-Haj (-0.001105) is significant at 10% level since the p-value is 0.1080. It can be concluded that Zil-Haj has significant negative impact on the volatility of MSCI ACWI Islamic Index. The value of Durbin-Watson statistics (1.670351) is within the acceptable range of (1.5 - 2.5). Moreover, student's t-distribution statistic (5.937196) is also significant at 1% level.

Table 7. Results of GARCH method of MSCI ACWI Islamic index

Dependent Variable: MSCI ACWI Islamic Index				
Method: ML - ARCH (Marquardt) - Student's t distribution				
Sample: 5/03/2011 11/12/2015				
Included observations: 1183				
Convergence achieved after 16 iterations				
Presample variance: backcast (parameter = 0.7)				
GARCH = C(4) + C(5)*RESID(-1)^2 + C(6)*GARCH(-1)				
	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000445	0.000208	2.145215	0.0319
RAMADAN	0.000146	0.000654	0.223883	0.8228
ZILHAJ	-0.001105	0.000687	-1.607387	0.1080
	Variance Equation			
C	1.02E-06	4.68E-07	2.178944	0.0293
RESID(-1)^2	0.079962	0.017702	4.517212	0.0000
GARCH(-1)	0.907688	0.019478	46.60050	0.0000
T-DIST. DOF	5.937196	1.076118	5.517237	0.0000
R-squared	0.000621	Mean dependent var		4.25E-06
Adjusted R-squared	-0.004478	S.D. dependent var		0.008771
S.E. of regression	0.008791	Akaike info criterion		-6.953521
Sum squared resid	0.090882	Schwarz criterion		-6.923487
Log likelihood	4120.008	Hannan-Quinn criter.		-6.942199
F-statistic	0.121818	Durbin-Watson stat		1.670351
Prob(F-statistic)	0.993776			

Source: Authors' Calculations.

3.4.3 S&P Global BMI Shariah Index

Table 8 describes the results of impact of Islamic months on volatility of S&P Global BMI Shariah Index returns. The coefficient of Zil-Haj attests that this month has negative impact on the volatility of index and this impact is significant at 10% level (p-value = 0.0971). Durbin-Watson has value 1.689837 which is within the acceptable range of (1.5 - 2.5). The student's t-distribution statistic (5.347790) is also significant at 1% level.

Table 8. Results of GARCH method of S&P Global BMI Shariah index

Dependent Variable: S&P Global BMI Shariah Index				
Method: ML - ARCH (Marquardt) - Student's t distribution				
Sample: 1/05/2011 11/12/2015				
Included observations: 1267				
Convergence achieved after 18 iterations				
Presample variance: backcast (parameter = 0.7)				
GARCH = C(4) + C(5)*RESID(-1)^2 + C(6)*GARCH(-1)				
	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000645	0.000194	3.333971	0.0009
RAMADAN	0.000130	0.000674	0.192858	0.8471
ZILHAJ	-0.001139	0.000687	-1.658854	0.0971
	Variance Equation			
C	1.87E-06	6.97E-07	2.680612	0.0073
RESID(-1)^2	0.104044	0.022488	4.626654	0.0000
GARCH(-1)	0.873749	0.025410	34.38603	0.0000
T-DIST. DOF	5.347790	0.973643	5.492556	0.0000
R-squared	0.000820	Mean dependent var		0.000202
Adjusted R-squared	-0.003938	S.D. dependent var		0.008451
S.E. of regression	0.008467	Akaike info criterion		-7.002050
Sum squared resid	0.090339	Schwarz criterion		-6.973628
Log likelihood	4442.799	Hannan-Quinn criter.		-6.991372
F-statistic	0.172259	Durbin-Watson stat		1.689837
Prob(F-statistic)	0.984260			

Source: Authors' Calculations.

4. Discussion

According to the results of OLS and GARCH (1,1) methods for all indices, it is proved that Ramadan has no significant impact on the returns and volatility of indices. Therefore the null hypothesis "Islamic month of Ramadan has no impact on the returns and volatility of Islamic Global Equity Indices" cannot be rejected. The reason behind the rejection of Ramadan effect can be the difference in mood and behavior of investors belonging to different regions. Some of the previous studies reported optimistic mood of investors in Ramadan, which lead to more investment in the market. The Islamic Global Equity Indices are not bound to a selected region, therefore the mixed effect of different regions abolish the effect of Ramadan. Moreover, the performance of non-Muslim countries might set off the adverse effect of Ramadan in Muslim countries. These findings of this paper are consistent with Al-Hajieh et al. (2011), Carl and Jakob (2010), and Seyyed et al. (2005) but contradict Ali et al. (2015), Shah et al. (2015), Iqbal et al. (2013), and Bukhari et al. (2011).

However, the alternate hypothesis regarding Zil-Haj effect "Islamic month of Zil-Haj has negative impact on the returns and volatility of Islamic Global Equity Indices" is accepted at 10% significance level by rejecting the null hypothesis in case of all indices. These Findings are consistent with Bukhari et al. (2011).

There can be three reasons behind the presence of Zil-Haj effect. One is that in this month millions of Muslims, who can afford, utilize their money to purchase cattle for slaughtering (Sunnat-e-Ibrahimi) instead of investing it in the market. Second, Muslims who can afford visit Saudi Arabia to perform Hajj (the Fifth Pillar of Islam) in this month. Third, the two important religious activities on Zil-Haj also generate new short time business opportunities. Many investors tend to invest in cattle business rather than investing in stock market. These new investment avenues reduce the flow of funds to the stock market, which demotivates other investors from investing more funds in the market. Thus the market activity slow downs, which result in lower return and volatility.

5. Conclusions and Further Research

This study attempted to test the impact of Islamic months of Ramadan and Zil-Haj on the returns and volatility of Islamic Global Equity Indices. Empirical findings reveal significant negative impact of Zil-Haj on returns and volatility of Islamic Global Equity Indices. However, no significant impact of Ramadan on returns and volatility of Islamic Global Equity Indices are revealed. The negative impact of Zil-Haj may be due to the economic shift of funds from capital market to new investment opportunities generated during the month of Zil-Haj. This outflow of funds resulted in not only reduced activity but also decrease in returns and volatility of stocks.

These empirical results will be fascinating and of utmost interest amidst the researchers, investors and practitioners. Moreover, these results will help investors around the Globe to design strategies accordingly. In addition, they might gain extraordinary return by buying at low price in Zil-Haj and selling at high price later.

In future, there is need to research on region-based impact of Islamic Calendar effects on returns and volatility of stocks. A comparative study should also be conducted on the impact of Islamic calendar effects on the economic activity of different regions of the world.

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Notes

Note 1. For further details See Dow Jones Islamic Market World Index.

Note 2. For further details See MSCI ACWI Islamic Index Factsheet.

Note 3. For further details See S&P Global BMI Shariah Index Factsheet.