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## Examining anomalies in Islamic equity market of the emerging economies

**Abstract.** The purpose of this study is to evaluate the performance of Islamic stock indices in the presence of Islamic calendar anomaly in the context of emerging economies. The current study has considered daily data from 1 January 2010 to 1 September 2017. Standard & Poor's (S&P) Shariah index, which comprises funds from 22 emerging economies, is used for the study. Descriptive statistics are applied to check the behaviour of the index. The Generalised Auto Regressive Conditional Heteroscedasticity Model (GARCH) model is applied to capture the seasonality in the returns and the volatility of the Islamic equity market. It has been found out that the effect of Ramadan, the holy month of Muslims, can be both significant and insignificant depending on different years. The Islamic indices during the earlier years of their establishment were performing poorly, if compared to the market benchmarks. But during the latter years, the markets have performed well or maintained a good place, as compared to market benchmarks. The results of Jensen's alpha show that the returns during Ramadan improve significantly. This study will help the investors to efficiently time their trading. Based on the authors' best knowledge, this is the first paper describing an investigation on Ramadan effect on the emerging Shariah index, which has also included the Ramadan period of 2017.

**Keywords:** Islamic Equity; Shariah Index; Emerging Economies; Anomalies; GARCH; Ramadan

**JEL Classification:** G41; D63; O50

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### Дослідження аномалій на фондових ринках в ісламських країнах з економікою, що розвивається

**Анотація.** Метою цього дослідження є оцінка ефективності фондових ринків в ісламських країнах з економікою, що розвивається, з урахуванням ісламського календаря. В основу дослідження покладено дані, що охоплюють період з 1-го січня 2010 року до 1-го вересня 2017 року. В ході дослідження було використано індекс шариату агентства Standard & Poor's (S&P), що включає дані 22-х країн з економікою, що розвивається. Для визначення динаміки індексу авторами дослідження було задіяно метод описової статистики. Узагальнену модель авторегресійної умовної гетероскедастичності (GARCH) було застосовано для визначення впливу сезонності на прибутковість, а також волатильності ринку цінних паперів в ісламських країнах. Було визначено, що ефект Рамадану, священного для мусульман місяця, може мати як істотний, так і несуттєвий вплив залежно від року. У перші роки від свого створення показники індексів ісламських ринків були далекі від еталонних ринкових показників. Однак у наступні роки ситуація вирівнялася. Показник альфи Йенсена показує, що в період Рамадану прибутковість істотно зростає. Дане дослідження допоможе інвесторам визначити найбільш сприятливі для інвестування періоди. Грунтуючись на накопиченому досвіді, автори статті вперше вивчили вплив Рамадану на індекс шариату, дослідивши в даному контексті й період 2017 року.

**Ключові слова:** ісламські акції; індекс шариату; країни з економікою, що розвивається; аномалії; GARCH; Рамадан.

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**Исследование аномалий на фондовых рынках в исламских странах с развивающейся экономикой**

**Аннотация.** Целью данного исследования является оценка эффективности фондовых рынков в исламских странах с развивающейся экономикой с учетом исламского календаря. В основу исследования положены данные, охватывающие период с 1-го января 2010 года до 1-го сентября 2017 года. В ходе исследования был использован индекс шариата агентства Standard & Poor's (S&P), включающий данные 22-х стран с развивающейся экономикой. Для определения динамики индекса авторами исследования был задействован метод описательной статистики. Обобщенная модель авторегрессионной условной гетероскедастичности (GARCH) была применена для определения влияния сезонности на доходность и волатильности рынка ценных бумаг в исламских странах. Было определено, что эффект Рамадана, священного для мусульман месяца, может иметь как существенное, так и несущественное влияние в зависимости от года. В первые годы от своего создания показатели индексов исламских рынков были далеки от эталонных рыночных показателей. Однако в последующие годы ситуация выровнялась. Показатель альфы Йенсена показывает, что в период Рамадана доходность существенно возрастает. Данное исследование поможет инвесторам определить наиболее благоприятные для инвестирования периоды. Основываясь на накопленном опыте, авторы статьи впервые изучили влияние Рамадана на индекс шариата, исследовав в данном контексте и период 2017 года.

**Ключевые слова:** исламские акции; индекс шариата; страны с развивающейся экономикой; аномалии; GARCH; Рамадан.

**1. Introduction**

The efficiency of the market is questioned during the presence of the anomaly. Yet irregularities and anomalies are not explained properly in any of the existing finance theories. Khan and Jebran (2014) said that an efficient market is a market in which investors earn no excessive profits, or they do not earn the highest returns above average market returns. The returns of stock markets can be predicted because of the seasonality factor (Jensen, 1978). Seasonality is also known as the anomaly. This, in turn, affects the basic concept of efficient market hypothesis (EMH).

An irregularity in the financial market is known as «anomaly». When an anomaly occurs, financial markets behave differently. Efficient markets are those in which investors do not have any possibility of earning the highest returns. The EMH states that by using trend analysis, investors will not be able to get excessive profits. The only feature of the market which is against this hypothesis is calendar anomalies. Many studies have been conducted on the Gregorian's calendar anomalies; however different regions have different anomalies. They include all those mentioned in the Hindu, Chinese, Hebrew and Hijri Calendar. The Hijri calendar has the same number of months as the Gregorian calendar, though the number of average days is fewer in it than in the latter. The months in the Hijri calendar depend on the appearance of the new moon. The ninth month of the Hijri calendar is known as Ramadan, in which Muslims fast from Dusk to Dawn.

In this month, people are motivated towards religious activities. Ramadan is one of the five pillars of Islam. Muslims try to refrain themselves from 'Haram' doings. They avoid getting involved into gambling and speculation. Since these are an essential part of the stock market system, the theory of behavioural finance suggests that optimism biases and outcome biases depend on increased uncertainty. During the beginning and ending of Ramadan, high level of volatility is reported by many researchers (Bialkowski et al., 2010).

Ramadan is observed with great passion and enthusiasm. There are changes in the socio-economic lifestyle of individuals, so it is interesting to examine how the Islamic stock index performs during this month of the year, as compared to the other months.

The present study uses the Standard & Poors Emerging Shariah Index as this index includes stocks from all the emerging economies which qualify as Shariah complaint stocks. The S&P Emerging Shariah Index is a subset of the S&P Global Index. The objective of this paper is to analyse the performance of the stock market during the Ramadan period and the effect of Ramadan on the returns of the stock index.

The paper is divided into five sections, the second section deals with the review of literature followed by the methodology

applied in this paper. The fourth section interprets the results and the fifth section concludes the paper.

**2. Brief Literature Review**

The systematic patterns in the returns of the indices during a specific period of time, which indicate the inefficiency of the market, are known as calendar anomalies (Brooks, 2004). Yet, these patterns do not stay long; they fade away or disappear (Schwert, 2001). The calendar anomalies do not mean that the stock market is inefficient. In fact, during this period the returns are less and the difference in returns is mainly because of the time varying risks (Brooks, 2004). Religious beliefs have an impact on stock markets (Weber, 1930). Numerous studies explain the calendar anomaly phenomenon with the help of the tax system of a country, the structure of the market, the trading mechanism and the cultural factors (Dbouk, Jamali & Kryzanowski, 2013; Dyl, 1977; Roll 1983; Hepsen, 2012; Fama & Blume, 1966; Bley & Saad, 2010; Chan, Khanthavit & Hugh, 1996).

Seasonal patterns are also identified when they are measured on a weekly basis. The returns on S&P 500 were analysed by Levy and Yagil (2012) to find the 44<sup>th</sup> week of the year effect. The robustness of the findings was not checked on the emerging markets but 19 developed markets showed robust results.

The growing share of the global markets comprises the emerging markets. The analysis of these markets helps investors to decide where they should invest. The emerging markets are integrated with the developed markets, yet there are a few of them which are not. Therefore, they constitute a separate asset class (Bekaert & Harvey, 1995, 2000; Bekaert, Harvey, Lundblad, & Siegel, 2011). Investors find it difficult to invest in the emerging markets as they lack hedging instruments, which, in turn, causes risk to international investors. This leads to a situation when developed markets are more efficient than emerging markets (Bekaert & Harvey, 2002).

According to behavioural finance, the market is also run by the emotions, religious beliefs and investors' behaviour. Spiritual beliefs can cause irregularity in the markets (Bialkowski et al., 2010). The stock returns are affected by the religious events mentioned in the calendars (Lakonishok & Smidh, 1988). Various studies have been conducted on the effect of calendar anomalies on bond markets, foreign exchange markets, future markets and mutual fund markets (Carl & Jacob, 2010).

Earlier studies were restricted to Muslim countries only. Further, it was found out that Muslim investors not only invest in Muslim countries but they also do so globally. Therefore, there are no more country-specific aspects. Calendar anomalies are present in the Islamic indices where there is a significant number of Muslim investors. Most of the Muslim countries relate to emerging economies, which is why this study has been

conducted based on the Islamic emerging markets. Most of the Islamic countries are using the Islamic banking system in their transactions, and it is confirmed that Islamic banking has contributed to the growth of the economies in the relevant countries (Tabash, 2013; 2014). This study shows the performance and the impact of Ramadan on the Islamic emerging markets. During Ramadan, Muslims are involved in religious activities like fasting, reciting prayers and the Holy Quran, social welfare and Itikaf (during the last ten days of Ramadan). Muslims spend most of their time performing religious activities, which, in turn, leads to slowing down activities related to investing in stock markets. At the same time, the month also attracts investors by generating new business opportunities. In this period, the returns become abnormal. In the emerging markets, there exists a higher serial correlation (Harvey, 1995), leakage of information prior to announcements (Bhattacharya, Daouk, Jorgenson, & Kehr, 2000), and higher returns are generated through cross sectional trading (Rouwenhorst, 1999).

Investors' decisions are strongly influenced by their social mood, which impacts the stock price (Edmans et al., 2007). Islamic stocks represent a developing investment category which is screened on the basis of Islamic principles (Masih et al., 2016). Ramadan being the holy month of the Hijri Calendar, the Muslims try not to get involved in Haram doings. They are less involved in social and economic activities.

Such behaviour leads to a reduction in returns and volatility (Husain 1998; Seyyed et al., 2005). Basing on studies of the Indian market, Mehta (2004) reports that Hindu festivals have an impact on the daily returns of the indices operating in India. Before a public holiday, the returns of the stock markets tend to increase. Thus, it leaves a significant impact on the stock markets (Noland, 2003). The Islamic month impacts the economic and financial activities, which can make it fluctuate at different times of the calendar, thus impacting the share returns (Halari et al., 2015). When studying Saudi Arabia, it was found out that religious beliefs have an impact on investors' portfolio decisions (Canepa & Ibnrubbian, 2014).

Numerous studies have been conducted on the impact of Islamic months on the stock markets. Khalid Mustafa studied the Islamic calendar months like Muharram, Shahban, Ramadan, Shawwal, Ziqad and Zilhajj's effect on the Karachi stock markets. He found that the effect of Ziqad and Shawwal has an impact on the stock markets, and that during Ramadan the market is less risky as compared to the other months. A study was also conducted on the Indian and Pakistani markets for the period between 1997 and 2003. It was found that the markets in Pakistan were less volatile during Ramadan and Rabi ul Awwal period, whereas they were highly volatile in the Indian market during Muharram and Shawaal. Kouser et al (2013) found that there was a significant impact of Ramadan on the markets due to the usage of the OLS technique. In the study conducted with regard to the Turkish markets, it was found that the funds gained positive returns during the Ramadan period (Bialkowski et al., 2013). In their study, Oguzsoy and Guyen (2004) showed that the impact of Ramadan on the Istanbul Stock Exchange had significant positive returns. Some studies were conducted on the markets which purely deal with Islamic finance, like in the case of Saudi Arabia. It was found that there were negative returns during the Ramadan period. This can be explained by the fact that investors divert their funds towards the socio-religious causes rather than investing in markets (Seyyed et al., 2005). One of the requisite of Ramadan is that Muslims have to give Zakat (Charity) to the poor. This can also be one of the reasons behind stable or negative returns during the Ramadan period. Positive moods of the investor lead to significant returns, like in the case of an odd number of days during the last ten days of this month (21<sup>st</sup>, 23<sup>rd</sup>, 25<sup>th</sup>, 27<sup>th</sup> and 29<sup>th</sup>). The highest returns were reported in the study conducted by Al-Ississ (2015). He reported that the markets were behaving abnormally on the 27<sup>th</sup> Ramadan.

As the month Ramadan finished, people go back to their daily lives. Businesses are back to normal or, in some cases, they earn higher returns during the following months. There were some studies, in which it was found out that during Eid ul Fitr, the markets were not affected at all, and the returns were similar to the ones in the preceding months. The study

was conducted basing on the Malaysian markets by Carl and Jakob (2010) by using the regression (OLS) technique. The Malaysian markets had a significant Christmas effect, but not the Eid ul Fitr effect (Wong and Lim, 2016).

**3. Data and Methodology**

In this study, we have collected the daily data for the S&P Emerging Shariah Index for the years between 2010 and 2017. This index includes securities from 22 countries, as shown in Table 1. The countries included in this index comprise stocks which are Shariah compliant by either choice or by chance. Those stocks which are Shariah compliant by have no significant effect on this index. The total number of securities included in this index are 1,126.

We have evaluated the performance of the index during both the Ramadan period and the overall period. Jensen's alpha is calculated with the help of regression. GARCH test is used to check the impact of Ramadan on the market. To examine the anomaly OLS, regression is used by taking Ramadan period as a dummy (0, 1) (Kouser et al., 2013; Seyyed et al., 2005)

The model used for calculating Jensen's alpha is:

$$R_{it} - RF_t = \alpha + \beta(RM_t - RF_t) + \varepsilon_{it}$$

where:

$R_{it}$  is the daily returns of the portfolios;

$RF_t$  is the risk free rate;

$RM_t$  is the daily return on the market index;

$\alpha$  is Jensen's alpha;

$\beta$  is the systematic risk;

$\varepsilon_{it}$  is the error term.

The risk free rate in this study is the US Treasury bill rate. The daily beta is calculated by taking one-month lag time period.

The volatility among different markets is checked with the help of the threshold GARCH (TGARCH) (Halari et al., 2015; Kenourgios et al., 2016). The GARCH model is divided into two parts: the mean equation and the variance equation:

$$R_{jt} = \mu_j + \sum_{i=1}^{11} \lambda_{ij} D_{it} + \varepsilon_{jt} ; \tag{1}$$

$$h_{jt} = \theta_j + \sum_{i=1}^{11} \lambda_{ij} D_{it} + \theta_k \varepsilon_{t-1}^2 + \varepsilon_{it} + \theta_m h_{t-1} . \tag{2}$$

Equation 1 is the mean equation, and Equation 2 is the variance equation. In the mean equation,  $R_{jt}$  represents the return

**Tab. 1: List of countries and number of constituents in the S&P Emerging Shariah Index, 2010-2017**

Country	Number of constituents
Hungary	1
Greece	1
Peru	2
Czech Republic	2
Chile	6
Egypt	6
United Arab Emirates	10
Qatar	14
Russia	15
Philippines	15
Poland	17
Turkey	17
Mexico	18
Pakistan	21
Brazil	32
Indonesia	37
South Africa	41
Thailand	67
Malaysia	82
China	229
India	244
Taiwan	267

Source: Compiled by the authors based on S&P's website

of S&P Emerging Shariah Market at time  $t$ , while  $D_i$  is the dummy variable of Ramadan  $i$  (1 for Ramadan and 0 for the rest of the dates of the other months).  $\varepsilon_{jt}$  is the error term. In the variance equation,  $h_{jt}$  is the conditional variance;  $\varepsilon_{jt-1}^2$  is the ARCH which will capture the volatility from the previous period.  $\theta_j$  and  $\mu_j$  are the effect of the excluded dummy variables. This model is similar to the one used in the studies by Jebran and Chen (2017).

**4. Empirical Results**

**4.1. Descriptive Statistics**

The Jarque-Bera test results suggest that the returns are not normally distributed. The results relating to the years 2011, 2013, 2014 and 2015 were negatively skewed as shown in Table 2. 2012 and 2013's returns were significant at the 5 percent level. The kurtosis value was higher than the critical value of 3 in all the years except 2011 and 2015. The results are similar to the results obtained by Halari et al., (2015). The results also showed that during 2011 the mean of the returns was positive, as compared to the rest of the months. For the year 2017, the return is positive. However, we cannot judge it on the basis of just 9 months taken in this study. The standard deviation is approximately the same all throughout the years.

**4.2. Overall performance versus performance during Ramadan**

To evaluate the performance during both the Ramadan period and the overall period, Jensen's alpha is calculated by taking one-month lag. In the years 2010, 2012 and 2017, the overall index performed well, but in the rest of the months they were underperforming, compared to market benchmarks. In the year 2010, the performance of the index during Ramadan was poor, as compared to the rest of the months. This can be explained by the fact that the index was not well established in all the regions of the emerging markets. In some of the markets, the index started operating from the year 2009. After that year, the markets stabilised and investors started investing in the Islamic index, which is why from the year 2011, the performance during Ramadan considerably improved. There were no as financial shocks during those years except for the year 2016, when Brexit took place. If we compare the performance of the market in terms of the preceding years, it can be observed that the overall market was performing better. During the Ramadan of 2016, the market outperformed the market benchmark. The results of the Jensen's Alpha are given in Table 3. The relevant results are also represented in Figure 1.

**4.3. GARCH results**

The results of the GARCH test are given in Table 4. As we can see from the table below, Ramadan had no significant effect on the returns of the market in the period between 2010 and 2013. The study is similar to the one conducted by Jebran and Chen (2017), in which it was reported that there was an insignificant Ramadan effect on the market, however during the period between 2014 and 2017, a significant effect was observed in the market. The results are similar to the results reported by Al-Ississ (2010), Al-Hajjeh et al., (2011) and Almudhaf (2012).

**5. Conclusion**

In the present study, we have examined the Islamic calendar anomaly, i.e. the Ramadan period with regard to the S&P Emerging Shariah Market in view of the period from 2010 to 2017. In some studies, the calendar anomalies were the Zil Haj period, Muharram and Ramadan. However, taking into account a larger number of countries in our study, we have considered only the Ramadan period. Jensen's alpha was used to evaluate the performance of the index during both Ramadan and the overall period. The results of Jensen's alpha have indicated that the performance during Ramadan was slightly getting better year wise.

Tab. 2: Descriptive Statistics

Year	Mean	Median	Skewness	Kurtosis	Jarque-Bera	Probability	Std. Dev.
2010	-0.113549	-0.103451	0.103532	3.651871	4.912022	0.085776	0.986754
2011	0.012742	0.076744	-0.193864	2.657050	2.813447	0.244945	1.023313
2012	-0.009280	0.000924	0.310728	4.845056	39.32578	0	0.942252
2013	-0.015093	0.018293	-0.264811	3.484259	5.407556	0.066952	0.998317
2014	-0.024714	-0.061674	-0.069020	3.065761	0.245484	0.884492	1.001912
2015	-0.011702	-0.073630	0.070775	2.898181	0.319236	0.852469	1.025586
2016	-0.005360	-0.033644	-0.069804	3.367582	1.623368	0.444110	1.035434
2017	0.031400	0.018884	0.054158	3.453793	1.541765	0.462605	1.010464

Source: Compiled by the authors

The GARCH results have indicated both a significant and insignificant effects of Ramadan over the index. The study has useful implications for the investors, so that they can time their trading strategies and invest during the Ramadan period because the returns during this period are either high or stable. The effects of the Islamic calendar can only be found in the regions which are under Islamic law. The financial shocks also had an effect on the performance of the markets. During the bearish periods, the Islamic markets were performing better than the market benchmarks, whereas during the bullish periods the benchmark markets were outperforming the Islamic markets. This study will also help the 'active investors' to decide when to invest for higher returns. Future studies should be done with regard to evaluating the performance of the indices during the calendar anomaly in conventional and Islamic markets.

Tab. 3: Jensen's Alpha for the overall period and the Ramadan period

S&P Emerging Shariah	Variable	Coefficient	Std. Error	t-Statistic	Prob.
Overall (2010)	C	0.046344	0.069881	0.663186	0.5078
Ramadan	C	-1.324949	0.512811	-2.583698	0.0182
Overall (2011)	C	-0.077449	0.087222	-0.887953	0.3754
Ramadan	C	-0.406670	0.434719	-0.935477	0.3613
Overall (2012)	C	0.041055	0.053523	0.767043	0.4438
Ramadan	C	-0.361303	1.121662	-0.322114	0.7509
Overall (2013)	C	-0.006453	0.046872	-0.13767	0.8906
Ramadan	C	-0.124872	0.178619	-0.699096	0.4925
Overall (2014)	C	-0.030484	0.043623	-0.698816	0.4853
Ramadan	C	-0.417243	0.292799	-1.425014	0.1723
Overall (2015)	C	-0.061177	0.064291	-0.951557	0.3422
Ramadan	C	-0.277181	0.862576	-0.321341	0.7515
Overall (2016)	C	-0.00125	0.056599	-0.022088	0.9824
Ramadan	C	0.337286	0.663279	0.508512	0.6169
Overall (2017)	C	0.148138	0.043266	3.423867	0.0008
Ramadan	C	-0.101786	0.045392	-2.242401	0.0386

Source: Compiled by the authors

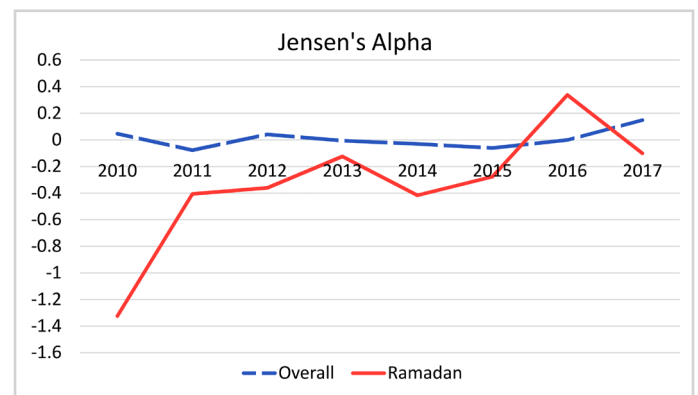


Fig. 1: Jensen's Alpha for the overall and Ramadan period  
Source: Calculated by the authors

Tab. 4: Results of the GARCH test

		2010				2014				
		Coefficient	Std. Error	z-Statistics	Prob.	Coefficient	Std. Error	z-Statistics	Prob.	
2010	Mean Equation					Mean Equation				
	Ramadan	.028858	.252161	6.693273	0	Ramadan	0.114889	0.098011	1.172206	0.2411
	S&P Global Index	.028858	.252161	.114441	.9089	S&P Global Index	0.159333	0.027894	5.712044	0
	Variance Equation					Variance Equation				
	Ramadan	.015382	.095565	.160958	0.8827	Ramadan	-0.093489	0.08207	-1.139135	0.2546
	Volatility	-0.437529	0.142676	-3.122321	0	Volatility	0.093301	0.206616	0.451568	0.6516
2011	S&P Global Index	-0.175612	0.027613	-6.084011	0	S&P Global Index	-0.019434	0.021425	-0.907057	0.3644
	Mean Equation					Mean Equation				
	Ramadan	-1.001615	0.318633	-3.143477	0.0017	Ramadan	-0.013101	0.247707	-0.05289	0.9578
	S&P Global Index	-0.054139	0.039046	-1.386543	0.1656	S&P Global Index	0.198117	0.034741	5.702744	0
	Variance Equation					Variance Equation				
	Ramadan	0.359054	0.086939	4.129963	0	Ramadan	0.073791	0.028814	2.560989	0.0104
2012	Volatility	0.001805	0.022736	0.079406	0.9367	Volatility	-0.022555	0.045321	-0.497673	0.6187
	S&P Global Index	-0.003246	0.026591	-0.122085	0.9028	S&P Global Index	-0.025762	0.011822	-2.179224	0.0293
	Mean Equation					Mean Equation				
	Ramadan	0.188321	0.161413	1.166703	0.2433	Ramadan	-0.001494	0.152877	-0.009774	0.9922
	S&P Global Index	0.164625	0.047843	3.440962	0.0006	S&P Global Index	0.046441	0.010639	4.365271	0
	Variance Equation					Variance Equation				
2013	Ramadan	-0.082918	0.073867	-1.122527	0.2616	Ramadan	0.024404	0.011008	2.21689	0.0266
	Volatility	-0.299255	0.211331	-1.416048	0.1568	Volatility	-0.056971	0.029059	-1.960517	0.0499
	S&P Global Index	-0.120113	0.055314	-2.17149	0.0299	S&P Global Index	-0.024096	0.011529	-2.08997	0.0366
	Mean Equation					Mean Equation				
	Ramadan	0.045234	0.219057	0.206492	0.8364	Ramadan	-0.023073	0.127422	-0.181079	0.8563
	S&P Global Index	0.06674	0.029636	2.251965	0.0243	S&P Global Index	0.105522	0.037039	2.848952	0.0044
2014	Variance Equation					Variance Equation				
	Ramadan	-0.011966	0.034418	-0.34766	0.7281	Ramadan	0.033953	0.096225	0.352852	0.7242
	Volatility	-0.010607	0.051214	-0.207119	0.8359	Volatility	0.351698	0.118893	2.958108	0.0031
	S&P Global Index	-0.037345	0.014775	-2.527567	0.0115	S&P Global Index	0.057571	0.028448	2.02374	0.043

Source: Calculated by the authors

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