

THE ISLAMIC CALENDAR EFFECTS: EVIDENCE FROM TWELVE STOCK MARKETS

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ABSTRACT

This paper investigates the Islamic calendar seasonal anomalies in the stock returns of twelve countries where the majority of the population are Muslims. We show empirical evidence of statistically significant Islamic calendar seasonal effects in all twelve countries of our sample. We document evidence of positive and statistically significance returns in the month of Ramadan in Jordan, Kuwait, Pakistan and Turkey. Our results provide some evidence against the weak-form of market efficiency.

Keywords: *Seasonality, Calendar Anomalies, Islamic Calendar effect, Ramadan Effect, International Stock Markets.*

INTRODUCTION

Time patterns in stock returns are reported in a number of studies. Rozeff and Kinney (1976) find that the monthly return is the greatest during the month of January compared to other months of the year in NYSE. This is early evidence of the existence of seasonality in monthly stock returns. This anomaly is known as the “January effect” in the literature. Such anomalies cast doubts to the “efficient market hypothesis”. Fountas and Segredakis (2002) test the January anomaly in eighteen emerging stock markets. They find little evidence in favor of January effect for countries in their sample. Asteriou and Kavetsos (2006) investigate seasonal effects of eight transition economies in Europe. Their results show evidence of seasonal and January effects in most of these stock markets. Previous research has well documented many seasonal effects which exist in the stock market returns in the US and other international countries. Day of the week effect, holiday effect, January effect, and turn of the year effect are examples of such calendar effect anomalies.

Our study extends the documentation of seasonality in stock market returns by examining seasonality according to the Islamic calendar. Ramadan effect is a form of a moving calendar effect which was documented in the literature in both Pakistan and Saudi Arabia. (Husain, 1998; Seyyed, Abraham, and Al-Hajji, 2005). This paper extends their research to test much more Islamic countries with a different data source and more recent time frame. This will constitute a more comprehensive test of the Islamic calendar effects of stock returns in general and the Ramadan effect in particular.

The social life of Muslims changes significantly during the month of Ramadan. Muslims perform more rituals and become more spiritual during this month. Muslims fast during the

month of Ramadan. They do their best to act well and refrain from all types of sins. Reduced working hours in Ramadan cause the economic activity in general to somewhat slow down during this month. The trading hours in the exchange in most of the Islamic countries are reduced during the Holy month of Ramadan. Some investors tend to believe that returns during the month of Ramadan are relatively lower than other Hijri months. However, we need to know if empirical evidence supports their views or not?

In this paper, we search for a seasonal pattern in the stock returns for the month of Ramadan in the Hijri (Islamic) lunar calendar. This study seeks to test whether Ramadan effect exists in stock indices of twelve Islamic countries. The results of such a study are important for both investors and academicians. An investor can construct a trading strategy which uses observed seasonalities in stock returns to earn excess returns. Such calendar anomalies contradict the “efficient market hypothesis” which is still debatable between financial economists.

LITERATURE REVIEW

Wong *et al.* (1990) document findings of a surprisingly negative Aidilfitri effect and Chinese New Year effect on the Malaysian stock market. Aidilfitri is an Islamic festival on the day after the month of Ramadan which is the ninth month in the Islamic lunar calendar. Chan, Khanthavit, and Thomas (1996) find an Islamic New Year effect on the Kuala Lumpur Stock Exchange (KLSE) in Malaysia. Their overall results confirm the importance of cultural influences in the stock returns. They test for a month of the Islamic year effect in Malaysia and report that none of the Islamic months except of Rabi 1 is significantly different from zero for KLSE. Their sample period covered the years from 1974 to 1992.

Husain (1998) studies the Pakistani stock market returns and finds a significant decline in stock returns volatility in the Islamic calendar month of Ramadan. However, the mean return of this month is negative, but not statistically significant in Pakistan. His sample period covered the years from 1989 to 1993. Islamic calendar effects in Pakistan were studied recently by Mustafa (2008). He investigates seasonality in Karachi stock exchange and finds Ziqad and Shawwal effects. He shows a positive but statistically insignificant mean returns during the month of Ramadan. Also, he documents an after Ramdhan effect for the sample from 1998 to 2004. The Ramadan effect was tested also in the Saudi Stock Exchange by Seyyed, Abraham, and Al-Hajji (2005). They find a decline in volatility during Ramadan, but average returns during Ramadan are not statistically significantly different from other months.

Our study extends the evidence on Islamic calendar seasonal effects in stock returns. We provide evidence from twelve Islamic countries. This will give us a better answer for the existence of such Islamic calendar anomalies.

DATA

Stock market indices daily data is extracted from Datastream for the period from 1996 to 2007. The countries included in this sample are: Bahrain, Egypt, Indonesia, Jordan, Kuwait, Malaysia, Morocco, Oman, Pakistan, Saudi Arabia, Turkey and United Arab Emirates. Table 1A in the appendix shows the names of indices and the time period covered for each country based on data availability.

The Islamic calendar is a lunar calendar of twelve months of 29 to 30 days. The months move through the solar season at a rate of 10 days per solar year. Table 2A of the appendix shows the names of each Islamic month in the Hijri calendar. Ramadan is the ninth month of the Islamic calendar. An algorithm is used to convert Gregorian dates to Islamic Hijri dates. This might lead to an error of 1 day because of differences in moon sighting in different Islamic countries. Monthly returns were calculated for each of the Hijri months after conversion using:

$$R_{i,t} = \ln(P_{i,t} / P_{i,t-1}) \quad (1)$$

Where $R_{i,t}$ is the return in time t on index i . $P_{i,t}$ is the closing price at time t for index i .

METHODOLOGY

We follow the same methodology of Fountas and Segredakis (2002) which was also used by Asteriou and Kavetsos (2006).

We run the regression for the following equation to test for Islamic seasonal effects:

$$R_t = a_1 D_{1t} + a_2 D_{2t} + \dots + a_{12} D_{12t} + \varepsilon_t$$

$$R_t = \sum_{i=1}^{12} a_i D_{it} + \varepsilon_t \quad (2)$$

Where R_t is the stock index return at time t . D_{it} is the seasonal dummy variable which equals 1 if the return at time t corresponds to Hijri month i , and 0 otherwise. a_i is the average monthly return on month i . We use two regression equations to test for the Ramadan effect. We first run the following regression:

$$R_t = c + a_1 D_{1t} + a_2 D_{2t} + a_3 D_{3t} + a_4 D_{4t} + a_5 D_{5t} + a_6 D_{6t}$$

$$+ a_7 D_{7t} + a_8 D_{8t} + a_{10} D_{10t} + a_{11} D_{11t} + a_{12} D_{12t} + \varepsilon_t \quad (3)$$

Where the intercept c represents the average return for Ramadan and the coefficients a_i indicates the difference in returns between the return of Ramadan and month i . A positive value of the dummy coefficients in equation (3) would be a proof of a Ramadan effect (lower returns on the month of Ramadan relative to other months of the Islamic year).

The following regression is estimated to examine the presence of the Ramadan effect:

$$R_t = c + \beta D_{9t} + \varepsilon_t \quad (4)$$

Where D_{9t} equals 1 for Ramadan and equals 0 otherwise.

The intercept in equation (4) measures the average return for non-Ramadan months. β coefficient measures the difference between Ramadan average returns and the average returns of the other months. If the β coefficient is negative and statistically significant, then the evidence is in favor of the Ramadan effect, where returns in Ramadan are lower than returns of the other Hijri months.

RESULTS

This study uses OLS as the estimation method. Table 1 reports the results of tests from Equation 2 for Islamic calendar seasonal effects in our sample. The t-statistics are created

using Newey-West heteroskedasticity and autocorrelation adjusted standard errors. Results in Table 1 show evidence of statistically significant Islamic calendar seasonal effects in all twelve countries of our sample. Jordan, Kuwait, Pakistan, and Turkey have positive statistically significant effects occurring in the month of Ramadan as shown in Table 1. What is surprising in our results is that all of the twelve countries have a positive coefficient for Ramadan. Table 2 shows results of the estimated regression in equation 3 to test the existence of the Ramadan effect. Based on results shown in Table 2, average Ramadan returns exceeds average returns in the other months of the Islamic calendar in Jordan, Kuwait, Pakistan, and Turkey. This contradicts previous results of researchers who found lower returns in the month of Ramadan compared to other months (Hussain (1998), and Seyyed, Abraham, and Al-Hajji (2005)). However, our results of positive returns in Ramadan are consistent with Mustafa (2008) who covered Karachi Stock Exchange from March 1998 to September 2004.

Table 1
Tests for Islamic Calendar Seasonal Effects

Variables	Saudi Arabia		Bahrain		Oman		Kuwait	
	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat
D1	0.038	3.082***	0.009	0.352	0.022	0.834	0.016	1.001
D2	0.033	1.145	-0.016	-0.777	0.015	1.200	0.014	0.604
D3	0.000	-0.017	0.024	2.853***	0.014	0.602	0.017	1.039
D4	0.003	0.081	-0.004	-0.356	0.050	1.821*	0.009	0.684
D5	0.040	1.467	0.008	0.562	0.022	2.148**	0.010	1.268
D6	-0.017	-0.610	-0.005	-0.430	-0.007	-0.687	0.002	0.152
D7	0.023	2.041**	0.034	1.090	-0.003	-0.207	-0.005	-0.357
D8	-0.009	-0.478	0.037	4.051***	0.009	0.547	0.009	0.568
D9	0.021	1.019	0.026	1.468	0.005	0.236	0.027	2.134**
D10	-0.006	-0.200	0.005	0.497	-0.006	-0.296*	0.012	0.944
D11	-0.005	-0.356	0.009	0.848	0.030	1.854	-0.008	-0.584
D12	0.020	0.953	0.010	0.673	0.032	1.617	0.010	0.651
R ²	0.067		0.144		0.125		0.040	
Variables	Turkey		Jordan		Egypt		Morocco	
	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat
D1	0.081	2.863***	0.004	0.228	-0.012	-0.376	0.001	0.049
D2	0.020	0.568	-0.001	-0.094	-0.011	-0.508	0.003	0.206
D3	-0.055	-1.945	0.029	1.597	-0.004	-0.174	0.012	1.033
D4	-0.047	-1.575	0.032	2.924***	-0.033	-1.207	-0.003	-0.136
D5	0.022	0.360	-0.003	-0.124	0.015	0.706	0.011	1.152
D6	-0.024	-0.688	-0.011	-0.798	0.016	1.020	0.011	1.115
D7	0.094	3.879***	0.024	2.266**	0.042	1.449	0.002	0.173
D8	0.110	2.516**	0.019	1.118	0.051	2.126**	-0.010	-0.755
D9	0.098	1.977*	0.033	2.100**	0.037	1.568	0.010	0.744
D10	0.044	1.107	0.025	1.429	0.007	0.704	0.019	1.262
D11	0.011	0.268	-0.012	-0.714	0.038	1.301	0.037	1.720*
D12	0.028	1.043	0.000	0.020	0.024	0.737	0.034	2.264**
R ²	0.163		0.096		0.089		0.077	

contd. table

Variables	Pakistan		Indonesia		Malaysia		Emirates	
	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat
D1	0.013	0.294	0.008	0.217	0.000	0.002	0.061	0.585
D2	-0.069	-1.716*	0.032	1.063	-0.029	-1.380	0.082	0.955
D3	-0.003	-0.162	0.033	1.053	-0.011	-0.483	0.035	0.388
D4	-0.021	-1.001	-0.084	-1.942*	-0.062	-1.632	0.016	0.210
D5	0.011	0.512	-0.042	-0.743	0.033	1.728*	0.047	0.605
D6	0.015	0.392	0.027	0.673	-0.021	-0.835	-0.015	-6.00***
D7	0.000	-0.012	-0.001	-0.036	-0.011	-0.425	0.114	3.071***
D8	0.010	0.428	0.028	1.715*	0.022	0.997	0.044	2.871***
D9	0.050	1.979*	0.030	1.222	0.010	0.662	0.048	1.579
D10	0.028	1.165	0.021	1.156	0.054	1.860*	0.003	0.022
D11	0.052	1.474	0.020	0.636	-0.003	-0.147	0.035	0.483
D12	0.020	1.312	0.016	0.533	0.006	0.275	-0.025	-2.012*
R ²	0.097		0.087		0.116		0.126	

The t-statistics are created according to the Newey–West adjusted standard errors

*, **, *** denote significance at 10%, 5%, and 1% respectively

Table 2
Tests for the Ramadan Effect

Variables	Saudi Arabia		Bahrain		Oman		Kuwait	
	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat
C	0.021	1.019	0.026	1.468	0.005	0.236	0.027	2.134**
D1	0.017	0.703	-0.016	-0.528	0.017	0.475	-0.010	-0.482
D2	0.012	0.323	-0.042	-1.538	0.010	0.368	-0.012	-0.458
D3	-0.022	-0.606	-0.001	-0.059	0.009	0.269	-0.010	-0.495
D4	-0.018	-0.391	-0.030	-1.415	0.044	1.235	-0.018	-1.026
D5	0.019	0.530	-0.017	-0.773	0.017	0.650	-0.017	-1.143
D6	-0.038	-1.188	-0.031	-1.483	-0.013	-0.491	-0.025	-1.362
D7	0.002	0.079	0.008	0.203	-0.009	-0.349	-0.031	-1.848*
D8	-0.030	-1.096	0.012	0.539	0.003	0.132	-0.018	-1.289
D10	-0.028	-0.769	-0.021	-1.090	-0.012	-0.310	-0.015	-0.811
D11	-0.026	-1.345	-0.017	-0.797	0.025	1.056	-0.034	-2.108**
D12	-0.002	-0.072	-0.015	-0.616	0.027	0.866	-0.016	-0.847
R ²	0.067		0.144		0.125		0.040	

Variables	Turkey		Jordan		Egypt		Morocco	
	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat
C	0.098	1.977*	0.033	2.100**	0.037	1.568	0.010	0.744
D1	-0.017	-0.297	-0.029	-1.303	-0.049	-1.266	-0.009	-0.496
D2	-0.077	-1.272	-0.034	-1.575	-0.048	-1.499	-0.007	-0.406
D3	-0.152	-2.68***	-0.003	-0.136	-0.041	-1.214	0.002	0.129
D4	-0.144	-2.506**	-0.001	-0.046	-0.070	-1.940*	-0.013	-0.490
D5	-0.075	-0.981	-0.035	-1.427	-0.022	-0.725	0.001	0.054
D6	-0.121	-1.954*	-0.044	-2.372**	-0.021	-0.748	0.001	0.080
D7	-0.003	-0.059	-0.009	-0.529	0.005	0.167	-0.008	-0.455
D8	0.013	0.318	-0.014	-0.556	0.014	0.506	-0.020	-1.383
D10	-0.053	-0.714	-0.007	-0.456	-0.030	-1.378	0.009	0.440
D11	-0.087	-1.419	-0.045	-1.909*	0.001	0.021	0.026	1.061
D12	-0.070	-1.181	-0.032	-1.556	-0.014	-0.354	0.024	1.249
R ²	0.163		0.096		0.089		0.077	

contd. table

Variables	Pakistan		Indonesia		Malaysia		Emirates	
	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat
C	0.050	1.979*	0.030	1.222	0.010	0.662	0.048	1.579
D1	-0.037	-0.712	-0.021	-0.443	-0.010	-0.295	0.013	0.117
D2	-0.119	-2.510**	0.003	0.068	-0.039	-1.505	0.034	0.371
D3	-0.054	-1.643	0.003	0.076	-0.021	-0.771	-0.013	-0.142
D4	-0.071	-2.162**	-0.114	-2.292**	-0.072	-1.761*	-0.032	-0.388
D5	-0.039	-1.111	-0.071	-1.209	0.023	1.004	-0.001	-0.014
D6	-0.035	-0.843	-0.002	-0.044	-0.031	-1.131	-0.063	-2.038*
D7	-0.051	-1.235	-0.031	-0.623	-0.021	-0.724	0.066	1.919*
D8	-0.040	-1.098	-0.002	-0.045	0.012	0.535	-0.004	-0.110
D10	-0.022	-0.623	-0.009	-0.246	0.044	1.417	-0.046	-0.356
D11	0.001	0.029	-0.010	-0.249	-0.013	-0.479	-0.013	-0.152
D12	-0.030	-0.997	-0.013	-0.330	-0.004	-0.140	-0.073	-2.285**
R ²	0.097		0.087		0.116		0.126	

The t-statistics are created according to the Newey–West adjusted standard errors

*, **, *** denote significance at 10%, 5%, and 1% respectively

Table 3 shows the results of equation 4. It indicates that the average return in Ramadan exceeds the average return over the rest of the months of the year in Pakistan and Turkey. We expected Saudi Arabia to be the most country affected by the Islamic calendar effects because it is the only country which still uses the Hijri calendar officially. From table 1, we see that the first month of the Islamic year (Muharram) has a positive and statistically significant return in Saudi Arabia. However, the overall results in other Hijri months were not as strong as we expected.

Table 3
Tests for the Ramadan Effect

Variables	Saudi Arabia		Bahrain		Oman		Kuwait	
	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat
C	0.011	1.162	0.010	1.866*	0.016	2.451**	0.008	1.482
D9	0.011	0.512	0.015	0.842	-0.011	-0.483	0.019	1.547
R ²	0.002		0.011		0.004		0.013	
Variables	Turkey		Jordan		Egypt		Morocco	
	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat
C	0.026	2.164**	0.010	1.414	0.012	1.273	0.011	2.368**
D9	0.072	1.721*	0.023	1.511	0.025	1.086	0.000	-0.036
R ²	0.022		0.015		0.007		0.000	
Variables	Pakistan		Indonesia		Malaysia		Emirates	
	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat
C	0.005	0.536	0.005	0.516	-0.002	-0.220	0.036	1.899*
D9	0.045	1.660*	0.024	0.885	0.012	0.783	0.012	0.184
R ²	0.016		0.003		0.002		0.001	

The t-statistics are created according to the Newey–West adjusted standard errors

*, **, *** denote significance at 10%, 5%, and 1% respectively

CONCLUSION

This study has tested for seasonality of monthly stock returns according to the Islamic calendar. It also investigated the existence of the Ramadan effect in twelve stock markets of Islamic countries. Our results show evidence of seasonality in stock returns based on the Islamic calendar. Results obtained indicate significant presence of the Ramadan effect (higher returns in Ramadan) in Jordan, Kuwait, Pakistan, and Turkey. However, Ramadan returns were positive and significant and not negative as predicted by some investors. These results are inconsistent with Husain (1998) and Seyyed, Abraham, and Al-Hajji (2005). Our empirical results support the existence of positive returns during the month of Ramadan relative to other months of the Islamic calendar. The differences in results between this study and some previous studies might be due to using different time periods and different market indices. Our results provide some evidence against the weak-form of market efficiency.

Appendix

Table 1A
Country Indices and Time Period Covered

<i>Country</i>	<i>Index</i>	<i>Start Date</i>	<i>End Date</i>
Pakistan	S&P/IFCG PAKISTAN	5/17/1996	1/18/2007
Indonesia	S&P/IFCG INDONESIA	5/17/1996	1/18/2007
Malaysia	S&P/IFCG MALAYSIA	5/17/1996	1/18/2007
Saudi Arabia	S&P/IFCG SAUDI ARABIA	4/24/1998	1/18/2007
Bahrain	S&P/IFCG BAHRAIN	3/23/2001	1/18/2007
Oman	S&P/IFCG OMAN	3/23/2001	1/18/2007
Jordan	S&P/IFCG JORDAN	5/17/1996	1/18/2007
Turkey	S&P/IFCG TURKEY	5/17/1996	1/18/2007
Egypt	S&P/IFCG EGYPT	5/17/1996	1/18/2007
Morocco	S&P/IFCG MOROCCO	5/17/1996	1/18/2007
Kuwait	DOW JONES KUWAIT TITANS 50	5/7/1997	1/18/2007
United Arab Emirates	DUBAI FINANCIAL MARKET	2/20/2004	1/18/2007

Table 2A
The Islamic Calendar Lunar (Hijri) Year

<i>Months of the Islamic year</i>	<i>Name</i>
1	Muharram
2	Safar
3	Rabi I
4	Rabi II
5	Jumada I
6	Jumada II
7	Rajab
8	Shaban
9	Ramadan
10	Shawwal
11	Thu Al-Quda
12	Thu Al-Hijja

Table 3A
Date Conversion for Beginning and Ending Dates in Our Data Sample

<i>Gregorian Date</i>	<i>Equivalent Islamic Hijri Date</i>
5/17/1996	29/12/1416
5/7/1997	30/12/1417
4/24/1998	27/12/1418
3/23/2001	28/12/1421
2/20/2004	29/12/1424
1/18/2007	29/12/1427

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