

THE ISLAMIC CALENDAR EFFECT ON KARACHI STOCK MARKET*

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Abstract

This paper attempts to investigate the effect of Islamic months on Karachi Stock Market using the daily data for the period of December 1991 to December 2010 with the application of OLS technique. The conditional and unconditional risk analyses are used to investigate the Islamic calendar effect on the Karachi Stock Market. In addition, risk is allowed to vary across the month of Islamic calendar. Five models are used starting from simple model of Islamic calendar effect to conditional risk model. Different models produce different result. A Ramadan effect is found common in all models. It indicates that there is Ramadan effect in Karachi Stock market. However, it is also noted that Karachi stock market is relatively high risky market during the month of Ramadan.

Key Words: Conditional and Unconditional risk, Islamic Calendar, Ramadan Effect

JEL Classification: C 32, G 12

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1. Introduction:

Calendar anomalies are one of the feature of financial market, which is against the efficient market hypothesis. Many researchers investigate the calendar anomalies, which are based on Gregorian calendar. However, different countries and societies also follow their own calendar, which are based on religion in addition to Gregorian calendar. For example, Jewish society follow Hebrew calendar, which is strictly based on luni-solar, the Christen society follows Gregorian calendar, which based on solar, Hindu and Chinese follow their own calendar. Muslim society follows the Islamic calendar, which is based on a lunar calendar, referred as Hijri calendar¹.

In these religious calendars, there are religious days and months, which these societies celebrate and observe e.g. Christen society, celebrated Christmas days, Deepavali by Hindu society, and Vesk day by Buddhist. Like these religious days Muslim society also observe and celebrate the religious months like Ramadan and Ashura and days like Eid-ul-Fitr and Eid-ul-Azha.

Ramadan is considered as the Holy month in which most of the time is spent on Salt-ul-Nafil, Recitation of Quran, and participation in social services. Moreover, in the last decade of Ramadan people sit in AAITAKAF, to search LAILA-TUL-QADAR. All days and nights are spent with religious activity as a proof of their affiliation to Allah i.e. fear of Allah. Some people also visit Saudi Arabia to perform UMMARAH. Maximum efforts are undertaken to avoid sin and wrongdoing such as speculation and illegal practice. To honour people's devotion to Allah, Muslim State gives relaxation in working hours.

Muslim society celebrates Eid-ul-Fitr after the end of Ramadan. People purchase new clothes, and decorate their houses. It is observed that food prices, prices of the cloths and prices of other commodities are increased during this month. The behavior

¹ This calendar contains twelve months that start with the appearance of new moon. The average days in a lunar month contain only 29.53 days that is why Islamic year is approximately eleven days shorter than the Gregorian year.

of the people during this month ultimately has impact on the financial market trading activity. It decreases the volatility of stock market in volume and stock returns in Pakistan (Husain, 1998). This phenomenon is not observed in Pakistan's financial market only it is also observed in Saudi Arabia stock market, Seyyed, Abraham and AlHajji(2005).

After celebration of Eid-ul-Fitar, the prices come down to normal. In the month of Zil-Hajj (Dhil-Hijja), people slaughter cattle like cow, camels' and goat etc, to follow the Sunnat-e-Ibrahim. Some people go to Saudi Arabia to perform Hajj. It increases the consumption of people, which reduces the purchasing power hence saving depleted. Ashura come after Eid-ul-Azha, which is observed as a mourning month. It implies that the expenditures of Pakistanis society are very high from Sha'ban to Muharram.

Due to such a peculiar change in these months as compared to other months, it is interesting to examine the behavior of trading activity under these situations. The purpose of this study is to investigate the impact of Islamic month on stock returns with and without risk factor. The rest of the paper is organized as such that the second section describes the review of literature, econometric methodology and related issues are described in section three. The empirical findings and interpretation are presented in section four. Section five contains the concluding remarks

2. Review of literature:

Though a lot of attention has been already given on calendar anomalies but a little attention is given on the religious calendar effect on stock markets. For example, religious holidays effect on S&P500 index and NYSE trading volumes Frieder and Subrahmanyam (2004). These holidays focused on the Jewish High Holy Days of Rosh Hashanah and Yom Kippur and the Christian holy day of St. Patrick's. They showed that returns are negative after Yom Kippur (Solemn) however, positive after Rosh Hashanah (Joyful) and St. Patrick's. They also reported that volume declined on Rosh Hashanah and Yom Kippur.

There has been given little attention to the Islamic calendar effect. However, some studies are available on the impact of Ramadan on stock returns. Alper and Aruoba (2001) analyze various macroeconomic variables in Turkey, and show **that the** usual seasonal adjustment procedures based on fixed holidays often fail to remove all seasonality when the series are subject to moving holidays like Ramadan. However, they do not find any significant Ramadan effect in Istanbul stock market. Moreover, Husain (1998) analyzed the Ramadan effect in Pakistani stock market and demonstrated that volatility is significantly lower during the weeks of Ramadan. He does not find any significant changes in average returns during Ramadan. However, he does not compare the mean average return before and after Ramadan. Seyyed, Abraham, and Al-Hajji (2005) investigated the Ramadan effect in Saudi Arabian stock market. They analyzed several sector indices in the market and showed that volatility and trading activity disappeared significantly during Ramadan. Their findings are identical to Husain's (1998) findings i.e. no significant change is found in average returns during Ramadan did not look at the stock returns before and after Ramadan.

3. Econometric Methodology and Data

The methodology of Ariel (1987), Lakonishok and Smidt (1988), Jaffe and Westerfield (1989) are used to investigate the Islamic calendar effects. However, some amendment has been proposed in this methodology. In this model the excess stock returns (R_i) are regressed on Muharram, Sha'ban, Ramadan, Shawwal, Dhil-Q'ada, Dhil-Hijja.

$$R_i = \delta_1 D_{1i} + \delta_2 D_{2i} + \delta_3 D_{3i} + \delta_4 D_{4i} + \delta_5 D_{5i} + \delta_6 D_{6i} + \varepsilon_{1i} \quad (1)$$

Where D_{1i} to D_{6i} represent the dummy variables for Islamic month i.e. Muharram, Sha'ban Ramadan, Shawwal, Dhil-Q'ada, Dhil-Hijja². The error term is assumed to be independent and identically distributed with a zero mean and constant variance.

² Other Islamic months are ignored due to less importance from trading point of view.

Equation (1) is the simplest test for Islamic calendar effects on stock market. Statistically insignificant estimated coefficients in equation (1) provide no evidence of Islamic month effects. There is no risk factor in this model. If risk factors³ are incorporated in this model, daily returns could be higher or lower before and after selected Islamic month because risk is higher or lower. Equation (2) explains turn of the Islamic month dummy variables and a market risk factor (RF), calculated by the excess returns on all share price index basis.

$$R_i = \delta_1 D_{1i} + \delta_2 D_{2i} + \delta_3 D_{3i} + \delta_4 D_{4i} + \delta_5 D_{5i} + \delta_6 D_{6i} + \beta_i RF_i + \varepsilon_{2i} \quad (2)$$

The risk factor is constant across the Islamic months in equation (2). This may be improved upon by adding slope interaction dummy variables that allow risk to vary across the selected Islamic months. After incorporating dummy variable in risk factor the equation (2) become.

$$R_i = \delta_1 D_{1i} + \delta_2 D_{2i} + \delta_3 D_{3i} + \delta_4 D_{4i} + \delta_5 D_{5i} + \delta_6 D_{6i} + \sum_{i=1}^6 \beta_i D_i RF_i + \varepsilon_{3i} \quad (3)$$

Equations (1) to (3) are unconditional risk models where market risk is assumed to have a symmetric impact on emerging stock market returns. Another approach to examine for turn of the Islamic month effects is to use a conditional risk factor in equation (3). There may be an asymmetric relationship between stock returns and market risk where positive market returns have a different impact on stock returns than do negative market returns (Fletcher (2000), Pettengill, Sundaram and Mathur (1995). Equation (4) shows the conditional risk factor that relates to stock returns to market risk.

$$R_i = \delta_1 D_{1i} + \delta_2 D_{2i} + \delta_3 D_{3i} + \delta_4 D_{4i} + \delta_5 D_{5i} + \delta_6 D_{6i} + \beta_{p_i} RF_i + \beta_{n_i} RF_i + \varepsilon_{4i} \quad (4)$$

where β_{p_i} is a positive risk factor and β_{n_i} is negative risk factor.

To incorporate the variability in return, the risk factor is incorporated. The reason is that the rate is high or low on different days which increase or decrease risk. The increasing or decreasing the return show the higher or lower risk which is termed as conditional risk

$$R_i = \delta_1 D_{1t} + \delta_2 D_{2t} + \delta_3 D_{3t} + \delta_4 D_{4t} + \delta_5 D_{5t} + \delta_6 D_{6t} + \sum_{i=1}^6 \beta_{pi} D_{pi} RF_i + \sum_{i=1}^6 \beta_{ni} D_{ni} RF_i + \varepsilon_{5t} \quad (5)$$

where D_{pi} is a dummy variable takes on a value of 1 for positive risk factor and 0 otherwise and D_{ni} is a dummy variable takes on a value of 1 for negative risk factor and 0 otherwise. Equation (5) is a conditional model relating excess stock returns to market returns that also includes slope interaction terms before and after selected Islamic month's variables. This model allows conditional risk to vary across the Islamic months.

The data used in this study is daily covered from December 1991 to December 2010. The data for stock prices are taken from several issues of Daily Business Recorder. The return is calculated by the difference of two successive log stock prices. Ordinary least square technique is used for estimation purpose.

4. Empirical Findings

The result of simple Islamic calendar effects is exhibited in table 1. The result indicates that the average return in the month of Ramadan is smaller and significant, which indicates that there is Ramadan effect in Karachi stock market. However, the positive and insignificant average return is found in all selected Islamic months. It implies that there is no after Ramadan effect in Karachi stock market. The reason is that during Eid the consumption of people increases and they pay less attention to investment in stock market. After Ramadan and Eid, people concentrate to investment in stock market, as a result trading activity increases in the month of Shawwal, Dhil-Q'ada in Karachi stock market. Moreover, higher kurtosis and higher positive skewness are found in the month of Shawwal. That indicates that investors prefer to invest in this month.

Table 1
Islamic Calendar Effect

Table shows the result of regressions of Islamic calendars on stock returns with multiplicative dummies for each month without risk factor

$$R_t = \delta_1 D_{1i} + \delta_2 D_{2i} + \delta_3 D_{3i} + \delta_4 D_{4i} + \delta_5 D_{5i} + \delta_6 D_{6i} + \varepsilon_{li}$$

Where R_t is the return and D_1 to D_6 are dummy variables from Sha'ban, Ramadan, Shawwal, Dhil-Q'ada, Dhil-Hijja, Muharram.

Days	Coefficient	Standard Error	t-value	p-value	Skewness	Kurtosis
Sha'ban	-0.0003	0.0008	-0.3689	-0.3689	-1.181	53.8412
Ramadan	0.0028	0.0009	3.3847	3.3847	0.897	48.1211
Shawwal	0.0007	0.0009	0.3653	0.3653	4.6859	273.7111
Dhil-Q'ada	0.0011	0.0008	1.2744	1.2744	1.1109	73.744
Dhil-Hijja	0.0005	0.0009	0.4069	0.4069	-1.3683	65.8244
Muharram	-0.0003	0.0008	-0.1332	-0.1332	-2.502	59.1797

F-values= 2.0837(p=0. 0.0644) $R^2 = 0.0023$

- a Significant at 1%
- b Significant at 5%
- c Significant at 10 %

With risk factor the coefficients of the average mean return in the month of Ramadan is significant and increases. Table 2 shows the same. Some additional Islamic effects are picked up i.e. the month of Dhil-Q'ada. Moreover, the coefficient of risk factor is negative, significant and more than unity; it indicates that Karachi stock market is relatively high risky market during selected Islamic month. However the average mean return in the month of Ramadan, and Dhil-Q'ada is also positive and significant

TABLE 2
Islamic Calendar Effect and Market Risk Factor

Table shows the result of regressions of Islamic calendars on stock returns with multiplicative dummies for each month with risk factor

$$R_i = \delta_1 D_{1i} + \delta_2 D_{2i} + \delta_3 D_{3i} + \delta_4 D_{4i} + \delta_5 D_{5i} + \delta_6 D_{6i} + \beta_i RF_i + \varepsilon_{2i}$$

Where R_i is the return, D_1 to D_6 are dummy variables from Sha'ban,

Ramadan, Shawwal, Dhil-Q'ada, Dhil-Hijja, Muharram and $R_i F_i$

is the risk factor.

Days	Coefficient	Standard Error	t-value	p-value
Sha'ban	0.0002	0.0008	0.2895	0.7722
Ramadan	0.0034	0.0009	3.8762	0.0001
Shawwal	0.0009	0.0009	0.9654	0.3344
Dhil-Q'ada	0.0016	0.0009	1.8362	0.0664
Dhil-Hijja	0.0009	0.0009	0.943	0.3457
Muharram	0.0004	0.0009	0.4571	0.6476
Risk Factor	-3.2672	1.1186	-2.9209	0.0035

F-values=3.1612 (p=0.0042) $R^2 = 0.0041$

- a Significant at 1%
- b Significant at 5%
- c Significant at 10 %

After adding dummy variable in risk factor with Islamic months only Ramadan and Muharram effect are found. Table 3 shows the same. With and without risk factors the significant excess return is found in the month of Ramadan and Muharram only. Equations (4) and (5) are conditional risk factor models that point out the asymmetric market effects. Equation (4) is the extension of equation (3) in which positive and negative returns are added. The estimated result is given in table 4 which indicates the Ramadan and Muharram effect are present in Karachi stock market. However, the positive stock returns are statistically significant.

Table 3
Islamic Calendar Effect and Market Risk Factor with
Calendar Dummies

Table shows the result of regressions of Islamic calendars on stock returns with dummies for each month with risk factor Where

$$R_i = \delta_1 D_{1i} + \delta_2 D_{2i} + \delta_3 D_{3i} + \delta_4 D_{4i} + \delta_5 D_{5i} + \delta_6 D_{6i} + \sum_{i=1}^5 \beta_i D_i RF + \varepsilon_{3i}$$

R_i is the return, D_1 to D_6 are dummy variables from Sha'ban, Ramadan, Shawwal, Dhil-Q'ada, Dhil-Hijja, Muharram and $R_i F_i$ is the risk factor.

Days	Coefficient	Standard Error	t-value	p-value
Sha'ban	-0.01	0.0058	-1.7176	0.0859
Ramadan	0.02	0.0069	2.8999	0.0038
Shawwal	0.0007	0.0059	0.114	0.9093
Dhil-Q'ada	0.0046	0.0061	0.7514	0.4525
Dhil-Hijja	-0.0078	0.0071	-1.1048	0.2693
Muharram	-0.0128	0.0068	-1.886	0.0594
Market Risk Factor with Month				
Sha'ban	-0.001	0.0006	-1.6823	0.0926
Ramadan	0.0018	0.0007	2.4909	0.0128
Shawwal	0	0.0006	0.0588	0.9531
Dhil-Q'ada	0.0004	0.0006	0.5794	0.5623
Dhil-Hijja	-0.0009	0.0008	-1.1683	0.2427
Muharram	-0.0014	0.0007	-1.8845	0.0596

F-values=2.2484 (p=0.010) $R^2 = 0.0539$

- a Significant at 1%
 b Significant at 5%
 c Significant at 10 %

The estimated results from equation (5) depicted in table 5 which shows that some of the Islamic month have effects in Karachi stock market. Comparing across Tables 1 to 5, Ramadan effect is found prominent in Karachi stock market, which indicates that there is Ramadan effect in Karachi stock market.

Table 4

Islamic Calendar Effect and Conditional Market Risk Factor

Table shows the result of regressions of Islamic calendars on stock returns with dummies for each month with risk fac

$$R_t = \delta_1 D_{1t} + \delta_2 D_{2t} + \delta_3 D_{3t} + \delta_4 D_{4t} + \delta_5 D_{5t} + \delta_6 D_{6t} + \beta_p RF_t + \beta_n RF_t + \varepsilon_{4t}$$

where R_t is the return, D_1 to D_{12} are dummy variables from Sha'ban, Ramadan, Shawwal, Dhil-Q'ada, Dhil-Hijja, Muharram and $R_p Fi$ and $R_n Fi$ is the positive and negative risk factor

Days	Coefficient	Standard Error	t-value	p-value
Sha'ban	-0.0001	0.0009	-0.1333	0.8939
Ramadan	0.0018	0.0010	1.7880	0.0740
Shawwal	0.0031	0.0010	1.0508	0.1023
Dhil-Q'ada	0.0031	0.0010	1.2067	0.1114
Dhil-Hijja	0.0001	0.0009	0.0539	0.9570
Muharram	-0.0002	0.0009	-1.8211	0.0832
Risk Factor (+)	-0.8043	0.0189	-42.3754	0.0000
Risk Factor (-)	-0.0001	0.0009	-0.1333	0.8939

F-values=76.45 (p=0.00) $R^2=0.717$

- a Significant at 1%
- b Significant at 5%
- c Significant at 10 %

Islamic calendar Effect and Conditional Market Risk Factor with Calendar Dummies

Table 5

Table shows of regressions of Islamic calendars on stock returns with dummies for each month with risk factor

$$R_t = \delta_1 D_{1t} + \delta_2 D_{2t} + \delta_3 D_{3t} + \delta_4 D_{4t} + \delta_5 D_{5t} + \delta_6 D_{6t} + \sum_{i=1}^6 \beta_{p_i} RF_i + \sum_{i=1}^6 \beta_{n_i} RF_i + \varepsilon_{5t}$$

where R_t is the return, D_1 to D_{12} are dummy variables from Sha'ban, Ramadan, Shawwal, Dhil-Q'ada, Dhil-Hijja, Muharram and $R_p Fi$ and $R_n Fi$ is the positive and negative risk factor.

Days	Coefficient	Standard Error	t-value	p-value
Sha'ban	0.0023	0.0022	1.0281	0.3040
Ramadan	0.0018	0.0023	0.7604	0.4471
Shawwal	0.0001	0.0019	0.0242	0.9807
Dhil-Q'ada	0.0026	0.0021	1.2295	0.2191
Dhil-Hijja	0.0006	0.0023	0.2548	0.7989
Muharram	-0.0001	0.0021	-0.0533	0.9575
Positive Risk Factor with Islamic Month				
Sha'ban	0.7974 ^a	0.1484	5.3734	0.000
Ramadan	1.0354 ^a	0.2041	5.0722	0.000
Shawwal	0.3065 ^a	0.1056	2.9024	0.003
Dhil-Q'ada	1.0999 ^a	0.1472	7.4687	0.000
Dhil-Hijja	1.0084 ^a	0.1878	5.3680	0.000
Muharram	1.0941 ^a	0.2077	5.2656	0.000
Negative Risk Factor with Islamic Month				
Sha'ban	-1.0432 ^a	0.1387	-7.5207	0.0000
Ramadan	-0.9614 ^a	0.1997	-4.8130	0.0000
Shawwal	0.1235	0.0872	1.4163	0.1569
Dhil-Q'ada	-0.9203 ^a	0.1214	-7.5805	0.0000
Dhil-Hijja	-0.9876 ^a	0.1939	-5.0933	0.0000
Muharram	-0.9542 ^a	0.1274	-7.4891	0.0000

F-values=37.013 (p=0.00) $R^2 = 0.285$

- a Significant at 1%
 b Significant at 5%
 c Significant at 10 %

5 Conclusion

Using daily data of KSE-100 index from December 1991 to December 2010 this study investigates the Islamic Calendar effects on Karachi Stock Market. Both conditional and unconditional risk models are used to investigate the Islamic calendar effect in Karachi stock market. Moreover, risk is allowed to vary across the months of Islamic calendar. Five models are used starting from simple model of Islamic calendar effect to conditional risk model. Different models produce different results. Ramadan effects are found common in all models where as Muharram effect is found in all models except one. It shows that there is Ramadan effect in Karachi Stock market. However, it is noted that Karachi stock market is relatively a high risky market during the month of Ramadan which is against the findings of Ramadan. Seyyed, Abraham, and Al-Hajji (2005) and Husain (1998).

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