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Calender Effect in Shariah-Compliant Stocks Returns; Evidence from FTSE Bursa Malaysia Hijrah Shariah Index

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Abstract. This study aims to investigate the calendar effect in Malaysia Shariah-Compliant stocks returns. FTSE Bursa Malaysia Hijrah Shariah (FBMHS) Index is employed. AR(1) in the mean equation and EGARCH (1.1) as variance equation are used to analyze the volatility. Evidence of significant Friday effect, January effect and February effect are found in the FBMHS Index. After conforming the presence of day of the week and month of the year effects, we re-examine one effect by adding another effect in the variance model. We find Friday, January and February effects still exist. However, none of the calendar effects increase or decrease the volatility.

Keywords: shariah-compliant, stockreturns, volatility, GARCH, EGARCH

1. Introduction

Malaysia has been recognized as the pioneer and at the forefront in Islamic finance. For the first 6 months of 2007, RM10 billion of Sukuk (Islamic bonds) were approved in the Malaysian capital market. The size of outstanding corporate Sukuk as at July of 2007 stands at RM166 billion. In the equity market, 86% of all securities listed on Bursa Malaysia are Shariah compliant. They represent 62% of the total market capitalization of the exchange. In the area of investment management, there are 116 Shariah-based unit trust funds with total net asset value in excess of RM12 billion, or over 8% of the total net asset value of Malaysia unit trust industry and almost 40% of the net asset value of the global Islamic unit trust industry.

Our study aims to investigate the calendar effect of Malaysia Shariah index. From 21 May 2007, FTSE group and Bursa Malaysia cooperate to launch the FTSE Bursa Malaysia Hijrah Shariah Index (FBMHS) which is designed mainly for international investors. At present, Malaysia is making her way to be a global ICM hub. This study will make some useful and relevant contributions in providing information and references to international and domestic investors. Therefore, FBMHS is regarded as an appropriate Shariah index to be studied in our paper.

Section 2 is literature review which provides a summary of previous works related to our study. Section 3 describes the data set and the methodology employed in the study. Section 4 shows empirical results and the last but not the least, some conclusions of the study are presented in Section 5.

2. Literature Review

After the first calendar effect-Monday effect is detected by Fields (1931), a good many of seasonal anomalies have been observed in various markets around the world: the January Effect (Haugen and Jorion, 1996), the turn of the year effect (Gultekin and Gultekin, 1983), the turn of the month effect (Ariel, 1987; Kohers and Kohli, 1991), the Friday the thirteenth effect (Chamberlain *et al.*, 1991), and the holiday effect (Fields, 1934) (Kramer and Runde, 1996). Much evidence shows that several forces that collectively have a more or less regular influence at particular moments of time can lead to calendar effect and the forces do not occur merely by chance. It is important to understand the sources of calendar effects because it can help us to rationalize the observed patterns and make predictions about the market outcomes, including the rate of stock price adjustment to changes in the determining factors and the permanence of systematic departures from rationality (Nico, 2003).

Studies on Malaysia market mainly focus on KLSE Industrial and Commercial Index. Wong *et al.* (1990) examined empirically the existence of seasonality according to the Gregorian, Chinese and Muslim calendars in the Malaysia stock market. The data used included Kuala Lumpur Stock Exchange (KLSE) Industrial, Finance, Hotel, Property, Plantation and the Tin indices from 1970 to 1985. A January effect, Chinese New Year effect and an Aidilfitri effect were presented. Empirical evidences showed that stock market rise before January and Chinese New Year while negative returns were observed in Aidifitri (the 10th month of Islamic calendar). The Muslim calendar effect was less widespread than the Chinese New Year and January effect.

Other studies on Malaysia are Wong et al. (1992), Chan *el al.* (1996), Clare *et al.* (1998), Kok and Wong (2004), Chia *et al.*(2006) and Hooi *et al.* (2007). Wong et al. (1992) find calendar anomalies on Thursday and Friday. The return of the index is always positive on these two days. Chan *el al.* (1996) find January, February, April, October and December effects and as well as Monday, Tuesday, Wednesday and Friday effect in KLSE. Clare *et al.* (1998) conclude that depressed Monday represents a true market anomaly. Kok and Wong (2004) investigate time-of-the-month anomaly in five ASEAN equity markets before, during, and after the Asian financial crisis. They also find that Monday, Wednesday and Friday effects in Malaysia when use OLS method while only Monday effect is detected when use GARCH-M model. Chia *et al.* (2006) however conclude that there is no evidence of any monthly seasonality. Hooi *et al.* (2007) show that on Monday, February, August and December, there are abnormal returns on Malaysia market.

3. Data and Methodology

3.1. Data

Our study is based on the historical daily price index of FTSE Bursa Malaysia Hijrah Shariah Index (FBMHS) covering the time period of 1 July 1999 to 14 August 2007, a total of 2111 observations. The data set is obtained from client service department of FTSE group. As a Shariah index, FBMHS is screened by the Malaysian Securities Commission's Shariah Advisory Council (SAC) and the global Shariah consultants, Yasaar Ltd, ensuring it meets the screening requirements of both domestic and international Muslim investors. FBMHS is a tradable index. The index is real-time (by every 15 seconds) and end of day calculated. The daily return is computed by

$$r_t = 100[\ln (P_t) - \ln (P_{t-1})] \qquad (1)$$

where r_t is daily return, P_t is current closing price and P_{t-1} is the closing price of the previous day. The natural logarithm form of daily closing price is used in the estimation in section 4. The plot of return series shows stretches of time where the volatility is comparatively high and comparatively low. This suggests an obvious volatility clustering in some time periods. In another word, there must be one of ARCH family models fitting the return data. The series also exhibits an excess kurtosis of 8.27, indicating that the returns series has thick tails and departures from normally distributed. The return is negatively skewed which shows that the lower tail of the distribution is thicker than the upper tail. In other words, market declines occur more often than market increases. This implies market asymmetric towards bad news.

3.2. Methodology

In our study, we use Augment Dickey-Fuller (ADF) and Phillips-Perron (PP) methods for the unit root test. The null hypothesis is there is a unit root in FBMHS daily closing price, represented by H_0: $\delta = 0$ against H_a: $\delta < 0$.

Calendar Effect

In our study, dummy variables are used in return equation denoting week days to investigate the day of week effect and months to investigate the month of year effect on daily stock returns. AR (1) is included in the return equation for removing the autocorrelation. For the possible presence of ARCH effect, OLS will not be reliable, so we use EGARCH (1,1) model to remove ARCH effect from residuals. The specific models are as below:

Day of the Week Effect

Mean: $r_t = \theta_1 Mon_t + \theta_2 Tue_t + \theta_3 Wen_t + \theta_4 Tus_t + \theta_5 Fri_t + \Phi r_{t-1} + \varepsilon_t$ (2)

Variance: $\varepsilon_t = v_t \sqrt{h_t} \qquad \varepsilon_t \mid F_{t-1} \sim N(0, h_t)\ ;\ v_t \sim N(0,1)$

$$\log(h_t) = \alpha_0 + \alpha_1 \left| \frac{\varepsilon_{t-1}}{\sqrt{h_{t-1}}} \right| + \beta_1 \log(h_{t-1}) + \gamma \frac{\varepsilon_{t-1}}{\sqrt{h_{t-1}}}$$

The null hypothesis is $\theta k = 0$, where k = 1, 2, 3, 4, 5. The rejection of the null hypothesis of a certain day means there is a calendar effect on that day. The sign of θk decides the average return on that day is always anomalous positive or negative.

Month of the Year Effect

Mean: $r_t = \theta_1 Jan_t + \theta_2 Feb_t + \theta_3 Mar_t + \ldots\ldots + \theta_{12} Dec_t + \Phi r_{t-1} + \varepsilon_t$ (3)

Variance: $\varepsilon_t = v_t \sqrt{h_t} \qquad \varepsilon_t \mid F_{t-1} \sim N(0, h_t)\ ;\ v_t \sim N(0,1)$

$$\log(h_t) = \alpha_0 + \alpha_1 \left| \frac{\varepsilon_{t-1}}{\sqrt{h_{t-1}}} \right| + \beta_1 \log(h_{t-1}) + \gamma \frac{\varepsilon_{t-1}}{\sqrt{h_{t-1}}}$$

The null hypothesis is $\theta k = 0$, where k = 1, 2…12. The rejection of the null hypothesis of a certain month means there is a calendar effect on that month. The sign of θk decides the average return on that month is always anomalous positive or negative.

Calendar Anomalies

When we know the day and month in which significant calendar effects are presented, then we include one effect when examining the other. For day of the week effect, we include month of the year effect in variance equation. Using similar procedure, next, for month of the year effect, we include day of the week effect in variance equation:

Variance: $\varepsilon_t = v_t \sqrt{h_t} \qquad \varepsilon_t \mid F_{t-1} \sim N(0, h_t)\ ;\ v_t \sim N(0,1)$

$$\log(h_t) = \alpha_0 + \alpha_1 \left| \frac{\varepsilon_{t-1}}{\sqrt{h_{t-1}}} \right| + \beta_1 \log(h_{t-1}) + \gamma \frac{\varepsilon_{t-1}}{\sqrt{h_{t-1}}} + \varphi M \quad \text{and} \quad \log(h_t) = \alpha_0 + \alpha_1 \left| \frac{\varepsilon_{t-1}}{\sqrt{h_{t-1}}} \right| + \beta_1 \log(h_{t-1}) + \gamma \frac{\varepsilon_{t-1}}{\sqrt{h_{t-1}}} + \varphi D$$

where M stands for a particular month that shows calendar anomalies, D stands for a particular day that shows calendar anomalies and φ is the parameter.

4. Finding

Results of the unit root tests for FBMHS index cannot reject null hypothesis of existence of a unit root while rejected on the first difference. Therefore, the data is said to be integrated of order one. The first difference of the log form prices is the returns. The unit root test result suggests that the return series is stationary and can be modelled via equations.

AR(1)-egarch (1,1) Model

Day of the Week Effect

Based on the results of OLS regression, we include the significant days (Monday and Friday) in the mean equation (Table 1). From the mean equation we find Friday is highly significant. The parameters of AR (1) and EGARCH (1,1) are significant as well. Ljung Box statistic of standardized residuals and squared standardized residuals shows that these residuals are well-behaved. No autocorrelation is left in the residuals and ARCH effect is removed. The expected return is positive on Friday. This indicates returns on Friday are always higher than other weekdays. The "end of week" effect is detected. The "end of week" effect is widely found in most stock markets all over the world. The most popular explanation is that people may have more cheerful mood before the coming weeks.

Month of the Year Effect

OLS results (Table 2) show that there are January, September, October effects, so in EGARCH model, we include these three significant months in the mean equation. The result of the month of year effect is presented in Table 2. Parameters of AR (1) and EGARCH (1,1) are significant and Ljung box statistic shows that there is no autocorrelation left in residuals and ARCH effect is removed. This gives the evidence that it is right to include AR (1) model in return equation and EGARCH (1,1) is adequate of fitting the return series. As presented in the result, not surprising, the January effect is detected. The return in January is significantly higher than other months.

	Variable	Parameter	Coefficient	Z-stat
Mean Equation	Mon_t	a_1	-0.0022	-0.0581
	Fri_t	a_5	0.0766	2.3232**
	r_{t-1}	Φ	0.1596	6.9075**
Variance Equation	Constant	α_0	-0.1826	-8.1180**
	$\left\|\frac{\varepsilon_{t-1}}{\sqrt{h_{t-1}}}\right\|$	α_1	0.1807	13.236**
	$\log(h_{t-1})$	β_1	0.9745	240.49**
	$\frac{\varepsilon_{t-1}}{\sqrt{h_{t-1}}}$	γ	-0.0394	-4.6466**
	Mon_t	θ_1	0.1969	2.7994**
	Fri_t	θ_2	0.0090	0.1260

Diagnostic Test

kurtosis	JB test	Q (5)	Q (20)	Q^2 (5)	Q^2 (20)	ARCH LM (5 lags)
5.6448	614.8317** Prob=0.0000	5.1535	23.5450	8.6548	18.8150	8.2755

Notes: **Significant at 5% level, * Significant at 10%

$Z_{0.05/2} = 1.96$, $\chi^2_{0.05,5} = 11.0705$; $\chi^2_{0.05,20} = 31.4104$, ARCH LM test: $nR^2 \sim \chi^2_{0.05,p}$

Table 1: Estimation of Day of Week Effect

	Variable	Parameter	Coefficient	Z-stat
Mean Equation	Jan_t	b_1	0.1198	1.9345*
	Sep_t	b_9	-0.0425	-0.6195
	Oct_t	b_{10}	0.0588	1.0042
	r_{t-1}	Φ	0.1613	7.0133**
Variance Equation	Constant	α_0	-0.1440	-13.4991**
	$\left\|\frac{\varepsilon_{t-1}}{\sqrt{h_{t-1}}}\right\|$	α_1	0.1858	13.0727**
	$\log(h_{t-1})$	β_1	0.9749	233.2964**
	$\frac{\varepsilon_{t-1}}{\sqrt{h_{t-1}}}$	γ	-0.0428	-5.2828**
	Jan_t	Ω_1	0.0057	0.4705
	Sep_t	Ω_2	-0.0071	-0.6463
	Oct_t	Ω_3	-0.0103	-0.8564

Diagnostic Test

kurtosis	JB test	Q (5)	Q (20)	Q^2(5)	Q^2 (20)	ARCH LM (5 lags)
5.6930	638.2507** Prob=0.0000	4.1863	21.8510	7.9126	17.201	7.6720

Notes: **Significant at 5% level, * Significant at 10%

$Z_{0.05/2} = 1.96$, $\chi^2_{0.05,5} = 11.0705$; $\chi^2_{0.05,20} = 31.4104$, ARCH LM test: $nR^2 \sim \chi^2_{0.05,p}$

Table 2: Estimation of Month of the Year Effect

Day-month Cross Effect

Based on the OLS results, we combine significant days and months in EGARCH model. The result is consistent with separate estimation (Table 4). Monday and January are significant. All diagnostic tests show that the model fits the return series well.

	Variable	Parameter	Coefficient	Z-stat
Mean Equation	Mon_t	a_1	-0.0059	-0.1527
	Fri_t	a_5	0.0664	1.9252*
	Jan_t	b_1	0.1149	1.8368*
	Sep_t	b_9	-0.0399	-0.6068
	Oct_t	b_{10}	0.0477	0.7840
	r_{t-1}	Φ	0.1573	6.7563**
Variance Equation	Constant	α_0	-0.1798	-7.6531**
	$\left\|\frac{\varepsilon_{t-1}}{\sqrt{h_{t-1}}}\right\|$	α_1	0.1813	12.5428**
	$\log(h_{t-1})$	β_1	-0.0392	-4.5000**
	$\frac{\varepsilon_{t-1}}{\sqrt{h_{t-1}}}$	γ	0.9751	231.1173**
	Mon_t	θ_1	0.2040	2.7753**
	Fri_t	θ_2	-0.0134	-0.1725
	Jan_t	Ω_1	0.0070	0.5784
	Sep_t	Ω_2	-0.0047	-0.4274
	Oct_t	Ω_3	-0.0098	-0.8068

Diagnostic Test

kurtosis	JB test	Q (5)	Q (20)	Q^2 (5)	Q^2 (20)	ARCH LM (5 lags)
5.6391	612.2630** Prob=0.0000	4.1748	20.7290	9.0626	18.7100	8.7101

Notes: **Significant at 5% level, * Significant at 10%

$Z_{0.05/2} = 1.96$, $\chi^2_{0.05,5} = 11.0705$; $\chi^2_{0.05,20} = 31.4104$, ARCH LM test: $nR^2 \sim \chi^2_{0.05,p}$

Table 3: Estimation of Day-Year Cross Effect

Since 86% of all securities listed on Bursa Malaysia are Shariah compliant, so the explanations for the whole market also can explain the calendar anomalies of Shariah securities. The prevailed explanation for January effect is tax-loss-selling hypothesis. Tax-loss-selling hypothesis refers that as a large part of shares are owned by taxable individual investors, these investors sell securities in which they have experienced a loss in order to deduct capital losses before the end of the tax year. When the selling pressure dissipates in January, stock price rallies. But the tax-loss-selling hypothesis is not applicable to Malaysia as there is no capital gains tax on share transactions.

5. Conclusion

The calendar effect is a phenomenon at odds with efficient markets theory. EGARCH (1,1) is proved well fitting the return series. Significant Friday effect and January effect are found in the FBMHS index. The explanation in our case for Friday effect is that Muslims regard Friday is a good day. People have more cheerful moods on that day and always have some important good things done on that day. For January effect in Malaysia Shariah-compliant stock market, Muslims` happy mood during festivals which fell in the end and beginning of the years during our study periods might be the appropriate explanation. The existence of calendar effect may enable investors and fund managers to take the advantage of setting up some strategies to earn abnormal profit. However it is not consistent with the theory of efficient market which states there is no trading strategy existing that will persistently yield abnormal returns. After confirming the presence of day of the week and month of the year effects, we re-examine one effect by combine significant days and months in one model. We find Friday, January effects still exist.

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