STOCK MARKET ANOMALIES: A CASE OF CALENDAR EFFECTS ON THE MALAYSIAN STOCK MARKET

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ABSTRACT

The existence of market anomalies for the return reveals the inefficiency in the market that could affect investor investment strategy, portfolio selection, and profit management. It is due to the unpredictable movement of the stock market return that will affect the decision of investors later. As such, this study intends to investigate day of the week effect, a month of the year effect, and a quarter of the year effect on the Malaysian Stock Exchange, namely the Kuala Lumpur Composite Index (KLCI) on data from 2nd January of 2015 until 31st December 2018. Based on the findings from Generalized Autoregressive Conditional Heteroskedasticity (GARCH) model analysis, it is found that the daily effect on returns was insignificant. Possible reasons for the insignificant return could be due to the lack of time-series data. However, the significant monthly effect on returns of May, November, and December while the quarterly effect on the returns is found significant in the first quarter. This study also concludes that volatility shock is persistent in the returns for all those three market anomalies.

Keywords*: Anomalies, GARCH, KLCI, Volatility*

1. Introduction

Calendar anomalies are considered as one of the issues that are most debated and scrutinized in the field of finance and economics. Several studies have been conducted on the stock market anomalies that involve annual return data with cross-sectional and time-series patterns. Thus, these studies are closely related to the efficient market hypothesis (EMH). Market anomalies are evidence for the existence of inefficiency in a stock market that affects the asset-pricing model. After a number of studies, they found that anomalies often attenuate or reverse in the financial market that may affect the prediction of the market return.

The practitioners always try to specify this pattern to see if any opportunity they can grab within the market return. The first-ever calendar effect research had been conducted in the 1930s in which includes the Monday effect, January effect, monthly effect, and holiday effect. At the beginning of the research, the study on the day of the week effect had been done by many researchers such as French (1980), Gibbons & Hess (1981), and Jaffe & Westerfield (1985) which were based on the simple linear regression model. However, Connolly (1991) indicated that using the General Autoregressive Conditional Heteroscedasticity (GARCH) model is better rather than simple linear regression because linear regression may lead to few problems such as autocorrelation in the return, possibilities of abnormal residuals, heteroskedasticity issues, and outliers that may affect the overall market price modeling.

Kamil & Lup (2005) investigated the January, Monday, and Holiday effects in selected sectors from 1995 to 2004 in Bursa Malaysia. The results only showed the existence of January effect for all sectors, the Monday effect in three sectors and no pre and post-holiday effects in

all holidays in Malaysia. Wong *et al*. (2007) revealed that the monthly effect on the Malaysian stock market over the period 1994 to 2006 exists at a different period of the year. The study divided the data into three subsamples corresponds to the pre, during and post crisis period and found that only February effect was existed during the pre-crisis meanwhile January effect was present in the crisis period. This result was contradicted with the result (Kim & Nofsinger, 2008) as the study found evidence the January, Monday and Friday effects in the Malaysian stock market during the pre-crisis. In other study, Al-smadi *et al.* (2016) found the positive returns for stock return of KPJ Healthcare Berhad between 3rd January 2011 until 30th December 2011. The study however argued the results were unrelated to the January effect due to different tax system in Malaysia. The recent study by Munir & Ching (2019) found the evidence of the presence of certain daily and monthly effect in Malaysian finance stocks market for the year of 1997 until 2014 based on TGARCH model. This indicated inefficiency in the weak-form in Malaysian market.

Lim & Chia (2010) investigated the day-of-the-week effect in the ASEAN-four stock markets (Indonesia, Malaysia, Singapore, and Thailand) throughout from10 June 2002 until 21 August 2009. All markets except for Singapore associated with negative mean returns on Monday while Friday the return was unusually high. Somehow, volatility tends to rise during economic disturbances in which show that volatility is closely related to risk. To gauge this leverage effect, Bollerslev (1986) suggested the GARCH model is another approach to estimate the market return. Several studies have been reviewed in Kumar (2017) and based on the findings, the markets have achieved a higher degree of efficiency during the 1980s and 1990s. Others related studies on calendar effect can be found in Abalala & Sollis (2015), Harshita & Yadav (2019) and Saldanha & Desai (2019).

The unpredictable movement of stock market return will affect the decision of investors. Investors have revealed market anomalies in various ways such as daily, weekly, monthly, quarterly, or holiday as they could choose the most rational decision for them to manage their portfolio. Along with that, the volatility of the returns also important for the investor to identify the risk in making investment decisions. Malaysia's financial market also has no exception in investigating calendar anomalies to compare the indices with each sector of stock and to predict the future return of the market. Thus, the market anomalies topic aroused the question of whether the investors will capitalise on them to obtain a huge return in the future.

Due to the interest in finding market anomalies in Malaysia, the study of day-of-the-week, month-of-the-year, and quarter-of-the-year effect on the Malaysian Stock Exchange are conducted. Most studies in Malaysia just focused on the study of day-of-the-week effect and month-of the-year rather than consider all market anomalies in Malaysia. As such, this study enhances the analysis by considering another form of calendar effect which is quarter-of-the-year effect. Furthermore, this study uses different sample from the recent study by Munir & Ching (2019) as the data are collected from January 2015 until December 2018. To achieve the aim of the study, the GARCH model is performed to encounter the stock market volatility in achieving the objective of the research. Moreover, it is hoped that calendar anomalies could be one of the guidelines for the Malaysian market practitioner decision in the future.

2. Data and Methodology

2.1 Data Collection

Kuala Lumpur Composite Index (KLCI) data are collected in the form of daily market prices. The range period of the data for the market prices between 2015 until 2018 yields 978 total number of observations. The KLCI data retrieved from the Bloomberg database. The daily return of KLCI is computed as

$$r_t = \ln\left(\frac{P_t}{P_{t-1}}\right) * 100 \qquad (1)$$

Where r_t is the daily return of KLCI on day t, P_t is the closing price of KLCI on day t, and P_{t-1} is the closing price of KLCI on the day before t.

2.2 Methodology

Several statistical analyses are employed to achieve the main objectives of the study. The methods are descriptive statistics, the Augmented Dickey-Fuller (ADF) Test, Autoregressive Conditional Heteroscedasticity (ARCH) Test, and General Autoregressive Conditional Heteroscedasticity (GARCH) Model.

Table 1. Description of the analyses

Test	Description
Descriptive Statistics	To illustrate the behavior of the data
Augmented Dickey-Fuller (ADF) Test	To determine the stationarity of time series variable
Autoregressive Conditional Heteroscedasticity (ARCH) Test	To detect the present of ARCH effect in the residuals (heteroskedasticity)
General Autoregressive Conditional Heteroscedasticity (GARCH) Model	To study the effect of calendar in KLCI market in the presence of heteroscedasticity in data. Mean equation: $r_t = \sum_{i=1}^{K} \theta_i D_{it} + \alpha r_{t-1} + \varepsilon_t$ with $\varepsilon_t \mid \psi_t \sim N\left(0, \sigma_t^2\right)$ Variance equation: $\sigma_t^2 = \beta_0 + \beta_1 \varepsilon_{t-1}^2 + \gamma \sigma_{t-1}^2$ Where r_t is security market return at time t, r_{t-1}; D_{it} is dummy variables; θ_i is the parameter for dummy variables; and ε_t is the error term for the calendar effect. ε_t is assumed to be an independent and identically distributed (i.i.d) random variable with continuous density which is a zero mean with a variance σ_t^2. The dummy trap can be avoided in the mean equation due to addition of security market return at time t-1 as independent variable.

3. Result and Discussion

The summary of descriptive statistics of Malaysian stock returns with the period from 2015 until 2018 is given in Table 2. The stock expected return on average is -0.004, and the median is 0.008. The standard deviation of the stock return is 0.589 in which indicates the greater spread in the data from the mean and has high volatility in the stock return. The data has negative skewness (-0.433) and the kurtosis of 2.578. This data indicates that the return was not distributed normally, as they did not correspond to the general criteria of the normal distribution (kurtosis 3 and skewness 3).

Table 2. Descriptive Statistics Results of KLCI

Measures	Values
Mean	-0.004
Median	0.008
Standard deviation	0.589
Skewness	-0.433
Kurtosis	2.578

To save space, the results of ADF and ARCH tests are not presented in this paper. All results indicate the significant results where the data is stationary and the ARCH effects are present for all Day-of-The-Week, Month-of-The-Year, and Quarter-of-The-Year Effects, respectively.

Table 3 provides the result of the GARCH (1, 1) model for the Day-of-The-Week Effect. The results reveal that the highest return observed is on Tuesday (0.029), followed by Friday (0.022), and the lowest return is on Wednesday (-0.046). The estimated coefficients are not statistically significant, where the p-value is greater than 5%. Thus, there is no indication of the daily effect on this stock return. The insignificant results might be due to the presence of volatility of the stock return as the ARCH (0.098) and GARCH (0.889) coefficients are positive with probability zero, indicating that the volatility is persistent in the range of study. This result reveals that the market is efficient in its weak form in which states that share price movement cannot be predicted in advance to form a trading strategy.

Table 3. GARCH (1,1) Model for Day-of-The-Week Effect

Variable	Coefficient	Std error	z-stats	p-value
Mon	0.006	0.038	0.158	0.875
Tue	0.029	0.033	0.893	0.372
Wed	-0.046	0.035	-1.328	0.184
Thu	-0.004	0.035	-0.125	0.900
Fri	0.022	0.034	0.631	0.528
r_{t-1}	0.059	0.033	1.773	0.076
Variance Equation				
constant	0.006	0.002	2.424	0.015
ε_{t-1}^2	0.098	0.016	6.197	0.000*
σ_{t-1}^2	0.889	0.017	52.355	0.000*

Note: *, significant at 5% level of significance

For a study on the monthly seasonal anomalies on KLCI, the result is presented in Table 4. The estimated coefficient for December (0.089) return is the highest while the May (-0.121) return still shown the lowest in GARCH (1,1) model and followed by November (-0.083). The null hypothesis of May return is rejected at 5% showed the presence of a monthly effect on this stock return. The results however contradict in most studies in Malaysia. The presence of monthly effect in May due to investors sentiments of policy uncertainties given by unexpected victory in Malaysia elections in May 2018. The ARCH and GARCH coefficients significantly yield the persistence in the volatility in the stock return.

Table 4. GARCH (1,1) Model for Month-of-The-Year Effect

Variable	Coefficient	Std error	z-stats	p-value
Jan	0.063	0.056	1.141	0.254
Feb	0.046	0.082	0.562	0.574
Mar	0.087	0.054	1.613	0.107
Apr	0.008	0.051	0.151	0.880
May	-0.121	0.055	-2.173	0.030*
Jun	-0.018	0.055	-0.327	0.743
Jul	0.031	0.055	0.553	0.581
Aug	0.030	0.047	0.639	0.523
Sep	-0.077	0.057	-1.344	0.179
Oct	-0.003	0.022	-0.047	0.963
Nov	-0.083	0.049	-1.700	0.090
Dec	0.089	0.048	1.856	0.064
r_{t-1}	0.042	0.032	1.221	0.222
Variance Equation				
Constant	0.005	0.002	2.338	0.019
ε_{t-1}^2	0.092	0.014	6.435	0.000*
σ_{t-1}^2	0.897	0.015	59.640	0.000*

Note: *, significant at 5% level of significance

Table 5. GARCH (1,1) Model for Quarter-of-The-Year Effect

Variable	Coefficient	Std error	z-stats	p-value
Q1	0.068	0.033	2.069	0.039*
Q2	-0.039	0.033	-1.190	0.234
Q3	0.001	0.030	0.023	0.981
Q4	-0.011	0.029	-0.374	0.708
r_{t-1}	0.050	0.033	1.504	0.133
Variance Equation				
Constant	0.005	0.002	2.367	0.018
ε_{t-1}^2	0.090	0.013	6.732	0.000*
σ_{t-1}^2	0.899	0.014	63.275	0.000*

Note: *, significant at 5% level of significance

The GARCH (1, 1) model is estimated to describe quarterly effects on the return of KLCI, and the result provided in Table 5. The highest return is on Quarter 1 (0.068), while the lowest return is on Quarter 2 (-0.0389) and followed by Quarter 4 (-0.011) and Quarter 3 (0.001). However, the coefficient of Quarter 1 return is significant at 5% level indicating the presence of the quarterly effect. Possible reasons could be due to positive return in the first three months of the year GARCH parameter estimates also indicated the volatility shocks are persistent in the daily returns. The positive and significant return in the first quarter has important implication to investors and policy makers. This would help the investors and policy makers to make decision by improving appropriate trading strategies on their returns.

4.   Conclusion

The summary of the findings shows that the coefficients of GARCH model are significant and positive indicated that the volatility is also persistent for daily, monthly, and quarterly effects model in the Malaysian stock market. As for the result, this information could yield new

findings that investors could take advantage of the market anomalies when investing in the Malaysian stock market. In other words, if traders aware of these anomalies, they could gain profit over the long-term and well-informed with the market pattern and volatility in the shorter-term.

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