

Efficient Market Hypothesis and Market Anomaly: Evidence from Day-of-the Week Effect of Malaysian Exchange

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Abstract

The movements of prices in the stock market are among a few phenomena that have cut across the boundaries of academic disciplines and have cumulative research evidence spanning almost a century. Today the field of financial market research seems to be at the exciting stage of “crisis” – past results are being questioned, and new solutions are being proposed. The preliminary evidence indicates that the initial confidence in the Efficient Market Hypothesis (EMH) might have been misplaced. Various anomalies and inconsistent results make EMH fail to depict trading operations in real world. The presence of calendar anomalies has been documented extensively for the last two decades in financial markets. However, for the Malaysian market, empirical analyses on the market anomaly were limited and contradicting. Some studies indicated market anomalies exist and some indicated non-exist. Hence, the present study was trying to sought for the answer of following questions: Is the return on common stocks usually distributed, as much as finance theory assumes? How has the volatility of stock returns changed over time? How is the distribution of returns affected by past returns? Generally, it was found that, day of the week-effect exist in Malaysian Exchange but only for the Monday effect.

Keywords: Efficient Market Hypothesis, Market Anomaly, Day of the week effect

1. Introduction

The distribution of returns on common stocks is one of the most widely studied in the financial market and the presence of calendar anomalies has been documented extensively for the last two decades. The most common ones are the day-of-the week effect and the January effect. Many studies (e.g. Aggarwal and Rivoli 1989; Cross 1973; French 1980; Keim and Stambaugh, 1984; Rogalski, 1984) has documented that the distribution of stock return varied according to the day of the week. For the Malaysian market, empirical analyses on the day-of-the week effect were limited and contradicting. Study by Wong et al. (1992) noted that the day-of-the week effect for Malaysian markets showed negative average returns on Monday and high positive returns on Thursday and Friday. Analyses by Anuar and Shamsir (1993) and Mansor (1997) substantiated the presence of the day-of-the week effect found by Wong et al. (1992). However, it contradicting with other studies of Marashdeh (1994) as he concluded that there was no week effect in the Malaysian stock market in his sample of study.

Substantial evidence supporting the Efficient Market Hypothesis (EMH) also has been documented over the years. EMH states that security prices fully reflect all available information and will immediately adjust to the arrival of new information (Adam, 2004). However, since market was closed on both Saturday and Sunday, it was argued that investors cannot do anything with the market even though they got some information during the weekend. There is where the anomalies exist.

The main idea for this study is to investigate whether the information processed over weekends will affect the index return of Kuala Lumpur (i.e. Composite Index (KLCI) at and after the opening on Monday). This study relates the elements of efficient market hypothesis (EMH) and market anomaly. Thus, the study tried to figure out whether the day-of-the week effect really exists in Kuala Lumpur Composite Index. The objectives of the present study was (1) to analyze empirically whether the day of the week effect exist in Kuala Lumpur Composite Index; and (2) To examine whether differences of the effect occur between the period of immediate financial crisis (1999-2002) and four year after financial crisis (2003-2006).

2. Literature Review

There has been an increase in empirical studies concerning emerging stock markets. A partial list of these studies includes Claessens and Gooptu (1993), Cornelius (1993), Mullin (1993), Claessens and Rhee (1994), Hauser, Marcus and Yaari (1994). However, there is little work with special reference to the Malaysia stock market in international literature. The weekend effect was the phenomena where the average return on Monday was significantly less than the average return over the other days of the week. The weekend effect regularity was not

limited to the U.S equity market. It had been documented that the weekend effect regularity was present in other international equity markets (Jaffe and Westerfield 1985; Solnik and Bousquet 1990; Barone 1990; among others). Although there has been an increasing trend in studies using daily data, many researchers have employed low frequency data. A none comprehensive list of studies concerning daily anomalies in developed stock markets includes Cross (1973), French (1980), Lakonishok and Smidt (1989), Smirlock and Starks (1986), Agrawal and Tandon (1994) and Abraham and Ikenberry (1994).

2.1 Efficient Market Hypothesis (EMH)

The efficient markets hypothesis (EMH), popularly known as the Random Walk Theory, is the proposition that current stock prices fully reflect available information about the value of the firm, and there is no way to earn excess profits, (more than the market overall), by using this information. The term market efficiency is used to explain the relationship between information and share prices in the capital market literature. Fama classifies market efficiency into three categories namely, weak form, semi-strong form and strong form. In its weak form, market efficiency hypothesis (EMH) states that the stock returns are serially uncorrelated and have a constant mean. In other words, a market is considered weak form efficient if current prices fully reflect all information contained in historical prices, which implies that no investor can devise a trading rule based solely on past price patterns to earn abnormal returns. A market is semi strong efficient if stock prices instantaneously reflect any new publicly available information and Strong form efficient if prices reflect all types of information whether available publicly or privately (Fama, 1965).

The efficient markets hypothesis implies that investors react quickly and in an unbiased manner to new information. In two widely publicized studies, DeBondt and Thaler (1990) present contradictory evidence. They find that stocks with low long-term past returns tend to have higher future returns and vice versa - stocks with high long-term past returns tend to have lower future returns (long-term reversals). These findings received significant publicity in the popular press, which ran numerous headlines touting the benefits of these so-called contrarian strategies. The results appear to be inconsistent with the EMH. However, they have not survived the test of time. One of the most enduring anomalies documented in the finance literature is the empirical observation that stock prices appear to respond to earnings for about a year after they are announced (Dreaman and Lufkin, 2000). Prices of companies experiencing positive earnings surprises tend to drift upward, while prices of stocks experiencing negative earnings surprises tend to drift downward. This "post-earnings-announcement drift" was first noted by Ball and Brown (1968) and has since been replicated by numerous studies over different time periods and in different countries.

2.2 Market Anomaly

International evidence on the day-of-the-week effect, observed similar behavior patterns of stock returns in the stock markets of the United Kingdom, Japan, Canada and Australia (Jaffe and Westerfield, 1985). Their results indicated consistently negative Monday returns (close Monday to close Friday) throughout the 55-year period. They also reported that in periods with Saturday trading, Friday's returns were generally lower than that of Saturday. Thomas (2002), in his study about trend and calendar effects in stock returns, of 207 stocks from Swedish stock market for a period of 1987 to 1996 found that the day-of-the-week affects the return significantly. Based on the study conducted by Dimitrios and Katerina (2003) on the day-of-the-week effect anomaly in the French stock Exchange, the highest volatility is also observed on Monday. Based on Bildik (1999) study, examining stock market returns and trading activity in the emerging market of Istanbul Stock Exchange using daily closing values of the ISE-100 index from 1988 to 1999, also found that Monday showed the lowest return and had the highest volatility across the week.

For the African market, study by Paul and Theodore (2006) examine two calendar anomalies in both for the day-of-the week and month of the year effects using daily closing prices of major share index on Ghana Stock Exchange for the period of 1994 to 2004. OSL model shows that all test statistics are very significant at 5% for Monday and 1% for Wednesday and Friday. Mean daily returns during the estimation period on Mondays are also lower than other days of the week (0.1% on Monday as opposed to 0.18% and 0.19% on Wednesday and Friday respectively). Similar result was found for the Chinese stock market and Indian Stock market studied by Gao and Gerhard (2005).

For Asian stock markets, Wong, Hui and Chan (1992) found no Monday effect in the KLSE Industrial and Commercial Index. Given that data was not normally distributed, they employed non-parametric tests (specifically the Mann-Whitney test) to investigate the returns over the period 1975 until 1988. The null hypothesis tested found that there was no difference in the returns across the days of the week. They reported that Monday and Tuesday results, while not different from each other, appeared to be different from the other

days of the week. This result was similar to that of Jaffe and Westerfield (1985) in the case of Australia and Japan. Chen and Liang (2004), investigated the daily anomalies in the five ASEAN equity markets of Malaysia, Singapore, Thailand, Indonesia and Philippines before, during and after the Asian financial crisis found that Monday effects still significant in Malaysian market, but no daily seasonal anomaly during the crisis period for Malaysian market and its show similar result after the crisis period.

For Malaysian market, there are few studies done in relation to market anomaly (e.g Anuar and Shamsar, 1993; Hakan and Halil, 2001; Kok and Wong, 2004; Mansor, 1997; Marashdeh, 1994; Wong et al. 1992). Kok and Wong (2004), using ordinary least Square (OLS) method found that day of the week effect did exist in Malaysia with a negative Monday effect and positive Wednesday and Friday effect for the pre-crisis period of 1996. However, during the crisis period (1996-1998), daily seasonal anomaly disappeared completely in all five ASEAN markets while for the post-crisis period, Malaysia showed only a positive Tuesday effect. Hakan and Halil (2001) on the other hand found the highest and lowest returns on Wednesday and Monday respectively. The day-of-the-week effect, examined by Mansor (1997) using the daily closing prices of the Kuala Lumpur Stock Exchange Composite Index (KLSCI) from January 1980 to December 1996 found that the day-of-the-week effect was present in the Malaysian market. Yet, the pattern of the effect had changed over the time from negative Tuesday, positive Thursday to negative Monday, positive Friday. Ho and Cheung (1994) investigated whether there was an effect, similar to the weekend effect, in the volatility of returns for a number of Asian markets over the period of 1975 until 1989. They found that the highest volatility occurred on Monday while the lowest average return occurred on Tuesday. Anuar and Shamsar (1993) had used the daily returns of the New Strait Times Industrial Index for the period of July 1975 until December 1985 to investigate the existence of the day-of-the-week effect. By employing the multiplicative random walk method, they substantiated the presence of the day-of-the-week effect found by Wong et al. (1992).

3. Research Methodology

The purpose of the present study was to investigate the presence of weekend effect in stock market return for the period of January 1999 to December 2006 for Kuala Lumpur Composite Index (KLSCI). This study is descriptive in nature as it's described whether stock return showed different effect on each day of trading. It is a longitudinal study as the phenomenon of the study was more than one point in time. Secondary data collected from 100 counters of Kuala Lumpur Composite (KLSCI) daily Index was used in estimating the day of the week effect. The daily indexes used were from 4th January 1999 until 29th December 2006. There was all together 2085 sample in the observation.

To achieve these objectives, two methods were employed. (1) log-different - to compute the index returns. (2) Ordinary Least Square (OLS) method - to estimate the day-of-the-week effect. The study also concern with the weekend effect for the most recent period after the financial crisis in 1997 and four years after the crisis. The sample then were divided into two sub periods; (1) January 1999 until December 2002, representing four year of immediate period after financial crisis; and (2) January 2003 until December 2006 representing the four years period after financial crisis.

In obtaining the result, the researchers calculate the daily returns of KLSCI using Minitab for windows. The daily returns were calculated using the log-difference of the index, as follows;

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

Where P was the closing price and r was the daily index. Return (r) was adjusted for dividend yield. This was not uncommon even if the dividend was a component of stock return. (Yong, 1995).

The equation of OLS is as follows;

$$\text{Return}_t = C_M D_{Mt} + C_T D_{Tt} + C_W D_{Wt} + C_H D_{Ht} + C_F D_{Ft} + \sum_{i=1}^p \text{return}_{t-i} + \varepsilon_t \quad (2)$$

where D_{Mt} , D_{Tt} , D_{Wt} , D_{Ht} and D_{Ft} were the dummy variables for Monday, Tuesday, Wednesday, Thursday and Friday.

$\sum_{i=1}^p$ Are the lag values of the return variable. (It was included into the equation to eliminate the possibility of having autocorrelated errors and heteroscedasticity problem).

4. Research Findings

4.1 Descriptive analysis

Table 1 summarized all the information about daily indexes of Kuala Lumpur Composite Index (KLCI) starting from 4th January 1999 until 29th December 2006. There were 2085 data and equally divided for each day of the week. It shows that, Monday had the lowest mean which is 786.30 and the highest mean was on Friday (788.11). This indicates that the return on every Monday of the particular year is lower compared to other weekdays. On the other hand, Monday had the highest standard deviation of 124.51 compared to other days of the week. The lowest standard deviation was on Thursday (123.65). Table 1 also shows that early days of the week had higher standard deviation compared to last days of the week. The minimum index for Monday, Tuesday, Wednesday, Thursday and Friday was 500.16, 498.57, 494.57, 499.14 and 500.16 respectively. Wednesday had the lowest index among the minimum index in all days of the week. The maximum index for Monday, Tuesday, Wednesday, Thursday and Friday was 1107.70, 1088.96, 1098.35, 1098.26 and 1098.59 respectively. The highest maximum index among all days was falls on Monday that was 1107.70. (refer to table 1)

Table 2 reported the preliminary statistics (evidence) for the returns for the entire study period as well as the return for each day of the week. The average return for the entire study period was 0.00336. The standard deviation of the return was 0.13901, and skewness was -0.13243. Skewness refers to asymmetry of the distribution. The kurtosis was 6.3727 and it was not normal since the difference from 3 was quite high which was double from the normal kurtosis (3). When the return of each day was analyzed, the findings indicated that Friday had an average return of 0.00106, while Monday had an average return of -0.00134. The signs of the findings were in line with day of the week effect literature.

To determine whether the day of the week effect were present during the immediate period and post period of financial crisis, the researcher divided the whole sample into two sub samples which comprised of four years for each sample. The first sample covered a period of January 1999 to December 2002 (immediate period after the financial crisis.) and the second sample covered the period during January 2003 until December 2006 which comprised of four years after the periods of financial crisis in 1997. Table 4 shows the results of descriptive statistics for both sub samples. For the first sample (1999-2002), the lowest average return was on Monday (-0.00271) and the highest average return was on Tuesday (0.00176). The findings showed a similar result with the whole sample that was the lowest average return was on Monday. Monday also had the highest standard deviation compared to other days of the week.

For the second sub sample, the result showed the similar result as in the first sample. Among the five days of the weeks, Monday had the lowest average return (-0.00018) while the highest average return was on Friday. Once again, the findings were in line with the finding for the whole sample that was the lowest and highest average returns was on Monday and Friday respectively. In the second sample, Wednesday had the highest standard deviation of 0.00681 and the lowest was on Friday that was 0.00506.

Table 3 on the other hand reported the standard deviations, skewness and kurtosis for each day. Monday had the highest standard deviation of 0.01558 and Tuesday had the lowest standard deviation of 0.00933. Standard deviation measures the dispersion of possible rates of return around the expected rate of return. Skewness is a measure of asymmetry and a value more than or less than zero indicates skewness in the data. Skewness for all days showed a negative value and was near to zero. It means that the dispersion of possible rates of return for all days is near to zero since it showed negative values. Tuesday, Thursday and Friday were positively skewed but Friday skewness was near to zero (0.12419). Monday and Wednesday were negatively skewed and Wednesday was near to zero (-0.2926).

Kurtosis is one measure of how different a distribution is from the normal distribution. A negative value typically indicated a distribution is more peaked than the normal. A positive value typically indicated a distribution is flatter than the normal. Each day showed a positive value and this indicated that the distribution was flatter than the normal distribution. The normal distribution was 3 and the day that was close to normal distribution was only Tuesday (3.4379). The lowest minimum return was on Wednesday (-0.06342) and the highest maximum return was on Friday (0.0585).

4.2 Regression Analysis

The present study used Ordinary Least Square (OLS) method to determine the existence of day of the week effect. This method was similarly used by Hakan and Halil (2001) in their study to test the presence of the day of the week effect using S&P 500 Index for the period of January 1973 and October 1997. On the other hand, the researchers also tested autocorrelation for returns using Ljung Box Q test. The results were as follow;

Table 4 indicates that day of the week effect was present in the Malaysian market but only for the Monday effect. It was proven by the t-statistic that shows a significant sign at 10 percent level. For this whole sample, the F-statistics were significant at least 10 percent level, indicating the presence of the day of the week effect. Researcher also performed the Ljung Box Q test with 12 lags. Based on the Ljung Box Q test, for 12 lags, the value was 77.17, which was bigger than 12. It indicates that, no autocorrelation in the data exists.

However, for the sub-period analysis, day of the week effect were found not significant in both samples. It was indicated by T-statistics and F value in table 5.

It can be concluded that the weekend effect or the day of the week effect was present in the Malaysian market. The pattern of the effect changed over time from negative Monday and Wednesday, positive Friday to negative Monday and positive Friday. However, the weekend effect did not exist during the immediate period of financial crisis and post financial crisis.

5. Discussion and Conclusion

The findings of the study using sample period of 1999 to 2006, found that the day-of-the week effect was present in the Malaysian market. The result obtained was consistent with Kok and Wong (2004), Anuar and Shamser (1993), Mansor (1997), and other researchers from different markets such as Hakan and Halil (2001) and Balaban (1995). The result also indicated that Monday had a lower average return than Friday.

The researcher further repeated the analysis to investigate the weekend effect in stock market return for the two sub periods. After divided the sample into two sub samples (1999 until 2002 and 2003 until 2006), the F-statistics and t-statistics became insignificant. However, the average return for Monday was still lower than Friday's average return. The result was in line with study done by Marashdeh (1994). Since the insignificant F-statistics and t-statistics were found in the samples that centered around 1999 and 2000, it can be agreed that the financial crisis during that years may be an explanation.

Looking at the day returns, researcher noted some interesting patterns in the weekend effect for the Malaysian market. First, the Monday average returns were always negative regardless of the number of sample being tested. Yet, the researcher found the returns to be insignificant in two sub samples (1999 until 2002 and 2003 until 2006). Again, the events around the stock market crash may be a source of this empirical irregularity or the length of the period used to test the existence of the anomalies. Second, the Wednesday average returns had changed over the years. In the first four rolling samples (1999 until 2002), they were found to be negative. However, in the next four rolling samples (2003 until 2006), the average returns were found to be positive. The only similarities between both samples were the average returns shows insignificant. The findings of Monday and Tuesday returns had important implications for the spillover hypothesis put forward in some studies. In particular, the hypothesis suggested that the negative average returns on Tuesday may be caused by the negative Monday returns. Jaffe and Westerfield (1985) in their study on U.S markets agreed with the hypothesis. Since trading in the two markets were twelve hours apart, there may be spillover from the U.S market to Malaysian market. Thus, in this research, the negative average return for Tuesday was not found and the hypothesis could not be supported.

Fortune (1999) provided another explanation for the negative weekend effect that was the stock prices closed "too high" on Fridays or "too low" on Mondays. One variant attributed to unusual high Friday closing prices was settlement delays. With the current T + 3 settlement schedules, settlement occurs on the third business day after the trade date. Buyers on Mondays and Tuesdays must pay during the same week (on Thursday and Friday), but buyers on Wednesday through Friday need to pay for five days because weekend occurs before the settlement day; they get an extra two days of interest-free credit from brokers before settlement. Monday prices must be lower than Friday prices to compensate those investors who delay purchases until Monday. Additionally, consistent with Wong et al. (1992), the observations around the market crash of 1987 had created irregularity in the daily returns.

Thirdly, with some exception, the later trading days, Wednesday, Thursday and Friday were characterized by positive average returns. The exception was the Wednesday average returns for the first sample (1999 until 2002). The Thursday and Friday average returns were consistently positive. In both sub samples, Friday average returns were higher than Thursday average returns. Cross (1973) studied the returns on the S&P 500 Index over the period of 1953, his findings indicated that the mean return on Friday was higher than the mean return on Monday. Similar results were reported by French (1980), who also studied the S&P 500 Index for the period of 1953 until 1977. Gibbons and Hess (1981) found negative Monday returns for 30 stocks of Dow Jones Industrial Index. Hakan and Halil (2001) who studied S&P 500 Index for the period of January 1973 and October 1997 also found that average returns for Monday was lower than average returns for Friday. Researcher observed that

the highest average return of the week was on Friday and lowest average return was on Monday. Similar pattern was also reported by Anuar and Shamsar (1993) in their study on daily returns of the New Straits Times Industrial Index for a period of July 1975 till December 1985.

In conclusion, consistent with the existing findings, researcher concluded that the weekend effect or the day of the week effect was present in the Malaysian market. However, the weekend effect did not exist in the two sub samples. The pattern of the effect changed over time from negative Monday and Wednesday, positive Friday to negative Monday and positive Friday. Additionally, consistent with Wong et al. (1992), the observations around the market crash of 1997 had created irregularity in the daily returns.

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Table 1. Summary statistic for daily index of KLCI (n=2085)

Statistic	All days	Monday	Tuesday	Wednesday	Thursday	Friday
Observation	2085	417	417	417	417	417
Mean	787.38	786.3	787.01	787.33	787.37	788.11
Standard Deviation	124.3	124.51	124.06	124.47	123.65	123.98
Min	494.57	500.16	498.57	494.57	499.14	500.16
Max	1107.7	1101.7	1088.96	1098.35	1098.26	1098.59

Table 2. Mean and standard deviation statistics of returns of two sub samples

	All days	Monday	Tuesday	Wednesday	Thursday	Friday
1999-2002						
Observation	1042	209	209	208	208	208
Mean	0.00013	-0.00271	0.00176	-0.0002	0.0007	0.00093
Standard deviation	0.01298	0.01534	0.01177	0.01227	0.01178	0.01337
2003-2006						
Observation	1043	208	208	209	209	209
Mean	0.00671	-0.00018	0.00025	0.00087	0.00045	0.00113
Standard deviation	0.20045	0.00614	0.00586	0.00681	0.00651	0.00506

Table 3. Summary statistic for returns of KLCI

Statistic	All days	Monday	Tuesday	Wednesday	Thursday	Friday
Observations	2085	417	417	417	417	417
Mean	0.00336	-0.00134	0.001	0.00033	0.00057	0.00106
T-Statistics	1	1.76*	1.33	1.44	1.37	1.44
Standard Deviation	0.13901	0.01558	0.00933	0.00992	0.0095	0.01009
Skewness	-0.13243	-1.296	1.0113	-0.29262	1.1302	0.12419
Kurtosis	6.3727	6.6748	3.4379	5.9362	5.7458	6.4791
Min	-0.06342	-0.0623	-0.02876	-0.06342	-0.03841	-0.05014
Max	0.0585	0.04086	0.04104	0.04503	0.0571	0.0585

indicate the level of significance at 10 percent level.

Table 4. Day of the Week Effect and L-jung Box Q test.

Days	Monday	Tuesday	Wednesday	Thursday	Friday	Lag return
Coefficient	1.0305	0.9657	0.9896	0.9806	0.9694	-0.00048
T-statistic	(1.76)*	(1.33)	(1.44)	(1.37)	(1.44)	(-0.02)
LB-Q stats (12) = 77.17			F-statistics = 1.82*			

indicates the level of significance at 10 percent level.

Table 5. T-statistics and F value

	Lag return	Monday	Tuesday	Wednesday	Thursday	Friday
1999-2002						
Coefficient	-0.00089	1.0665	0.925	1.008	0.969	0.968
T-statistics	(-0.03)	(1.19)	(0.8)	(0.9)	(0.84)	(0.95)
F-value	(0.75)					
2003-2006						
Coefficient	-0.00134	1.03	0.954	0.883	0.912	0.733
T-statistics	(-0.04)	(0.45)	(0.4)	(0.43)	(0.42)	(0.27)
F-value	(0.14)					