The Day of the Week Effects on Stock Returns in the Stock Exchange of Thailand

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Abstract

This research aims to test the effect of the day of the week on returns of the Stock Exchange of Thailand (SET) index for the upward or downward trends and the whole period. The research used the daily closing prices of the Stock Exchange of Thailand index for the whole period from April 30, 1975 until January 29, 2016 to examine the day of the week effect on daily returns. The results exhibited that the average returns of all the trading days are not identical. The lowest average returns are on Monday and the highest on Friday, which confirms the presence of the day of the week anomaly, had a significant effect. This can be included that consideration to separate data into three periods depends on trend lines upward or downward trends. It can be concluded that the lowest average returns appeared at the beginning of a week (Monday or Tuesday) and the highest average returns appeared at the end of a week (Friday). Therefore, many investors can use this research, the day of the week effect, as a tool to analyze, determine and maximize their expected return in their portfolios.

Keywords: the day of the week effects, returns, The Stock Exchange of Thailand

บทคัดย่อ

วัตถุประสงก์ของงานวิจัชนี้เพื่อศึกษาอิทธิพลของวันแต่ละวันในสัปดาห์ที่มีผลกระทบต่ออัตราผลตอบแทนเฉลี่ยราขวันของดัชนีรากาหุ้น ตลาดหลักทรัพย์แห่งประเทศไทยในช่วงแนวโน้มขาขึ้นและขาดงภายในระยะเวลาทั้งหมดที่ศึกษา งานวิจัชครั้งนี้ใช้ราคาปิดในแต่ละวันของดัชนีรากา หุ้นตลาดหลักทรัพย์แห่งประเทศไทย ตั้งแต่วันที่ 30 เมษาชน 2518 ถึงวันที่ 29 มกรากม 2559 เป็นข้อมูลพื้นฐานในการวิเกราะห์ เพื่อตรวจสอบอิทธิพล ของวันแต่ละวันในสัปดาห์ที่มีผลต่ออัตราผลตอบแทนเฉลี่ยรายวัน ผลการวิจัย พบว่าอัตราผลตอบแทนเฉลี่ยรายวันในแต่ละวันไม่เท่ากัน โดยอัตรา ผลตอบแทนเฉลี่ยรายวันจะมีก่าต่ำสุดในวันจันทร์และมีก่าสูงสุดในวันศุกร์ ซึ่งเป็นการขึ้นขันว่าอิทธิพลของวันแต่ละวันในแต่ละวันไม่เท่ากัน โดยอัตรา ผลตอบแทนเฉลี่ยรายวันจะมีก่าต่ำสุดในวันจันทร์และมีก่าสูงสุดในวันศุกร์ ซึ่งเป็นการขึ้นขันว่าอิทธิพลของวันแต่ละวันในสปดาห์นั้นมีผลกระทบต่อ อัตราผลตอบแทนเฉลี่ยรายวันจะมีก่าต่ำสุดในวันจักร์และมีก่าสูงสุดในวันศุกร์ ซึ่งเป็นการขึ้นขันว่าอิทธิพลของวันแต่ละวันในแต่ละวันไม่เท่ากัน ลดอบแทนเฉลี่ยรายวันจะมีก่าต่ำสุดในวันจันทร์และมีก่าสูงสุดในวันศุกร์ ซึ่งเป็นการขึ้นขันว่าอิทธิพลของวันแต่ละวันในสปดาห์นั้นมีผลกระทบต่อ อัตราผลตอบแทนเฉลี่ยรายวันจะมีก่าซ่างการนี้และมีก่าสูงสุดในวันศุกร์ ซึ่งเป็นการขึ้นขันว่าอิทธิพลงองเส้นแนวโน้ม (แนวโน้มจาขึ้น หรือแนวโน้มจา ลง) สรุปได้ว่าอัตราผลตอบแทนเฉลี่ยรายวันมีก่าต่ำสุดในช่วงต้นสปดาห์ (วันจันทร์หรืออังการ) และมีก่าสูงสุดในวันสุดสปดาห์ (ศุกร์) ซึ่งนักลงทุน สามารถใช้งานวิจัชนี้เป็นเครื่องมือช่วยในการวิเคราะห์และตัดสินใจวางแผนเพื่อให้ได้รับผลตอบแทนจากการถงทุนที่เพิ่มมากขึ้น

ี <mark>กำสำคัญ</mark> : อิทธิพลของวันแต่ละวันในสัปคาห์ อัตราผลตอบแทนเฉลี่ยรายวัน คัชนีราคาหุ้นตลาคหลักทรัพย์แห่งประเทศไทย

1. Introduction

An interesting area of financial research is a stock return which has many factors involved. Many academicians and investors including investment managers believed that they can use news, information, fundamental analysis or technical analysis to select securities that will outperform the market or can identify the growth securities which are undervalued and expected to increase in value in the future.

In recent years an active field of research that involved a stock return, which academicians and investors are interested, is the calendar anomalies or calendar effects. The calendar effects are any financial market anomalies on returns or economic effect which appears to be related to the calendar or the cycle is based on the calendar. Such effects include the different behavior of stock markets on different days of the week, different times of the month and different times of year, sometimes includes multi-year effects or time of day effects such as:

- The January effect also known as the turn of the year effect or the January anomaly which stocks are large in January and much smaller for the rest of the year, is said to affect small caps more than mid or large caps.

- The day of the week effect also known as the weekend effect refers to the tendency of stocks that relatively large returns on Fridays compared to those on Mondays or the returns on Mondays were significantly lower than those of the preceding Friday, etc.

From literature, the evidence in international research shows that the day of the week effect still exists in many markets and many countries as following. (Table1)

Author	Market	Period of study	Data analysis	Observations
A. Corhay	The Brussels	January 1,1977-	t-tests, F-tests,	Tuesday average return appears to
	Stock Exchange	December 31,1985	Regression	be systematically lower than the
				return of the other days of the week
Brishan	The Johannesburg	June 30, 1995-	Regression,	Monday and Wednesday effects
Rowjee	Stock Exchange	December 31,	Kolmogorov-	are found to exist in the Health
		2012	Smirnov test	Care.
Lei Gao and	The Chinese stock	1990-2002	AutoRegressive	Mondays are considerably weak
Gerhard Kling	market		Integrated Moving	and Fridays show significantly
			Average	positive average returns.
Li Bin and	The New Zealand	October 1, 1997-	t-tests	The mid and small capitalization
Liu Benjamin	stock market	April 16, 2009		stocks have significant negative
				returns on Mondays than on other
				weekdays.
Manaporn	The Stock	January 1994 -	constraint-OLS	The strong weekend effect in Thai
Duangprasert	Exchange	October 2009	Regression	stock market. The firm size has a
	of Thailand			strong impact on the degree of the
				weekend effect.
Maria Rosa	17 European stock	1994-2007	Generalized	Excess returns tend to be negative
Borges	market indexes		AutoRegressive	and decreasing in the first three
			Conditional	days of the week, while positive in
			Heteroskedasticity	Thursdays and Fridays, in most
				countries.
Phaisarn	The Stock	January 4, 2005 -	Mean Absolute	The highest percent of prediction
Sutheebanjard	Exchange	March 31, 2009	Percentage Error,	error on Monday and the lowest
and Wichian	of Thailand		Mean Squared Error	percent of prediction error on
Premchaiswadi				Friday
Vandana	Indian Stock	January 1, 2006 -	AutoRegressive	Maximum average positive returns
Khanna	Market	December 31, 2010	Moving Average	on Tuesday
Werner	The main stock	1993-2007	Generalized	A Monday Effect (lower than
Kristjanpoller	markets in Latin		AutoRegressive	expected returns) or a Friday Effect
Rodriguez	America (Argentina,		Conditional	(higher than expected returns) in
	Brazil, Colombia,		Heteroskedasticity	many cases in the region
	Chile, Mexico, Peru)			

Table 1 The evidence in international context about the day of the week effect.

2. Objective

The main objective is to test the existence of the day of the week effect on returns of the Stock Exchange of Thailand (SET) index for the upward or downward trends and the whole period from April 30, 1975 to January 29, 2016.

3. Materials and methods

The daily closing prices of SET index from April 30, 1975 to January 29, 2016 constitute the database of 10,013 observations to study. These data are transformed into daily returns of SET index (r_t)

using the formula $r_t = p_t/p_{t-1}$ where p_t represents the daily closing prices of SET index during trading day t.

The descriptive statistics are employed for every day of the week to determine the normality of the data. These include mean, median, mode, standard deviation, skewness, kurtosis and histogram. Using these statistics and the Kolmogorov-Smirnov Test, an analysis of the distribution of returns can be observed. This will aid in deciding if either a parametric or non-parametric tests should be used. If results show a non-normal distribution, the Kruskal–Wallis test will be employed for a non-parametric test and if it is significant, the Dunn-Bonferroni will be used for pairwise comparisons.

4. Results

Considering the whole period, from April 30, 1975 to January 29, 2016 these results were calculated which the descriptive statistics for daily returns of SET index were presented in Figure 1.



Figure 1 Histogram and Statistics of Returns from Apr 30, 1975 to Jan 29, 2016.

Kruskal-Wallis Test	Chi-Square	df	Asymp.Sig.
Return	98.188	4	.000

From Figure 1 and the Kolmogorov-Smirnov Test, it is obvious that the daily returns of markets is a non-normal distribution; it has been found to be significantly leptokurtic with kurtosis of 8.708.

For testing the day of the week effects, all data are classified into 5 groups by the day of the week and analyzed by using the Kruskal–Wallis test to compare the daily returns in each day as shown in Table 2. It was found that, at least, one group of the daily returns of each day was different and, therefore, we use the Dunn-Bonferroni to find all possible pairwise differences. The descriptive statistics of the daily returns in each day and results of the Dunn-Bonferroni are presented in Table 3 and 4.

Returns	Mo	Tu	We	Th	Fr
Ν	1896	2023	2040	2030	2024
Mean	0.9987099	0.9995611	1.0009103	1.0003495	1.0021623
Median	0.9989999	0.9995705	1.0005676	1.0004170	1.0013459
Sd.	0.0164574	0.0142846	0.0142845	0.0139089	0.0129477
Minimum	0.89503	0.85160	0.90458	0.92455	0.90394
Maximum	1.12019	1.10101	1.11157	1.09050	1.10770
Range	0.22516	0.24941	0.20698	0.16594	0.20376
Skewness	0.326	-0.534	0.014	0.426	0.650
Kurtosis	7.301	12.456	6.620	7.100	10.343
Positive return days (%)	44.9%	47.0%	52.9%	51.9%	57.3%
Negative return days (%)	55.1%	53.0%	47.1%	48.1%	42.7%

Table 3 Statistics of Returns from Apr 30, 1975 to Jan 29, 2016 classified by day of the week.

 Table 4 Pairwise Comparisons using the Dunn-Bonferroni.

	Mo-Tu	Mo-We	Mo-Th	Mo-Fr	Tu-We	Tu-Th	Tu-Fr	We-Th	We-Fr	Th-Fr
Test Statistic	3.380	26.051	17.239	65.903	14.061	9.779	34.378	0.252	4.823	9.476
Sig.	0.066	0.000	0.000	0.000	0.000	0.002	0.000	0.616	0.028	0.002



Figure 2 Mean and Median plots of return from Apr 30, 1975 to Jan 29,2016 classified by the day of the week and percentage of positive/negative return days plots.

From Table 3 and Figure 2, the descriptive statistics of daily returns on each day, from Mondays through Fridays, show that the mean and median of returns describe the presence of lowest Monday and highest Friday. The highest standard deviation and highest percentage of negative return days could be seen on Monday. There are significant pairwise differences as shown in Table 4. All result from Table 2-4, indicates that the daily returns in each day was not identical cause of the day of the week effect.

The next step to confirm the result, the whole data is divided into three periods which depend on the trend lines (as shown in Figure 3).

- Period 1: upward trends, from Apr 30, 1975 to Jan 05, 1994

- Period 2: downward trends, from Jan 06, 1994 to Sep 04, 1998
- Period 3: upward trends, from Sep 05, 1998 to Jan 29, 2016



From the data of each period, it was analyzed and the descriptive statistics was identified as shown in Table 5-9.

Figure 3 Set index (from Apr 30, 1975 to Jan 29, 2016) separated into three periods, which are: period 1 (Apr 30, 1975- Jan 05, 1994) period 2 (Jan 06, 1994 - Sep 04, 1998) and period 3 (Sep 05, 1998 - Jan 29, 2016).

Returns	Period 1	Period 2	Period 3
Ν	4608	1144	4261
Mean	1.00069	0.99833	1.00054
Median	1.00027	0.99797	1.00045
Mode	1.00000	0.90458	1.00000
Sd.	0.01244	0.01888	0.01503
Skewness	-0.084	0.755	0.002
Kurtosis	12.034	5.155	7.580
Kolmogorov-Smirnov Test	Period 1	Period 2	Period 3
Test Statistic	0.127	0.090	0.063
Sig. (2-tailed)	0.000	0.000	0.000

Table 5 Statistics of Returns from Apr 30, 1975 to Jan 29, 2016 classified by a period.

 Table 6 Kruskal-Wallis Test for comparing Returns that were grouped by the day of the week.

Kruskal-Wallis Test	Return (period 1)	Return (period 2)	Return (period 3
Chi-Square	45.629	23.472	44.778
df	4	4	4
Asymp. Sig.	0.000	0.000	0.000

The result of Kolmogorov-Smirnov Test from Table 5 show that the daily returns of markets in every period are non-normal distribution and all of them have been found to be significantly leptokurtic.

From Table 6, for testing the day of the week effects on returns in each period, using the Kruskal– Wallis test to compare the daily returns, the result was found that every period has, at least, one group of the daily returns which was different. The conclusion of every period confirms the same result but there was a little difference as the following.

Returns	Mo	Tu	We	Th	Fr
Ν	872	932	940	931	933
Mean	1.0001661	0.9994258	1.0007288	1.0008671	1.0022447
Median	0.9997998	0.9996096	1.0001501	1.0006907	1.0013022
Sd.	0.0148968	0.0132117	0.0117226	0.0121257	0.0096526
Minimum	0.91938	0.91124	0.91391	0.92455	0.94299
Maximum	1.10903	1.08829	1.06069	1.09050	1.06204
Range	0.18965	0.17705	0.14678	0.16594	0.11905
Skewness	0.308	-0.531	-0.567	0.370	0.226
Kurtosis	10.548	12.956	8.922	13.368	7.046
Positive return days (%)	46.8%	46.6%	51.2%	54.5%	59.3%
Negative return days (%)	53.2%	53.4%	48.8%	45.5%	40.7%

Table 7 Statistics of Returns on the period 1, classified by the day of the week.

Table 8 Statistics of Returns on the period 2, classified by the day of the week.

Returns	Мо	Tu	We	Th	Fr
N	218	229	231	234	232
Mean	0.9944967	0.9978257	1.0004309	0.9983166	1.0003729
Median	0.9942648	0.9977120	1.0001080	0.9979968	0.9994553
Sd.	0.0216646	0.0152818	0.0203982	0.0178771	0.0182475
Minimum	0.93143	0.93847	0.90458	0.95096	0.94454
Maximum	1.12019	1.06904	1.07872	1.08648	1.10730
Range	0.18876	0.13056	0.17414	0.13553	0.16277
Skewness	1.418	0.378	-0.209	1.002	1.195
Kurtosis	7.596	2.836	3.456	4.088	5.803
Positive return days (%)	36.2%	43.7%	50.6%	39.7%	46.6%
Negative return days (%)	63.8%	56.3%	49.4%	60.3%	53.4%

Table 9 Statistics of Returns on the period 3, classified by the day of the week.

Returns	Мо	Tu	We	Th	Fr
N	806	862	869	865	859
Mean	0.9982740	1.0001684	1.0012341	1.0003424	1.0025561
Median	0.9984286	0.9997581	1.0014787	1.0005705	1.0016774
Sd.	0.0162376	0.0150805	0.0148394	0.0144381	0.0142614
Minimum	0.89503	0.85160	0.93121	0.93280	0.90394
Maximum	1.07841	1.10101	1.11157	1.08354	1.10770
Range	0.18338	0.24941	0.18036	0.15074	0.20376
Skewness	-0.144	-0.790	0.482	0.245	0.477
Kurtosis	3.982	14.680	5.338	4.501	10.139
Positive return days (%)	45.2%	48.4%	55.4%	52.5%	58.1%
Negative return days (%)	54.8%	51.6%	44.6%	47.5%	41.9%

Considering average returns of each period in Table 7–9, it was found that:

Period 1: The trend line of Set index is upward from Apr 30, 1975 to Jan 05, 1994, has the lowest average returns on Tuesday and the highest on Friday.

Period 2: The trend line of Set index is downward from Jan 06, 1994 to Sep 04, 1998 has the lowest average returns on Monday and the highest on Wednesday and Friday.

Period 3: The trend line of Set index is upward from Sep 05,1998 to Jan 29, 2016 has the lowest average returns on Monday and the highest on Friday, as shown in Figure 4.



Figure 4 Mean and Median plots of return in each period, classified by the day of the week

5. Discussion

This research aims to test the existence of the day of the week effect on returns of SET index. From the result, it was obvious that overall of the daily returns is abnormally low on Monday which the probability of closing price on Monday is less than the closing price on the last Friday at 55.1%. Furthermore, the abnormally high return on Friday in which the probability of closing price on Friday is greater than closing price yesterday is 57.3%. These results are in accordance with the strong weekend effect in Thai stock market. Moreover, the highest standard deviation could be seen on Monday and the lowest standard deviation on Friday agrees with the highest percent of prediction error on Monday and the lowest percent of prediction error on Friday.

From literature, the Brussels Stock Exchange, the Johannesburg Stock Exchange, the Chinese stock, the New Zealand stock market, 17 European stock market, and the main stock markets in Latin America (Argentina, Brazil, Colombia, Chile, Mexico, Peru), all of them have the day of the week effect which excess returns tend to be negative or decreasing at the beginning of the week and positive at the end of the week according to this result.

6. Conclusion

The primary objective of this research was to investigate the day of the week effect on returns of the SET index for the whole period from April 30, 1975, to January 29, 2016. The results provide evidence that the lowest average returns are on Monday and the highest on Friday, and it can be concluded that the day of the week had a significant effect.

Consideration to separate data into three periods depend on trend lines, such as, period 1 (upward trends: Apr 30, 1975-Jan 05, 1994), period 2 (downward trends: Jan 06, 1994-Sep 04, 1998) and period 3 (upward trends: Sep 05, 1998-Jan 29, 2016). It found that the lowest average returns are on Tuesday and the highest on Friday for period 1, the lowest average returns is on Monday and the highest on Friday for the period 2, and the lowest average returns is on Monday and the highest on Friday for the period 3. From the result above, it can be concluded that the lowest average returns appeared at the beginning of a week (Monday or Tuesday) and the highest average returns appeared at the end of a week (Friday).

In an efficient market, on average, competition will cause the full effects of new information on intrinsic values to be reflected "instantaneously" in actual prices and there is impossible to earn profits more than the market overall.

These results show that the day of the week effect still exists in many markets and many countries including Thailand. The day of the week effect supports the existence of inefficient markets which can provide speculators opportunities for arbitrage. Therefore, many investors can use this research, the day of the week effect, as a tool to analyze, determine and maximize their expected return in their portfolios.

Even though the day of the week effect have existed in the Stock Exchange of Thailand, a lot of people cannot get this chance to make a profit because many investors do not know and the commission fees in each time that they buy or sell. After considering transaction costs and the chance of the day of the week effect, sometimes, it is not worth investing.

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