Dollar-Cost Averaging in Thailand's Equity Index Mutual Fund and Day-of-the-Week Effect

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Abstract

This study aimed to address the question of which day of the week was optimal for purchasing mutual funds to maximize investment returns. It examined the day-of-the-week effect in investment and explores the concept of Dollar-Cost Averaging (DCA) in an equity mutual fund. The research focused on testing an index fund representing all publicly listed companies in the Thai stock market (SCBSET) over different time periods ranging from 5 years to 25 years. Continuous investments had been made in the mutual fund throughout these durations. The results indicated that there was no significant difference in long-term investment returns. However, it is noteworthy that purchasing mutual fund units on Mondays yields the highest returns, aligning with previous research suggesting that Mondays exhibit more negative price movements compared with any other day of the week. In this regard, dollar-cost averaging proves beneficial as investors have the opportunity to buy more units at lower costs on Monday. This results in a higher return on investment over the long term in comparison. In addition, implementing DCA every Friday may lead to the lowest potential returns as the stock market tends to experience the highest upward adjustments on that day. For investors planning to sell their investments, Fridays could potentially offer the best returns.

Keywords: Day-of-the-week effect, Dollar-cost averaging, Mutual fund

Introduction

Background in this research is divided into 2 parts: The day-of-the-week effect and dollar-cost averaging. The day-of-the-week effect refers to a consistent pattern in the stock market where returns vary across different days of the week. It has been observed that certain days tend to exhibit specific return patterns that persist over time. The earliest documented evidence of this effect can be traced back to Kelly's study in 1930. Kelly found that returns on Mondays were consistently lower compared to the returns on other days of the week.

Over the years, several other researchers, including Fields (1931) and Cross (1973), have conducted studies that support the existence of the day-of-the-week effect. These studies have provided additional evidence that returns on specific days of the week deviate from the overall market trend. Academic interest in the day-of-the-week effect gained momentum with French's research in 1980. French expanded on the previous findings and not only confirmed the negative returns on Mondays but also discovered positive returns on the remaining days of the week. This expanded understanding of the effect generated further curiosity among researchers and led to more extensive investigations. Gibbons and Hess (1981) conducted a study on the S&P 500 index and the equal weighted index during the period of 1962-1978. Their objective was to analyze the impact of different days of the week on asset returns. Their findings were consistent with those of French (1980), but they discovered that Mondays were not the sole day associated with significantly low average returns. Tuesdays also exhibited lower returns, while Wednesdays and Fridays demonstrated higher average returns compared to Tuesdays and Thursdays.

Jaffe and Westerfield (1985) wanted to broaden this research area because many scholars had concentrated primarily on the American stock market for these anomalies. As a result, they discovered evidence of this phenomenon in four other industrialized nations. They proved that this anomaly wasn't limited to the American stock market. Along with the US, Canada, the UK, Japan, and Australia had demonstrated evidence of day of the week impacts, according to Jaffe and Westerfield (1985). The US, Canada, and UK showed the lowest Monday mean returns, which is consistent with the available literature. In contrast to the poor returns on Monday, Japan and Australia's returns were discovered to be the lowest on Tuesday. In addition, a research conducted by Chaouach (2020) also show the lowest mean daily returns of the Canadian stock market index on Monday as well. The findings indicated that Monday

returns exhibit a negative trend and are significantly lower compared to the returns observed on the remaining trading days of the week.

Published academic articles on the day of the week effect in the Thai stock market seem to be limited. A research work by Khanthavit and Chaowalerd (2016), using data between the year 2002 and 2015, found the presence of the Monday Effect, indicating negative returns on Mondays in the SET index. Jenwittayaroje (2019) showed that, when compared to the average returns for the other days, Monday's return is the lowest and negative. Finally, the latest study conducted by Wuthisatian (2022) provided compelling evidence of a weekday seasonality in the Thai stock market using daily stock returns from March 2014 to March 2019. The finding showed that there was strong evidence of a persistent monthly pattern and weekday seasonality in the Thai stock market. Specifically, Monday returns were negative and significantly lower than the returns on other trading days of the week

The day-of-the-week effect in the stock market can be examined through statistical methods such as Ordinary Least Square (OLS) regression. Suppose we want to investigate the phenomenon known as the Monday Effect, which suggests that the returns on securities tend to be lower on Mondays compared to other weekdays of the week. In this case, the OLS equation used for testing is:

$$r_t = \alpha + \beta D_t + \epsilon_t \qquad (1)$$

where r_t represents the return on day t, D_t is a dummy variable that equals 1 when t is Monday and 0 otherwise, and ε_t is the error term. If the Monday Effect truly exists, the coefficient β should have a negative value and be statistically significant. OLS regression can be used independently or in conjunction with other techniques like Autoregressive Conditional Heteroscedasticity (ARCH) or Generalized Autoregressive Conditional Heteroscedasticity (GARCH). These methods are commonly employed for analyzing financial time series data where the majority of the literature has predominantly employed OLS regression. Nevertheless, this OLS approach has its own limitation because OLS assumes constant error variance over time and fails to consider the time-varying volatility observed in stock returns. Nevertheless, the above-mentioned methods can be challenging to comprehend in general practice, especially individual investors who have limited knowledge in statistics. Thus, this

study aims to employ real mutual fund data as a more practical approach to indirectly test such phenomena. This will be explained further in details.

According to a study by Mehdian and Perry from 2001, day-of-the-week impacts have diminished over time in the United States. They examined three major stock indices from 1964 to 1998, and while they discovered that Monday returns were negative during the entire study period, they discovered that beginning in 1987, Monday returns began to become positive. This is in line with research by Smirlock and Starks (1986), who discovered that the Monday coefficient's sign has evolved over time. Kohers et al. (2004), who investigated whether the rise in market efficiency over the previous 22 years had caused the day of the week effects to decrease, also agreed with this notion. To thoroughly examine any potential changes in this phenomenon, it is recommended to extend the period of data collection.

While the exact causes of this effect are not fully understood, several factors have been suggested as potential explanations: (1) Psychological factors such as investor sentiment may contribute to the day-of-the-week effect. It is believed that negative news and events occurring over the weekend can result in increased anxiety and caution among investors, leading to lower trading activity and lower stock prices on Mondays. (2) Weekend news flow (Important news, events, or economic data releases) tend to be less frequent over the weekends. Investors may react to this accumulation of news on Mondays, causing higher volatility of price movements compared to other days of the week. (3) Trading and liquidity where Mondays often witness lower trading volumes can lead to wider bid-ask spreads and reduced market efficiency. This illiquidity may contribute to greater price volatility on Mondays. (4) Market Structure can also influence the day-of-the-week effect. For example, short-selling restrictions or limitations on specific trading strategies may impact market dynamics differently on certain days. (5) It is possible that investors tend to overreact to news or events at the beginning of the week, resulting in exaggerated price movements. This could be due to reduced market activity over the weekends, allowing emotions to build up.

Dollar-Cost Averaging (DCA) is a strategy that entails regularly investing a fixed amount of money in a specific security over a set period, regardless of its price fluctuations. This approach allows investors to potentially reduce their average cost per share and mitigate the impact of market volatility on their portfolios. Essentially, it eliminates the need to time the market in order to buy at the most favorable prices, making the investment process more effortless. DCA can be applied to equity mutual funds. This strategy involves purchasing fund

units regardless of their price fluctuations. The goal is to potentially lower the average cost per unit over time. There are several empirical researches supporting DCA. For instance, Dubil (2005) and Trainor (2005) both demonstrated that DCA effectively lowers the risk of falling short of financial goals, particularly in the contexts of retirement savings and retail investing. Additionally, Grable and Chatterjee (2015) observed that employing a DCA strategy can lead to better performance even when faced with a bear market. Luskin (2017) noted that DCA delivered superior results compared to a lump sum investment.

By implementing DCA with equity mutual funds, investors aim to capitalize on market fluctuations. When the fund's price is high, the fixed investment amount buys a smaller number of units, while during periods of low prices, the same investment amount buys a greater number of units. This approach helps to smooth out the impact of market volatility, as the focus is on steadily accumulating shares over the long term rather than attempting to time the market to make purchases at the most opportune moments. A combination of these two ideas can lead to interesting results, which will be described in the following content.

Objectives and Scopes

The inspiration behind this research was primarily focused on practical outcomes. The primary objective of this study was to investigate the optimal day of the week for purchasing mutual funds in order to maximize investment returns. In addition, the secondary objective of this research was to examine the existence of the day-of-the-week effect. If it does exist, how can individual investors who use the dollar-cost averaging method benefit from this phenomenon? To have a clear practical perspective, the experiment employed data from SCB SET INDEX FUND (SCBSET), the first and oldest equity index fund in Thailand. Registered in 1996, it is the only fund available that tracks the movement of the broad market of SET Index, which represents all public companies traded in the Stock Exchange of Thailand. The remaining Thai equity index funds use the SET50 Index as their benchmark, which reflects only the 50 largest companies and does not include medium and small-sized companies. Therefore, they were not included in this study because the analysis aimed to provide an overview of registered companies across the entire market, including large, medium, and small-sized companies. Core investment of SCBSET was in equities significant to the SET Index whereby tracking of the index’s movement was replicated via a computer program and investment comprised of no more than 50% of the listed securities, which its average net

exposure for the accounting year at least 80% of the fund's Net Asset Value (NAV). The movement of the investment portfolio's net asset value tracked the movement of the SET Index as closely as possible. The study included testing periods of 5, 10, 15, 20, and 25 years over the fund's historical data. The investment simulation in this study utilized actual fund data. The resulting returns were deducted by various fees incurred by the fund, including management fee, trustee fee, registrar fee, and miscellaneous fees, amounting to approximately 1 percent in total.

Methodology

The research process began by aggregating the NAV data of the SCBSET fund for the past 25 years, starting from the end of April 2023 and moving backward. Hence, this fund has been in existence for over 26 years since its registration date on 20 Aug 1996. After that, a simulation was conducted by purchasing units of the fund with an equal amount of money at each time. The purchases were divided into five cases, which were every Monday, every Tuesday, and so on. In the case where the desired purchase date falls on a holiday, the purchase will be made on the next business day.

Data analysis involved computing the Compound Annual Growth Rate (CAGR) to assess historical returns as shown in equation (1) CAGR represents the annualized rate of return needed for an investment to grow from its initial balance to its final balance, assuming that profits are reinvested at the end of each period throughout the investment's lifespan.

$$CAGR = \left(\frac{Ending\ Value}{Beginning\ Value}\right)^{1/N} - 1 \qquad (2)$$

where N is number of years in investment period

The CAGR calculation was performed at five different time intervals: 5 years, 10 years, 15 years, 20 years, and 25 years. Afterward, the returns generated from investing on each day of the week were compared to draw conclusive findings.

Results and Discussions

The research results can be explained in two tables. Table 1 shows the returns obtained from implementing Dollar-Cost Averaging (DCA) on different days over various time

periods. For example, if an investment of 1,000 Baht is made every Monday continuously for a period of 20 years, assuming there are 52 weeks in a year, the total number of investment purchases would be 1,040 times. The cumulative investment amount over the 20-year period would be 1,040,000 Baht. At the end of the investment horizon, it was found that the invested capital has grown to 1,967,264 Baht, resulting in a return rate of 89.2 percent as shown in this table.

Table 1 Investment Return from Dollar-Cost Averaging each Day of the Week

Duration (years)	Investment Return (%)				
	Monday	Tuesday	Wednesday	Thursday	Friday
5	1.2	1.0	0.9	1.0	1.0
10	7.9	7.8	7.7	7.7	7.7
15	48.9	48.8	48.7	48.7	48.5
20	89.2	89.1	88.9	88.9	88.5
25	178.8	178.7	178.5	178.3	177.6

When comparing the investment periods of the same duration, such as 20 years, it could be observed that implementing DCA every Monday yielded the highest returns, followed closely by Tuesdays. On the other hand, implementing DCA every Friday resulted in the lowest returns. However, the difference between them is considered insignificant. For example, on Mondays, the return was 89.2 percent, while on Fridays, the return was 88.5 percent, with a difference of less than 1 percent. This is considered a very small gap considering a 20-year investment horizon.

Table 2 Compound Annual Growth Rate (CAGR) from Dollar-Cost Averaging

Duration (years)	Compound Annual Growth Rate CAGR (%)					Arithmetic Mean (%)	Standard Deviation (%)
	Monday	Tuesday	Wednesday	Thursday	Friday		
5	0.47*	0.40	0.37	0.38	0.38	0.38	0.013
10	1.52*	1.50	1.49	1.49	1.48	1.49	0.008
15	5.13	5.13	5.12	5.12	5.10*	5.13	0.006
20	6.00	6.00	5.99	5.99	5.97*	6.00	0.006

Table 2 (continued)

Duration (years)	Compound Annual Growth Rate CAGR (%)					Arithmetic Mean (%)	Standard Deviation (%)
	Monday	Tuesday	Wednesday	Thursday	Friday		
25	7.44	7.44	7.43	7.43	7.42*	7.44	0.006
(*) indicates statistically significant return							

Corresponding results from the study were demonstrated in Table 2, which presented the Compound Annual Growth Rate (CAGR) derived from implementing Dollar Cost Averaging on each day of the week. With the intention of improving clarity in the realm of statistics, the approach of hypothesis testing using inferential statistics was implemented. The objective was to investigate whether a specific day (such as Monday or Friday) generates a significant higher or lower investment return when compared to the overall mean return spanning from Monday to Friday. The null and alternative hypotheses were expressed as follows:

$$H_0: \ \mu_{day} = \mu_{mean} \quad (3)$$

$$H_1: \ \mu_{day} \neq \mu_{mean} \quad (4)$$

where μ_{day} refers to the CAGR of the day being tested, while μ_{mean} refers to the average value of the CAGR spanning from Monday to Friday. The t-test statistic was employed by testing the difference between these CAGRs. The acceptance criteria were based on a significance level of 0.05.

The results presented in Table 2 demonstrated that over periods of 5 and 10 years, employing the DCA technique on Mondays resulted in a statistically significant higher return (indicated by the asterisk symbol). However, over durations of 15, 20, and 25 years, the CAGR on Mondays exhibited a slightly higher value, though not achieving statistical significance. Conversely, by the week's conclusion, utilizing the DCA technique on Fridays yielded marginally lower values compared to other days, yet this difference lacked statistical significance for 5 and 10-year periods. In contrast, for extended durations of 15, 20, and 25 years, the CAGR on Fridays demonstrated a statistically significant lower value.

This research aligned with previous studies, indicating that the returns of the stock market index on Mondays tended to be the lowest. However, if investors consistently

purchase investment units every Monday, they would have a lower initial investment compared to other days of the week. In other words, they would accumulate a greater number of investment units for the same amount of money invested. Accumulating investment units with a lower initial cost over the long term brought higher returns as time passes.

On the contrary, implementing DCA every Friday would result in the lowest potential returns. This is because, on average, the stock market tended to experience the highest upward adjustments on Fridays. Therefore, for investors looking to sell their investments, Fridays would be the day that potentially offers the best returns.

Another interesting observation from Table 2 was that when comparing the CAGR values across different investment extended, the gap between the returns gradually narrowed down as the number of years invested increased. For example, considering a 5-year investment horizon, the CAGR of Mondays was 23.7 percent higher than that of Fridays [(0.47-0.38)/0.38×100], while the CAGR of Mondays was only 0.27 percent higher than that of Fridays [(7.44-7.42)/7.42×100] when considering a 25-year horizon. Therefore, from the perspective of long-term investors, the day of the week had a minimal impact on the overall returns.

Conclusions and Recommendations

In summary, the research findings indicated that the day-of-the-week effect did indeed occur. This was observed indirectly through the lowest returns of the stock market index on Mondays and the highest returns achieved by employing DCA on every Monday. This was because investing on Mondays allows investors to purchase investment units at lower prices compared to other days, resulting in a higher accumulation of investment units in the long run. These implied comparable results in the literatures previously described, especially Khanthavit and Chaowalerd (2016), Jenwittayaroje (2019) ,and Wuthisatian (2022), where day-of-the-week effect were statistically tested in a straightforward manner.

Due to the reasons stated above, adhering to the DCA strategy on a weekly basis, particularly on Fridays, would typically lead to relatively lower returns. This was because the stock market tends to exhibit the highest upward adjustments on Fridays. Consequently, for investors intending to sell their investments, Fridays would likely be the most opportune day in terms of achieving favorable returns. This research served as a good opportunity to take advantage from the day-of-the-week effect. Nonetheless, as the investment horizon lengthened, the gaps in returns among these days gradually narrowed down. Therefore,

investors who practice continuous DCA over decades need not overly concern themselves with the impact of the day-of-the-week effect. It's important to note that DCA does not guarantee profits or protect against losses. Investment performance will still depend on the underlying assets and overall market conditions.

Recommendations for future research can be made in this aspect such as: (1) Investigate the day-of-the-week effect over sub-periods to see if it stays the same or changes over time. (2) Compare the day-of-the-week effect in different countries to find out if it happens everywhere or varies across regions. (3) Explore the reasons and psychological factors that contribute to the day-of-the-week effect, such as investor emotions, market efficiency, or biases. (4) Examine if the day-of-the-week effect is stronger in certain industries and uncover the factors behind these patterns. (5) Explore if the day-of-the-week effect also applies to other financial instruments like bonds, commodities, or currencies, and (6) further investigations on importance events such as pandemic, political, effect By pursuing these research directions, we can enhance our understanding of market anomalies like the day-of-the-week effect and contribute to the evolving field of finance and investment.

References

Chaouachi, O. (2020). The Day of the Week Effect: Unconditional and Conditional Market Risk Analysis. *International Journal of Economics and Financial Issues, 10*(6), 94-98.

Cross, F. (1973). The Behavior of Stock Prices on Fridays and Mondays. *Financial Analysts Journal*, *29*(6), 67–69.

Dubil, R. (2005). Lifetime Dollar-Cost Averaging: Forget Cost Savings, Think Risk Reduction. *Journal of Financial Planning*, *18*(10), 86-90.

Fields, M. (1931). Stock Prices: A Problem in Verification. *The Journal of Business*, 4, 415–418.

French, K. (1980). Stock Returns and the Weekend Effect. *Journal of Financial Economics*, *8*(1), 55–69.

Grable, J. and Chatterjee, S. (2015). Another Look at Lump-Sum versus Dollar-Cost Averaging. *Journal of Financial Service Professionals*, *69*(5), 16–18.

Gibbons, M. and Hess, P. (1981). Day of the Week Effects and Asset Returns. *The Journal of Business*, *54*(4), 579-596.

Jaffe, J. and Westerfield, R. (1985). The Week-End Effect in Common Stock Returns: The International Evidence. *Journal of Finance*, *40*(2), 433-54.

Jenwittayaroje, N. (2019). The Study of Monday Effect in the Stock Exchange of Thailand. *NIDA Business Journal*, *25*, 158-172.

Kelly, F. (1930). *Why You Win or Lose: The Psychology of Speculation*. Boston. Houghton Mifflin.

Khanthavit, A., and Chaowalerd, O. (2016). Revisiting the day-of-the-week effect in the Stock Exchange of Thailand. *Journal of Business Administration*, *39*, 73-89.

Kohers. G., Kohers, N., Pandey, V., and Kohers, T. (2004). The Disappearing Day-of-the-Week Effect in the World's Largest Equity Markets. *Applied Economics Letters*, *11*(3), 167-171.

Luskin, J. (2017). Dollar-Cost Averaging Using the CAPE Ratio: An Identifiable Trend Influencing Outperformance*. Journal of Financial Planning, 30*(1)*,* 54-60.

Mehdian, S. and Perry, L. (2001). Market Efficiency and the Reversal of the Monday Effect: New Evidence from U.S. Equity Markets. *Journal of Business Finance and Accounting*, *28*(7-8), 1043-1065.

Smirlock, M. and Starks, L. (1986). Day-of-the-week and Intraday Effects in Stock Returns. *Journal of Financial Economics*, *17*(1), 197-210.

Trainor, W. (2005). Within-Horizon Exposure to Loss for Dollar-Cost Averaging and Lump-Sum Investing. *Financial Services Review*. *14*(4), 319–330.

Wuthisatian, R. (2022), An Examination of Calendar Anomalies: Evidence from The ThaiStock Market. *Journal of Economic Studies*, *49*(3), 422-434.