DOES THE INVESTOR STILL OVERREACT?: EVIDENCE FROM A TWO-DECADE ASSESSMENT OF THE SET INDEX

BY

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ABSTRACT

This research aims to study the response behavior of investors in the Stock Exchange of Thailand (SET) to changes in stock prices during 2004–2023 by using the Contrarian Strategy to test the market's overreaction hypothesis. The analysis of monthly stock price data found that the Contrarian Strategy could not generate statistically significant positive returns, reflecting investors' underreaction behavior. Meanwhile, the Momentum Strategy yielded significantly higher returns than the SET Index, especially in small-cap stocks.

In addition, the research results found that investors' response behavior was asymmetric, with a tendency to respond slowly when prices increased but overreact when prices decreased. The findings of this research contradicted the weak-form EMH theory, which states that current stock prices reflect all past information. The research results indicate that the Thai market is inefficient, which might be caused by irrational investors or investors who are influenced by "noise traders", causing stock prices to deviate from their true values over a period of time.

Keywords: Investor behavior, Contrarian strategy, Momentum strategy, Market overreaction, Market efficiency, SET Index

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TABLE OF CONTENTS

	Page
ABSTRACT	(1)
ACKNOWLEDGEMENTS	(2)
LIST OF TABLES	(5)
CHAPTER 1 INTRODUCTION	1
CHAPTER 2 LITERATURE REVIEW AND THEORETICAL FRAMEWORK	3
2.1 Literature Review	3
2.1.1 Efficient Market Hypothesis	3
2.1.2 Market Overreact	5
2.1.3 Anomalies	7
2.1.4 Investment strategies, momentum, and contrarian	8
2.2 Theoretical Framework	10
2.2.1 Market Efficiency Hypothesis	10
2.2.2 Anomalies	11
2.2.3 Overreaction Hypothesis	11
2.2.4 Behavioral Finance	11
2.2.5 Momentum and Contrarian Strategies	12
CHAPTER 3 RESEARCH METHODOLOGY	13
3.1 Data Selection	13
3.2 The Overreaction Hypothesis	13

CHAPTER 4 EMPIRICAL RESULT AND DISCUSSION 16

4.1 Descriptive Statistics 16
4.2 Testing the overreaction of investors in SET 17

CHAPTER 5 CONCLUSIONS AND RECOMMENDATIONS 25

5.1 Conclusions 25
5.2 Limitations 26
5.3 Recommendations 26

REFERENCES 28

BIOGRAPHY 31

LIST OF TABLES

Tables	Page
4.1 Descriptive Statistics	17
4.2 Returns from using contrarian strategies for stocks in the SET Index	17
4.3 Returns from the winner portfolio for stocks in the SET index	20
4.4 Returns from the loser portfolio for stocks in the SET index	20

CHAPTER 1
INTRODUCTION

The famous adage “Be greedy when others are fearful” attributed to Warren Buffett, encapsulates a contrarian investment strategy that takes advantage of market downturns. This principle assumes that times of widespread fear and market pessimism present unique opportunities for investors willing to take calculated risks. Previous studies have highlighted the potential benefits of contrarian trading strategies in various markets (Jegadeesh & Titman, 1993; De Bondt & Thaler, 1985). However, there have been few studies that focus specifically on the SET Index. We aim to fill this gap by providing a detailed assessment of the SET Index, thus contributing to a broader understanding of market behavior and investment strategies. This study aims to assess the validity of this investment philosophy based on a comprehensive analysis of the stock in the SET Index over the past two decades. serves as the focal point of this study, examining the performance of these indices during periods of significant market volatility. And try to find clear evidence of the effectiveness of the contrarian investment strategy of the Thai stock market.

The Contrarian Strategy is effective because investors tend to overreact to new news and information in the market. When there is bad news or events that affect confidence, many investors tend to sell securities quickly and cause prices to fall below their true value. Conversely, when there is good news, investors tend to buy securities quickly and cause prices to exceed their true value (De Bondt & Thaler, 1985,1987; Brailsford, 1992; Chopra et al., 1992; Gunaratne & Yonesawa, 1997). This overreact creates opportunities for investors using the Contrarian Strategy by buying securities that have been sold during the market downturn and selling securities that are overpriced during the market's high confidence.

However, the contrarian investment strategy challenges the efficient market hypothesis (EMH) (Fama, 1970), which states that market prices reflect all available information. And cannot make abnormal profits from using the currently available information. However, Contrarian is considered one of the anomalies that challenge the efficient market theory, believing that markets tend to misvalue over time, indicating

that there is an opportunity to profit from price movements that are inconsistent with the available information. The fact that the Contrarian Strategy can generate returns that outperform the market in some periods of time shows market imperfections and misvaluations of securities, which EMH cannot fully explain.

However, previous studies have found that many anomalies that have been discovered in the past tend to decrease or disappear over time, which may be due to investors starting to learn and adapt to new information received (McLean & Pontiff, 2004; Jones & Pomorski, 2015). Therefore, this study aims to examine whether Contrarian anomalies, one of the popular investment strategies, tend to decrease or disappear over time in order to understand the change in the efficiency of this strategy in a rapidly changing financial market.

This research focuses on analyzing long-term data to obtain empirical evidence on the profits from the strategy, as well as the change in the efficiency of this strategy in this market. The results of this research will not only support the existing literature on trading strategies But it also provides useful insights for investors looking to optimize their investment strategies in volatile markets.

The results of this study are expected to offer valuable insights for investors and policymakers, enhancing their ability to navigate market complexities and make informed investment decisions. By providing empirical evidence on the performance of contrarian strategies in the SET indexes, this research will contribute to the ongoing discourse on market efficiency and investment behavior.

CHAPTER 2
LITERATURE REVIEW AND THEORETICAL FRAMEWORK

This section covers various Efficient Market Hypothesis, Market Overreact, Anomalies, Investing strategies such as momentum and contrarian methods, and Warren Buffett's philosophy that once said "being greedy when others are fearful"

2.1 Literature Review

2.1.1 Efficient Market Hypothesis

Fama (1970) proposed the Efficient Market Hypothesis (EMH), which states that stock prices reflect all available information. If markets are efficient, stock prices will move randomly (random walk process), meaning that there will be no abnormal returns and investors will receive returns only according to the risks they accept.

Fama classified market efficiency into three types: weak form, semi-strong form, and strong form. Weak Form Tests examine whether past stock prices can predict future stock prices. Most of the test results support the EMH, showing that past prices do not provide useful information for predicting future prices. Semi-Strong Form Tests examine whether security prices respond quickly to new publicly available information, such as earnings announcements, stock splits, and new share issuances. The results show that prices respond quickly to these information events, supporting the semi-strong form of the EMH. Strong Form Tests examine whether there are investors or groups with access to privileged nonpublic information. Although there is some evidence that insiders and experts may have access to nonpublic information, overall markets are still efficient.

However, Keane (1986) explores the changing perspectives on the Efficient Market Hypothesis (EMH), finding that since 1978, a growing number of studies have reported results that contradict the EMH, raising questions about whether markets were efficient in the past and are now inefficient. Or has the stock price behavior consistently been consistent with the practitioners' view but evaded the

scrutiny of researchers? Keane thus divides market inefficiencies into three categories: Class I, Class II, and Class III. Class I is inefficiency that is perceived by only highly skilled analysts; Class II is inefficiency that can be exploited by ordinary investors; and Class III is inefficiency that information from experts can be conveyed to ordinary investors. As a result, operationally efficient markets can have some degree of inefficiency that can be exploited by expert analysts but not by ordinary investors. Thus, the choice of an appropriate investment strategy still depends on investors' beliefs about the efficiency of the market and their ability to exploit the reported inefficiencies.

Black (1986) proposed an important idea that explains that financial markets are generally not fully efficient because there is something called “noise” or immaterial information embedded in the price movements of financial markets. “Noise” refers to the fact that some investors trade by mistakenly believing that the information they have is real when in fact it is just a misunderstanding or false signal. This behavior is called noise trading.

Although trading from noise may seem irrational, Black argues that noise trading is necessary for the existence of a liquid market because if there are only truly informed traders, there will be very little trading because those with information will hesitate to trade with those with equally good information. Therefore, players who lack information are motivated to trade and are the reason why the market can function in practice.

However, the presence of noise in the market causes the price of assets to deviate from their true value in the short term, making the market inefficient at times. Although prices may rebound to their long-term value (mean reversion), the uncertainty about the source of the information makes it difficult to decide when the market is truly inefficient and can be speculated on.

Black also suggests that An efficient market could be redefined more broadly, suggesting that an “efficient market” could mean a market where the price of an asset falls within $\pm 100\%$ of its intrinsic value, for example a stock price that falls between 50% and 200% of its value is considered “efficient”, according to a more relaxed definition than traditional theory.

Shleifer (2000) argues against the Efficient Market Hypothesis (EMH), stating that in the real world, asset prices tend to deviate systematically and over a long period from their fundamental values, which contradicts the idea that market prices reflect all information quickly and accurately.

Drawing on evidence from behavioral finance, Shleifer explains that the behavior of many investors is not based on traditional economic rationale, but is instead influenced by psychological biases such as overreaction. (overreaction), underreaction, and over-reliance on certain information, all of which cause asset prices to move deviate from their fundamentals continuously.

Furthermore, market inefficiencies persist because of limits to arbitrage that prevent rational players from always correcting misprices, such as the risk that prices will remain mispriced for a long time, restrictions on short selling, and pressure from investors or fund managers. As a result, markets can be inefficient even with informed and rational investors in the system.

These concepts are the foundation of behavioral finance and are used to explain anomalies found in markets, such as asset bubbles, uninformative price movements, and returns that are inconsistent with the CAPM risk level.

2.1.2 Market Overreact

A contrarian strategy is effective because of overreaction. De Bondt and Thaler (1985) proved that people tend to overreact to unexpected and large-scale news. This overreaction results in an exaggerated movement in stock prices, making the contrarian strategy effective. Gunaratne and Yonesawa (1997) prove that the extreme losers outperform the extreme winners in terms of risk-adjusted abnormal returns during the subsequent period. It is controversial whether these abnormal returns are due to overreaction by the investor Brailsford (1992) studied the “winner-loser anomaly” phenomenon in the Australian stock market between 1958 and 1987. And Donovon et al. (2000) studied between 1980 and 1997. The results found that while the winners' portfolios exhibited clear price reversals, the losers' portfolios continued to exhibit negative returns. This contradicts studies from the US stock market which found price reversals in both winners and losers. Chopra et al. (1992) studied stock market investment behavior by focusing on abnormal returns of stocks with different past performances between extreme losers and extreme winners. The study found that stocks

with poor past performances (losers) had higher average returns than stocks with good past performances (winners), which supports the overreaction hypothesis that the market tends to misvalue stocks due to investors' extrapolation bias.

A study by SiriAmornsook (2011) analyzed overreaction in the Stock Exchange of Thailand (SET) and the effect of stock liquidity on the level of overreaction using data from all stocks in the SET from December 1988 to December 2010. Found the evidence of overreaction in the Stock Exchange. Losers outperform winners in subsequent periods, which contradicts the efficient market hypothesis. In addition this study also found that stock liquidity affects the degree of overreaction, with highly liquid stocks overreacting more severely.

Pokavattana et al. (2019) studied the overreaction effect in the Stock Exchange of Thailand using the Contrarian investment strategy covering the period from 2012-2017. The results showed that the portfolio consisting of losing stocks had higher returns than the portfolio consisting of profitable stocks, especially from the 27th month onwards, indicating an overreaction in the Stock Exchange of Thailand. The results also indicated that the Thai stock market did not completely conform to the Efficient Market Hypothesis (EMH).

Piromsopa (2007) studied the short-term trend reversal of stock prices in the Stock Exchange of Thailand, focusing on the period from 2000 to 2006. It was found that stock prices reversed in cases where prices declined due to bad market news or no bad news (perhaps due to rumors or profit-taking), but no reversal was found in cases where prices declined due to bad company news, which shows that the Thai stock market is inefficient. Especially in the weak form EMH, where historical stock price data can be used to predict future price movements.

The study by Lerskullawat and Ungphakorn (2018) examined the over-reaction hypothesis of stock prices in the Stock Exchange of Thailand covering the period from 1990 to 2016. The results found over-reaction, especially during financial crises such as the Asian financial crisis in 1997 and the global financial crisis in 2008-2009. The results showed that the Contrarian strategy is an appropriate strategy for investment in Thailand. Since the portfolio of stocks with poor past performance outperformed the latter, it was also found that large-cap stocks tended to overreact more

than small-cap stocks, and stock prices were predictable, indicating that the Thai stock market was inefficient.

Panyakosa (2004) tested the overreaction of common stocks in the Stock Exchange of Thailand. During the period from January 1998 to December 2003, it was found that the accumulated abnormal returns of both groups of securities had a direction of change in the level of abnormal returns in the opposite direction of the past abnormal returns. The Top Winner group of securities had an abnormal return value of -0.51%, T-value = -0.06, while the Top Loser group of securities had an abnormal return value of 8.75%, T-value = -0.81.

Hypothesis: There is an overreaction in the SET market

2.1.3 Anomalies

A study by McLean and Pontiff (2004) examined the impact of academic research on the predictability of stock returns using 97 variables presented in academic research. The results showed that portfolio returns declined by 26% in the period after the original sample and by 58% in the period after publication, indicating that research publication affects investors' learning about mispricing. The study also found that returns declined more for predictors with higher returns in the sample and increased for portfolios with higher idiosyncratic risk and lower liquidity. Investors also learned about mispricing from research publications, leading to increased trading volume and increased short- selling interest in stocks in the predictor portfolio. Publication also affected the relationship between the returns of unpublished and published predictor portfolios.

Jones and Pomorski (2015) studied the decline in anomalies in financial markets after they were discovered. They propose a Bayesian analytical framework to study their impact on investment decisions. They found that several anomalies, such as the January effect and short-term index autocorrelation, tend to decline over time after they are discovered. This study uses three parameters: the initial strength of the anomaly, the time when the anomaly is discovered, and the decline rate, to analyze the changes in the anomalies over time. The results show that the January effect has been declining slowly since the 1970s, and the short-term index autocorrelation almost disappeared by the mid-1990s. Taking the decline of anomalies into account has a significant impact on investment decisions. Using an anomaly

decline analysis framework leads to better investment performance in out-of-sample models. Jones and Pomorski conclude that studying the decline of anomalies helps to understand the root causes of the anomalies and improves the prediction of future returns.

However, Asness et al. (2013) found that investment strategies using value and momentum variables continue to provide good returns across markets worldwide, even after the release of information about these strategies. The study found that the returns of value and momentum strategies are consistent and have a strong common factor structure across a variety of asset classes, indicating that these strategies are still effective in generating good returns.

2.1.4 Investment strategies, momentum, and contrarian

Momentum and contrarian strategies are two widely used approaches in investment strategies. Wu (2011) studied the momentum trading, mean reversion, and overreaction strategies in the Chinese stock market. It was found that the momentum strategy alone could not generate excess returns in the Chinese stock market, but the contrarian strategy that emphasized mean reversion could generate significant excess returns.

Forner and Marhuenda (2003) studied contrarian and momentum strategies in the Spanish stock market. Using data from 1963 to 1997, the results show that the 12-month momentum strategy and the 60-month contrarian strategy can generate significant excess returns, although the results of the contrarian strategy are questionable when using non-overlapping test periods.

Bornholt et al. (2015) studied the role of past trading volume on the behavior of momentum returns in international stock markets using data from 38,273 stocks in 37 countries during 1995–2009. This research classifying momentum strategies into three types: pure momentum, early stage momentum, and late stage momentum, which take into account past trading volume. They found that the early stage momentum strategy, which focuses on investing in low-volume winners and selling high-volume losers, yielded significantly higher average returns than other strategies in 34 out of the 37 countries studied.

Teplova and Mikova (2015) studied the momentum phenomenon in the Japanese stock market and found that the momentum effect does exist but occurs under specific conditions, such as before the 2008 financial crisis or in large-cap stocks. The returns from the momentum strategy are significant in some periods, especially when using a full rebalancing portfolio and in a bull market. There is also a seasonal effect, with significant negative returns in January and May. The Fama-French model cannot fully explain these excess returns, reflecting the unique characteristics of the Japanese market, which differ from those of Western countries.

Maheshwari and Dhankar (2017) studied the relationship between trading volume and the profitability of momentum and contrarian strategies in the Indian stock market. Using data from the NSE market between 1997–2013, the study found that momentum strategies deliver better returns over the short to medium term (3–12 months), while contrarian strategies outperform over the long term (36 months). Importantly, both momentum and contrarian volume-based strategies outperform conventional strategies, particularly the early-stage momentum strategy (buying low-volume winners and selling high-volume losers), which delivers high and consistent returns for up to 36 months.

Su (2021) conducted a comprehensive study of the style momentum investment strategy in the Chinese stock market. Using data from non-financial companies in the Shanghai and Shenzhen stock exchanges from 1994 to 2017, this study suggests that grouping stocks by fundamental characteristics such as company size and book-to-market ratio and then ranking them by their historical returns can generate significant returns, especially after 2006, when the Chinese market underwent structural developments such as allowing short selling and increasing the role of institutional investors. The results indicate that style momentum yields significantly higher returns than price momentum and industry momentum, and is cyclical, i.e., yields higher returns during bear markets.

Lakonishok et al. (1994) studied the issue of contrarian investment strategies, indicating that investors can generate returns that outperform the market by investing in undervalued stocks (value stocks) that are often undervalued and avoiding popular but overvalued stocks (glamour stocks). It was found that the excess returns of value stocks did not come from accepting more risk, but from the market's mispricing

caused by investors' extrapolation bias. Investors tend to use historical data as a basis for predicting the future, resulting in glamour stock prices being overvalued and value stock prices being undervalued.

Lo and MacKinlay (1990) studied a contrarian investment strategy that emphasized buying stocks that were falling in price and selling stocks that were rising in price. Using data from the NYSE and AMEX stock exchanges between 1962 and 1987, the results show that most of the profits from contrarian strategies are not due to stock market overreaction alone, but to cross-autocorrelation between stocks, meaning that the returns of large-cap stocks tend to lead the returns of small-cap stocks.

A study by Piromsopa (2007) showed that the contrarian strategy can generate high returns, especially in the case of price declines without bad news. Investors can make a maximum profit of about 3% in the case of bad market news and a maximum of about 14% in the case of no bad news. This research emphasizes the potential to exploit short-term market inefficiencies through contrarian investment strategies.

2.2 Theoretical Framework

The theoretical framework of this study integrates concepts from Market overreact, Anomalies, market efficiency, and behavioral finance to explore the effectiveness of momentum and contrarian strategy in the SET indices

2.2.1 Market Efficiency Hypothesis

The market efficiency hypothesis is divided into three main forms: the weak form, the semi-strong form, and the strong form. In the weak form, stock prices reflect all past information. In the semi-strong form, stock prices reflect all public information. And in the strong form, stock prices reflect all public and private information. This means that investors cannot make abnormal profits by using information already available in the market.

This hypothesis contradicts the effectiveness of contrarian strategies, which expect stock prices to return to their optimal levels later. Because the market efficiency hypothesis suggests that it is impossible to predict future asset prices. This

research aims to explore whether contrarian strategies can outperform the market in this context.

2.2.2 Anomalies

Market anomalies are situations in which asset returns are inconsistent with market efficiency assumptions, such as the size effect, value effect, and momentum effect. These anomalies can be used to develop investment strategies that can outperform the market. One of the most important anomalies is the contrarian strategies.

However, when these anomalies become public and many investors start using strategies based on them, their returns tend to decrease, because the more investors use the same strategies, the faster the asset prices adapt to new information. The study of market anomalies is therefore important to understand how markets work and how investors can exploit them.

2.2.3 Overreaction Hypothesis

This hypothesis is based on the observation that investors tend to react to new information with excessive panic, which causes the price of a security to move excessively. For example, when there is good news about a company, the company's stock price may rise rapidly beyond its intrinsic value, and conversely, when there is bad news, the stock price may fall rapidly beyond its appropriate level. This hypothesis suggests that an initial sharp price movement is followed by a later correction to an appropriate level, which contradicts the weak-form market efficiency, which believes that stock prices reflect all past information.

This overreaction can be caused by several factors, such as the rapid distribution of news in the digital age, incomplete analysis of data, Or decisions based on emotion rather than rational information. It can also occur because investors tend to follow the behavior of others (herd behavior), which makes price movements more severe.

2.2.4 Behavioral Finance

Behavioral finance studies how investor psychology affects investment decisions and market movements. For example, investors may panic and sell stocks when prices fall rapidly, or may be greedy and buy stocks when prices rise. This study, which cites Warren Buffett's quote “Be fearful when others are greedy and

greedy when others are fearful," means that buying or selling stocks during that period may be a good opportunity to make a profit. This behavior is important in understanding how contrarian strategies can be used effectively when stock prices change. Understanding these behaviors can help investors make better decisions and avoid potential mistakes.

2.2.5 Momentum and Contrarian Strategies

Momentum strategies are investments in assets that are in a continuous uptrend or downtrend. Momentum strategies believe that the market tends to underreact and prices will eventually continue to move. Momentum strategies require the ability to analyze and make quick decisions because there are many risks involved, such as entering an investment too early, closing a position too late, or missing important trends and technical deviations. Analyzing the price trends of existing assets in the market helps investors make profits effectively.

Contrarian strategy is a contrast to the Momentum strategy, which is investing in assets that are undervalued and selling assets that are overvalued. Contrarian strategy believes that the market tends to overreact and eventually prices will adjust back to the right level. Contrarian strategy requires patience and good analysis, as misvalued assets can take a long time to adjust back to their true value. In addition, choosing the right assets to invest in, as well as analyzing the company's fundamentals and assessing the true value of the assets can help investors make better decisions.

However, Momentum and Contrarian strategies may yield good results in some conditions, but may also lead to significant losses when market conditions change, especially in the context of the SET index.

CHAPTER 3
RESEARCH METHODOLOGY

This study starts by examining whether the SET indices actually overreact to their price movements by adapting the methodology of (De Bondt & Thaler, 1985) to examine the return from overreacting.

3.1 Data Selection

We use the monthly priced data of common stocks in SET, and use the monthly priced data of SET index from the Datastream database from January 2004 to July 2024, this timeframe includes both bull and bear market periods, which helps ensure that our study was not biased by focusing solely on one type of market condition or influenced by a short or unusual period. And the SET returns are used as the market index.

3.2 The Overreaction Hypothesis

Starting from every stock in the SET index (represented by i), starting from January 2004 (month 1, "Portfolio formation Period") (t = 0), the return will be calculated for 1 to 6 months (the "Portfolio formation Period" is months 1 to 6).

$$R_{i,t} = \left[P_{i,t} - P_{i,0}\right] / |P_{i,0} \times 100\%$$

P = Stock price

If some or all price data are missing after the portfolio formation Period, the return will be calculated up to that point. This process is repeated 233 times, starting from January 2004, February 2004, and repeated every month until July 2023. Over time, if the stocks in the SET index change, the stocks that meet the conditions for this step will be changed.

Then, in each portfolio formation from the return calculation for 1 to 6 months (represented by f, the period used to formation the portfolio), a total of 234 periods, totaling 1,404 portfolios, the return ($R_{i,t}$) of the stocks in each period will be ranked from low to high, and the portfolio will be formed. The top 25 companies with the highest positive returns are classified as the winners (W) portfolio, and the bottom 25 companies with the lowest negative returns are classified as the losers (L) portfolio.

Then, the winners and losers portfolios, which are formed by calculating returns for 1 to 6 months, are calculated after the portfolios have been formed for 1 to 6 months, from t = 1 to t = 6 (the "holding period"), with the returns for each portfolio calculated on an equal weight basis. This is done for all the 234 overlapping winners and losers portfolios formed (n = 1,..., N; N = 234) until January 2024. We obtain the returns of the winner's portfolios $AR_{W,n,f,t,}$ and the losers' portfolios $AR_{L,n,f,t}$, in each portfolio and each holding period, if the stocks' returns are lost within the holding period from that point onwards, the stocks are permanently removed from the portfolio, and the returns of each portfolio are calculated only from the stocks remaining in the portfolio, which means that when a stock is lost during the portfolio holding period, the calculation is based on a rebalance by default.

Then, take the returns of the winner portfolio $AR_{W,n,f,t}$ and the loser portfolio $AR_{L,n,f,t}$ from all 234 test periods in each portfolio formation period and calculate the average returns from holding the portfolios for the period of 1 to 6 months from t = 1 to t = 6, which will be $AAR_{W,f,t}$ and $AAR_{L,f,t}$ From the overreaction hypothesis, when t > 0, $AAR_{W,f,t} < 0$, and $AAR_{L,f,t} > 0$, which will make $[AAR_{L,f,t} - AAR_{W,f,t}] > 0$. Then, check whether there is a statistically significant difference in the actual investment performance at any time t > 0. Therefore, we must find the population variance in $AR_{f,t}$

$$S_t^2 = \left[\sum_{n=1}^{N} (AR_{W,n,f,t} - AAR_{W,f,t})^2 + \sum_{n=1}^{N} (AR_{L,n,f,t} - AAR_{L,f,t})^2\right] / 2(N-1)$$

Since the two samples in each period of portfolio formation have the same population size N, the variance of the sample mean difference is equal to $2S_t^2/N$ And the t-statistic is therefore

$$T_t = \left[AAR_{L,f,t} - AAR_{W,f,t}\right] / \sqrt{2S_t^2/N}$$

The corresponding t-statistic can be found for each month after 1 to 6 months of formation, but these values do not represent independent evidence.

In order to determine whether the average return for each t contributes to $AAR_{W,f,t}$ or $AAR_{L,f,t}$, we can test whether they are significantly different from zero. We must find the standard deviation of the sample of the winner and loser groups.

Therefore, the standard deviation of the sample in the winner group is equal to

$$S_t = \sqrt{\sum_{n=1}^{N} (AR_{W,n,f,t} - AAR_{W,f,t})^2 / N - 1}$$

Since $S_t/\sqrt{N}$ represents the sample estimate of the standard error of $AAR_{W,f,t}$, the t-statistic is equal to

$$T_t = AAR_{W,f,t} / (S_t/\sqrt{N}).$$

Find the standard deviation of the sample of the loser group using a similar procedure. Therefore, the standard deviation of the sample in the loser group is equal to

$$S_t = \sqrt{\sum_{n=1}^{N} (AR_{L,n,f,t} - AAR_{L,f,t})^2 / N - 1}$$

Since $S_t/\sqrt{N}$ represents the sample estimate of the standard error of $AAR_{L,f,t}$, the t-statistic is equal to

$$T_t = AAR_{L,f,t} / (S_t/\sqrt{N}).$$

CHAPTER 4
EMPIRICAL RESULT AND DISCUSSION

This research focuses on analyzing data from stocks in the Stock Exchange of Thailand (SET) index over a two-decade period, from 2004 to 2023, using contrarian strategies, a strategy that focuses on trading against the general market trend, to test the hypothesis that investors in the Stock Exchange of Thailand overreact to price changes.

In this research, 36 strategies were created, forming portfolios for 1 to 6 months and holding portfolios for 1 to 6 months, with different portfolio creation and holding periods, to test the effectiveness of contrarian strategies to see if they can generate better returns than investing in the general market trend.

4.1 Descriptive Statistics

The data used in this research consisted of monthly stock price data from stocks in the Stock Exchange of Thailand (SET) index over a two-decade period, from 2004 to 2023, totaling 240 months. These data cover 1,033 stocks traded on the Stock Exchange of Thailand during that period.

In this research, monthly stock price data was analyzed to create investment strategies by forming portfolios and holding portfolios for different periods, ranging from 1 to 6 months, totaling 36 strategies, to test the effectiveness of contrarian strategies to see if they can generate better returns than investing according to the general market trend.

In addition, preliminary statistical analysis of stock prices in the SET index was conducted within the specified period. Important statistical values were calculated and presented, including the mean, which represents the overall average price level of stocks in the market, the standard deviation, which reflects the volatility of stock prices, the median, which is the middle value of the data set when sorted, and the minimum and maximum values of stock prices during that period. All data were collected and

presented in Table 4.1, which is very important for in-depth analysis in the next step of the research.

Table 4.1

Descriptive Statistics

No. of stock	Observations	Mean	SD	Median	Min	Max
1033	240	17.50	47.01	4.66	0.01	1200

4.2 Testing the overreaction of investors in SET

The first part of this study focuses on testing the hypothesis that investors in the Stock Exchange of Thailand (SET) generally overreact to changes in stock prices. By using the contrarian strategies simulation method

And to make the hypothesis test reliable and accurate, a statistical test was conducted using the t-test, which is a statistical test method used to compare the means of two groups of data to see if there is a statistically significant difference. The results of the test are shown in Table 4.2.

Table 4.2

Returns from using contrarian strategies for stocks in the SET Index

Holding Period "t" (Month)	Average Return (%)					
	Formation period "f" (Month)					
	1	2	3	4	5	6
1	-4.1638 (-0.418)	-3.3673 (-0.347)	-14.1184 (-1.401)	-18.4559 (-1.838)*	-14.9138 (-1.480)	-15.7166 (-1.506)
2	-8.5274 (-1.139)	-11.1722 (-1.506)	-17.0008 (-2.243)**	-18.5216 (-2.377)**	-18.8311 (-2.413)**	-18.1495 (-2.259)**
3	-10.6661 (-1.589)	-12.3424 (-1.866)*	-14.9981 (-2.315)**	-17.5153 (-2.689)***	-17.5906 (-2.642)***	-18.1691 (-2.681)***
4	-8.9501 (-1.479)	-10.4816 (-1.720)*	-13.7650 (-2.354)**	-16.4742 (-2.828)***	-18.6829 (-3.082)***	-18.4563 (-2.928)***
5	-9.9585 (-1.731)*	-10.6463 (-1.798)*	-14.0296 (-2.517)**	-17.2070 (-3.203)***	-19.1213 (-3.391)***	-17.6092 (-2.952)***
6	-8.8529 (-1.593)	-11.1089 (-2.111)**	-15.1798 (-2.864)***	-17.3554 (-3.320)***	-18.6202 (-3.348)***	-17.2420 (-2.937)***

*, **, *** significant at 10%, 5%, and 1% level

From Table 4.2, it was found that using the contrarian strategy to create an investment portfolio for 1-6 months and holding an investment portfolio for 1-6 months, all 36 strategies over the 20 years tested between 2004 and 2023 all gave negative returns, with a negative t-statistic value, indicating that investors investing in stocks in the SET index have underreacted to price changes less than reality.

Since all contrarian strategies gave negative returns, it shows that investors in the Stock Exchange of Thailand do not overreact to price changes, but tend to underreact to price changes, meaning that investors do not respond to price changes as quickly or as strongly as expected. This underreactivity supports the idea that investors using momentum strategies, which involve investing in market trends, can generate better returns.

From the research results in Table 4.2, it was found that if the momentum strategy is used to form an investment portfolio from the returns of stocks each month, the returns will vary depending on the period used to form and hold the investment portfolio. The strategy that forms the portfolio for 1 and 2 months and holds the portfolio for 3 months will give the highest returns in this group. In addition, if the portfolio is formed for 3 and 4 months and held for 2 months, it will give the highest returns for this group. And if the portfolio is formed for 5 and 6 months and held for 5 and 4 months, respectively, it will give the highest returns in this group.

The momentum strategies used in this research consist of a long winner portfolio and a short loser portfolio, which means investing in stocks with good performance (long winner portfolio) and selling stocks with poor performance (short loser portfolio). Using this strategy allows for better returns by taking advantage of the changes in stock prices. In summary, the momentum strategy that yielded the best results was forming a portfolio for a period of 5 months and holding it for 5 months, which yielded an average return of 19.1213% per year. This research therefore shows that using a momentum strategy in investing can generate good returns, depending on the period it takes to form and hold the portfolio.

From the research results in Table 4.2, it was found that when compared to the average returns of the SET index over the 20-year period tested, from 2004 to 2023, which we used as a benchmark, the SET index had an average return of 6.0398% per year.

The research results indicate that using momentum strategies can achieve average returns that outperform the SET index in almost all strategies.

The use of the momentum strategy to form an investment portfolio and hold the investment portfolio for different periods of time found that the average return outperformed the SET index, except for two strategies: the strategy that formed the investment portfolio for 1 and 2 months and held the investment portfolio for 1 month, which had an average return lower than the average return of the SET index or underperformed when compared to the benchmark.

The analysis of the return of the momentum strategy in each period shows that using the momentum strategy can generate better returns than investing in the SET index in the long term by forming and holding the investment portfolio for an appropriate period of time

And, from the results, it is found to contradict the Efficient Market Hypothesis - Weak Form theory (Fama, 1970), which states that the current stock price reflects all information from past prices. Therefore, technical analysis and using past data to predict stock prices cannot help investors make profits. However, from the results, it was found that the SET market does not follow this theory, which shows that the market is inefficient. Because historical data can be used to predict future stock prices and make profits.

However, when compared to other research that studied the reactions of investors in the Thai stock market, such as Pokavattana et al. (2019), and the research of Lerskullawat and Ungphakorn, (2018), which are listed in the literature review, it was found that even though their research results indicated that investors in the Thai stock market overreacted to price changes when stock prices changed, we found that in their research results, the momentum effect lasted only for the first 2 months, which is different from our results. This depends on the time period we used to organize the portfolio, which makes it impossible to conclude whether the Thai stock market has become more efficient or not.

Next, the test results are obtained by dividing the stocks in the Stock Exchange of Thailand (SET) index into winners and losers, by separating the investment strategies in each portfolio, in order to examine how investors who invest

in stocks in the SET index respond to price changes when the stock price increases and when the stock price decreases.

In this test, the return of stocks in each portfolio group is analyzed over a specified period of time. By dividing stocks into winners and losers, investors' behavior can be analyzed in more detail and accurately.

After that, in order for the hypothesis test to be reliable and accurate, a statistical test using the t-test was performed to see if it was statistically significant. The results of the test are shown in Tables 4.3 and 4.4.

Table 4.3

Returns from the winner portfolio for stocks in the SET index

Holding Period "t" (Month)	Average Return (%)					
	Formation period "f" (Month)					
	1	2	3	4	5	6
1	20.7268 (2.895)***	17.2892 (2.598)***	24.4784 (3.649)***	24.7845 (3.750)***	25.1822 (3.828)***	25.5887 (3.695)***
2	21.0760 (3.723)***	19.6306 (3.679)***	23.1808 (4.494)***	24.4346 (4.528)***	25.0009 (4.696)***	24.3326 (4.516)***
3	21.4889 (4.476)***	20.1988 (4.494)***	21.8771 (4.997)***	23.2473 (5.015)***	24.5805 (5.354)***	24.1677 (5.186)***
4	19.8275 (4.693)***	19.4779 (4.769)***	20.9420 (5.174)***	22.4899 (5.436)***	25.0102 (5.788)***	24.4674 (5.415)***
5	20.3502 (4.872)***	19.3339 (4.977)***	21.3519 (5.469)***	22.8675 (5.816)***	24.8766 (5.951)***	24.1311 (5.556)***
6	19.6250 (5.054)***	18.9499 (5.175)***	22.2983 (5.838)***	23.4899 (6.031)***	25.2712 (5.980)***	24.7421 (5.571)***

*, **, *** significant at 10%, 5%, and 1% level

Table 4.4

Returns from the loser portfolio for stocks in the SET index

Holding Period "t" (Month)	Average Return (%)					
	Formation period "f" (Month)					
	1	2	3	4	5	6
1	16.5629 (2.391)**	13.9220 (1.968)**	10.3600 (1.378)	6.3286 (0.837)	10.2684 (1.345)	9.8720 (1.265)
2	12.5486 (2.564)**	8.4584 (1.642)	6.1800 (1.113)	5.9130 (1.052)	6.1699 (1.081)	6.1832 (1.037)

Table 4.4

Returns from the loser portfolio for stocks in the SET index (Cont.)

Holding Period "t" (Month)	Average Return (%)					
	Formation period "f" (Month)					
	1	**2**	**3**	**4**	**5**	**6**
3	10.8228 (2.308)**	7.8564 (1.618)	6.8790 (1.441)	5.7321 (1.253)	6.9899 (1.449)	5.9987 (1.219)
4	10.8774 (2.511)**	8.9963 (1.988)**	7.1770 (1.700)*	6.0157 (1.467)	6.3273 (1.488)	6.0111 (1.368)
5	10.3917 (2.626)***	8.6877 (1.944)*	7.3223 (1.840)*	5.6605 (1.546)	5.7553 (1.521)	6.5218 (1.595)
6	10.7721 (2.709)***	7.8410 (2.076)**	7.1185 (1.937)*	6.1345 (1.759)*	6.6510 (1.840)*	7.5001 (1.953)*

*, **, *** significant at 10%, 5%, and 1% level

From the analysis of the result in Table 4.3, it was found that the returns for the "Winner Portfolio," which was constructed and held for periods ranging from 1 to 6 months, showed positive returns across all 36 strategies tested over a 20-year period from 2004 to 2023. This indicates that investors who invested in stocks within the SET index exhibited underreaction behavior to stock price changes when stock prices increased.

And from the analysis of the results in Table 4.3 found that if investing solely in the Winner Portfolio, the returns would vary depending on the duration used to form and hold the investment portfolio. Forming the portfolio for 1 and 2 months and then holding it for 2 months yielded the highest returns in this group. Additionally, strategies that formed the portfolio for 3, 4, and 6 months and then held it for 1 month yielded the highest returns in this group. For the strategy that formed the portfolio for 5 months and held it for 6 months, it yielded the highest returns in this group. In summary, the strategy that yielded the best returns for investing solely in the Winner Portfolio was forming the investment portfolio for 6 months and holding the investment portfolio for 1 month, which provided an average annual return of 25.5887%.

However, from the analysis of the results in Table 4.4, it was found that the returns for the "Loser Portfolio," which was constructed and held for periods ranging from 1 to 6 months, showed positive returns across all 36 strategies tested over a 20-year period from 2004 to 2023. This indicates that investors who invested in stocks

within the SET index exhibited overreaction behavior to stock price changes when stock prices decreased.

And from the analysis of the results in Table 4.4 found that if investors choose to invest solely in the "Loser Portfolio," the returns would vary depending on the duration used to form and hold the investment portfolio. However, it was found that all strategies that hold the portfolio for 1 month yield the highest returns in every tested group. Specifically, the strategy that yields the best returns is forming the investment portfolio for 1 month and then holding the investment portfolio for 1 month, which provides an average annual return of 16.5629%.

And from the analysis of the results in Table 4.3 and 4.4, If investors use momentum trading strategies by pairing portfolios to independently long the Winner Portfolio and short the Loser Portfolio, by buying the Winner Portfolio formed over 6 months and held for 1 month, and shorting the Loser Portfolio formed over 4 months and held for 5 months, during the 20-year test period from 2004 to 2023, they can achieve the highest average annual return of 19.9282%.

Regarding the use of contrarian trading strategies by pairing portfolios to independently short the Winner Portfolio and long the Loser Portfolio, by shorting the Winner Portfolio formed over 2 months and held for 1 month, and buying the Loser Portfolio formed over 1 month and held for 1 month, during the 20-year test period from 2004 to 2023, they can achieve the highest average annual return of -0.7263%. This negative return indicates that contrarian trading strategies cannot generate positive returns for the 20-year test period, given the form and hold durations specified in this research.

From the research results above, which are separated for Winner and Loser, it was found that investors who invest in stocks in the SET index have an underreacting behavior to changes in stock prices when the stock price increases and an overreacting behavior to changes in stock prices when the stock price decreases, which indicates that investors have an asymmetric response to changes in stock prices when the stock price increases and when the stock price decreases.

Investors who have an underreacting behavior when the stock price increases means that investors respond to increases in stock prices slower than they actually are, which may cause them to miss opportunities to make profits from increases

in stock prices. Conversely, investors who have an overreacting behavior when the stock price decreases means that investors respond too much to decreases in stock prices, which may cause them to sell their stocks at prices lower than they actually are.

This asymmetric response behavior is consistent with the research of Leemakdej (2012) who found that investors have an asymmetric response to profits and losses from stock trading, where investors tend to adjust their portfolio risk differently after profits and losses. This risk adjustment may be due to different psychological feelings when there are profits and losses, which affect investment decisions.

When examining the stocks in the portfolios called “Winner” and “Loser” at every time period, it was found that the majority of the stocks in both portfolios were small-cap stocks, meaning companies with a market capitalization (Market Cap.) of less than 10 billion baht. In general, small-cap stocks tend to be more volatile than mid-cap and large-cap stocks because small-cap stocks are less liquid and have higher risk.

Mid-cap stocks are companies with a market capitalization of more than 10 billion baht but less than 50 billion baht, while large-cap stocks are companies with a market capitalization of more than 50 billion baht. Mid-cap and large-cap stocks tend to be less volatile and more liquid because they are traded more and have lower risk.

However, that in early 2018, the reverse occurred, where the majority of the stocks in the portfolios called "Winner" were mid-cap and large-cap stocks, which is different from the usual trend where stocks in this portfolio tend to be small-cap stocks. This phenomenon can be caused by several factors, such as changes in market conditions, adjustments in investors' investment strategies, or changes in the fundamentals of the companies in the portfolio.

Finally, from the results Separately for Winner and Loser portfolio, it was confirmed that it contradicts the theory of Efficient Market Hypothesis - Weak Form of (Fama, 1970), which according to this theory, the market should be unable to use past data to predict future stock prices and make profits. However, from the results, it was found that the SET market can use past data to predict future stock prices and make profits, which is not in accordance with this theory, which shows that the market is inefficient. The reason for the inefficient market might be due to irrational investors or noise traders. According to Black (1986), and Shleifer (2000), some investors trade based on data that “seem” to be real but are actually noise, and investors often behave

irrationally, which makes the price wrong for longer than expected before adjusting back. This leads to continuous market inefficiency.

CHAPTER 5
CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

This research studies investors' responses to stock price changes by simulating the use of contrarian strategies in stocks in the SET (Stock Exchange of Thailand) index for a period of 20 years, from 2004 to 2023.

The results of the research found that investors who invested in stocks in the SET index during the 20-year study period underreacted or underreacted to price changes, which prevented the use of contrarian strategies from generating significant returns. On the other hand, the results of the research also support investors who used momentum strategies to generate better returns.

In addition, when studying separately for stocks that are Winners (stocks with higher prices) and Losers (stocks with lower prices), it was found that investors who invested in stocks in the SET index underreacted to price changes when the stock price increased and overreacted or overreacted to price changes when the stock price decreased. This behavior indicates that investors have an asymmetric response to stock price changes.

It was also found that if investors use a momentum trading strategy by pairing a Portfolio that will Long Winner Portfolio and short Loser Portfolio independently by buying Winner Portfolio from a portfolio created for 6 months and holding it for 1 month and short Loser Portfolio from a portfolio created for 4 months and holding it for 5 months, during the 20 years tested between 2004 and 2023, they will be able to receive the highest average return of 19.9282% per year.

The majority of stocks in the Winner and Loser portfolios are small stocks that tend to have more price volatility than mid-cap and large-cap stocks, except for early 2018. In summary, investors can take advantage of the market's underreact and overreaction behavior to create a trading strategy with good returns.

The research results also contradict the Efficient Market Hypothesis (EMH) - Weak Form theory because this study indicates that the SET (Stock Exchange of

Thailand) can use historical data to predict future stock prices and generate profits. This might be a result of irrational investors or noise traders who trade based on information that appears to be real but is actually noise, causing stock prices to deviate from their true values for longer than expected before adjusting back. This behavior makes the market inefficient.

5.2 Limitations

This study only uses historical data, which cannot accurately predict future market conditions. This is because the stock market is constantly changing and there are many factors that may affect future stock prices, such as changing economic conditions, changes in market structure, and geopolitical events that may occur, which are not considered in this study.

In addition, this study does not include the consideration of the impact of transaction costs, such as commissions and securities borrowing fees, which are costs that investors face when trading stocks in the real market. In addition, the implicit costs of trading, such as bid-ask spreads, price impacts, and taxes on the profits of trading strategies, which may significantly affect the net returns of investors' trading strategies in the real market. Therefore, this study has several limitations that should be considered when using the research results to make future investment decisions.

5.3 Recommendations

This study simulates the use of contrarian strategies in stocks in the SET index by forming a portfolio for 1-6 months and holding the portfolio for only 1-6 months. Extending the forming and holding periods will provide a broader perspective on the effectiveness of these strategies in different market conditions.

In addition, the use of other trading strategies besides contrarian and momentum, such as value investing, growth investing, or algorithmic trading, may result in significantly different results.

And this study is limited to stocks in the SET index only. If this trading strategy is applied to stocks in other indices with different index structures, such as SET

50, MAI, or Nikkei 225, including different methods of stock weighting in the portfolio and the number of stocks in the portfolio, the results may also differ. In addition, factors such as market liquidity, volatility, and the economic environment of the relevant index may have a significant impact on the performance of the trading strategy.

If additional research were conducted on the impact of transaction costs, such as commissions and borrowing fees, as well as implicit trading costs, such as bid-ask spreads and price impact, The impact of implicit trading costs, such as changes in stock prices resulting from large buy or sell orders, and taxes on trading profits of trading strategies it would yield more accurate and comprehensive results. These factors could significantly influence net returns.

Additionally, the study examines the phenomenon that occurred in early 2018, where most of the stocks in the "Winner" portfolio turned out to be mid-cap and large-cap stocks, which is contrary to the usual trend where the stocks in this portfolio are typically small-cap stocks. The study investigates various factors such as changes in investors' investment strategies, market conditions, or fundamental changes in the companies within the portfolio, as well as whether there are any other contributing factors.

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