

การปรับปรุงกลยุทธ์การลงทุนแบบย้อนตลาดในตลาดหลักทรัพย์  
แห่งประเทศไทยด้วยปริมาณการซื้อขาย



นายพริยะ คำทิพย์

ศูนย์วิจัยทรัพยากร

จุฬาลงกรณ์มหาวิทยาลัย

วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาวิทยาศาสตรมหาบัณฑิต

สาขาวิชาการเงิน ภาควิชาการธนาคารและการเงิน

คณะพาณิชยศาสตร์และการบัญชี จุฬาลงกรณ์มหาวิทยาลัย

ปีการศึกษา 2553

ลิขสิทธิ์ของจุฬาลงกรณ์มหาวิทยาลัย

VOLUME-ENHANCED CONTRARIAN STRATEGY  
IN THE STOCK EXCHANGE OF THAILAND

Mr. Piriya Kamtip

ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย

A Thesis Submitted in Partial Fulfillment of the Requirements  
for the Degree of Master of Science Program in Finance  
Department of Banking and Finance  
Faculty of Commerce and Accountancy  
Chulalongkorn University  
Academic Year 2010  
Copyright of Chulalongkorn University



พิริยะ คำทิพย์: การปรับปรุงกลยุทธ์การลงทุนแบบย้อนตลาดในตลาดหลักทรัพย์แห่งประเทศไทยด้วยปริมาณการซื้อขาย. (VOLUME-ENHANCED CONTRARIAN STRATEGY IN THE STOCK EXCHANGE OF THAILAND) อ. ที่ปรึกษาวิทยานิพนธ์หลัก: ดร.ฉัฐวุฒิ เจนวิทยาโรจน์, 41 หน้า.

วิทยานิพนธ์ฉบับนี้จัดทำขึ้นเพื่อศึกษาผลตอบแทนของกลยุทธ์การลงทุนแบบย้อนตลาดในตลาดหลักทรัพย์แห่งประเทศไทยในช่วงปี 1988-2007 โดยพิจารณาจากผลตอบแทนในอดีตและอัตราส่วนราคาต่อราคาสูงสุดในรอบ 52 สัปดาห์ประกอบกับปริมาณการซื้อขายในอดีต ผลการศึกษาพบว่าในช่วงการลงทุนระยะยาว (3 ปีขึ้นไป) หลักทรัพย์ที่มีผลตอบแทนในอดีตต่ำ (สูง) ที่มีปริมาณการซื้อขายในอดีตสูง มีแนวโน้มที่จะได้รับผลตอบแทนจากการลงทุนมากกว่าหลักทรัพย์ที่มีผลตอบแทนในอดีตต่ำ (สูง) ที่มีปริมาณการซื้อขายในอดีตต่ำ และจากการศึกษายังพบว่าปริมาณการซื้อขายในอดีตสามารถนำมาพิจารณาพร้อมกับกลยุทธ์การลงทุนแบบย้อนตลาดทำให้ได้ผลตอบแทนมากขึ้นกว่ากลยุทธ์การลงทุนแบบย้อนตลาดแบบไม่คำนึงถึงปริมาณการซื้อขาย โดยกลยุทธ์การลงทุนย้อนตลาดแบบ Late stage (การซื้อหลักทรัพย์ที่มีผลตอบแทนในอดีตต่ำและมีปริมาณการซื้อขายในสูง พร้อมทั้งขายหลักทรัพย์ที่มีผลตอบแทนในอดีตสูงและมีปริมาณการซื้อขายในอดีตต่ำ) สามารถสร้างผลตอบแทนได้มากกว่ากลยุทธ์การลงทุนแบบย้อนตลาดโดยไม่คำนึงปริมาณการซื้อขายในอดีต ในขณะที่กลยุทธ์การลงทุนแบบย้อนตลาดแบบ Early stage (การซื้อหลักทรัพย์ที่มีผลตอบแทนในอดีตต่ำและมีปริมาณการซื้อขายในอดีตต่ำ พร้อมทั้งขายหลักทรัพย์ที่มีผลตอบแทนในอดีตสูงและมีปริมาณการซื้อขายในอดีตสูง) ให้ผลตอบแทนต่ำที่สุด และกลยุทธ์การลงทุนย้อนตลาดแบบ Late stage สามารถสร้างผลตอบแทนที่สูงกว่าผลตอบแทนเฉลี่ยของตลาดแม้ว่าจะปรับเผื่อด้วยความเสี่ยงต่างๆ ในขณะที่ผลตอบแทนของกลยุทธ์การลงทุนแบบย้อนตลาดที่ใช้อัตราส่วนราคาต่อราคาสูงสุดในรอบ 52 สัปดาห์กับปริมาณการซื้อขายในการพิจารณาให้ผลตอบแทนที่น้อยกว่ากลยุทธ์การลงทุนแบบใช้ผลตอบแทนในอดีตกับปริมาณการซื้อขายในอดีตในการพิจารณา หรืออาจมีผลตอบแทนตอบแทนส่วนเกินเป็นลบได้

ภาควิชา การธนาคารและการเงิน  
สาขาวิชา ..... การเงิน.....  
ปีการศึกษา ..... 2553.....

ลายมือชื่อนิสิต.....ฉัฐวุฒิ เจนวิทยาโรจน์.....  
ลายมือชื่อ อ.ที่ปรึกษาวิทยานิพนธ์หลัก.....*Natthud*.....

## 5082179626: MAJOR FINANCE

KEYWORDS: CONTRARIAN STRATEGY / TRADING VOLUME / 52-WEEK  
HIGH PRICE

PIRIYA KAMTIP: VOLUME-ENHANCED CONTRARIAN STRATEGY IN  
THE STOCK EXCHANGE OF THAILAND. THESIS ADVISOR: NATTAWUT  
JENWITTAYAROJE, Ph.D., 41 pp.

This study investigates the return of the prior return-volume based long-term contrarian strategy and 52-week high price-volume based contrarian strategy in the Stock Exchange of Thailand (SET) over the period of 1988-2007. The evidence shows that the long-term (three years or more) loser (winner) with high past trading volume outperform loser (winner) with low past trading volume for both prior return-volume based and 52-week high price-volume based contrarian strategies. Moreover, the evidence shows that the using of past trading volume as a key analytical help improve the profitability of contrarian portfolios. A late stage contrarian strategy which buys high volume loser and sells low volume winner outperforms a simple contrarian strategy, whereas an early stage contrarian strategy which buys low volume loser and sells high volume winner underperforms. For prior return-volume based long-term contrarian strategy, the return of late stage portfolio remains highly positive even after controlling for market premium, size effect and book value effect (using Fama and French 3 factors model) whereas the excess return of late stage portfolio of 52-week high price-volume based long-term contrarian strategy after controlling for risks is much lower or even negative.

ศูนย์วิทยพัชกร  
จุฬาลงกรณ์มหาวิทยาลัย

Department: Banking and Finance

Field of Study: Finance

Academic Year: 2010

Student's Signature: Piriya K.

Advisor's Signature: Nattawut Jenwittayaroje

## ACKNOWLEDGEMENTS

I appreciate acknowledge helpful comments and suggestions from Dr. Nattawut Jenwittayaroje, my advisor, and all professors in MSF program. I would like to give special thanks to all of my friends in MSF program. Finally, I gratefully thank my family for all their supports and love.



ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย

## CONTENTS

	<b>Page</b>
<b>ABSTRACT (THAI)</b> .....	iv
<b>ABSTRACT (ENGLISH)</b> .....	v
<b>ACKNOWLEDGEMENTS</b> .....	vi
<b>CONTENTS</b> .....	vii
<b>LIST OF TABLES</b> .....	ix
<b>CHAPTER I INTRODUCTION</b> .....	1
1.1 Background of the study .....	1
1.2 Statement of Problem/Research Questions .....	4
1.3 Objective of the study.....	5
1.4 Contribution.....	5
1.5 Research Hypotheses.....	5
<b>CHAPTER II LITERRATURE REVIEW</b> .....	6
2.1 Contrarian Strategy and Overreaction .....	7
2.2 Trading volume and volume-based momentum strategy .....	8
2.3 Momentum strategy based on 52-Week high price.....	9
<b>CHAPTER III SAMPLE DATA AND METHODOLOGY</b> .....	11
3.1 Sample Data .....	11
3.2 Methodology .....	13
3.2.1 Simple contrarian strategy.....	13
3.2.2 Volume based contrarian strategy.....	14
3.2.3 Contrarian strategy based on 52-week high price .....	15
<b>CHAPTER IV EMPIRICAL RESULTS</b> .....	16
4.1 Simple contrarian strategies.....	16
4.1.1 Simple contrarian strategy based on prior return .....	16
4.1.2 Simple contrarian strategy based on 52-week high price .....	16
4.2 Volume-based contrarian strategies .....	19
4.2.1 Contrarian Strategy based on prior return and past trading volume..	19
4.2.2 Contrarian Strategy based on 52-week high price and past trading volume.....	22

4.3 The comparison of simple, early stage and late stage contrarian strategies.....	25
4.4 Risk adjusted return of simple contrarian portfolio.....	26
4.4.1 CAPM regression.....	26
4.4.2 Fama-French 3 Factors regression.....	28
4.5 Risk adjusted return of volume based contrarian portfolio.....	30
4.5.1 CAPM regression.....	30
4.5.2 Fama-French 3 Factors regression.....	33
<b>CHAPTER V CONCLUSIONS</b> .....	36
<b>REFERENCES</b> .....	38
<b>BIOGRAPHY</b> .....	41



ศูนย์วิจัยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย



## LIST OF TABLES

		<b>Page</b>
TABLE 1	Return of simple contrarian portfolios based on prior return and portfolio characteristics.....	17
TABLE 2	Return of simple contrarian portfolios based on 52-week high price and portfolio characteristics.....	18
TABLE 3	Return of prior return-volume based contrarian portfolios and portfolio characteristics.....	20
TABLE 4	Return of 52-week high price-volume based contrarian portfolios and portfolio characteristics .....	23
TABLE 5	Investment period return of simple, early stage and late stage contrarian strategies .....	25
TABLE 6	CAPM regression of simple contrarian portfolio based on prior return.....	27
TABLE 7	CAPM regression of simple contrarian portfolio based on 52-week high price.....	27
TABLE 8	Fama-French 3 Factors regression of simple contrarian portfolio based on prior return .....	29
TABLE 9	Fama-French 3 Factors regression of simple contrarian portfolio based on 52-week high price.....	29
TABLE 10	CAPM regression of prior return-volume based contrarian portfolio.....	31
TABLE 11	CAPM regression of 52-week high price-volume based contrarian portfolio .....	32
TABLE 12	Fama-French 3 Factors regression of prior return volume-based contrarian portfolio.....	34
TABLE 13	Fama-French 3 Factors regression of 52-week high price volume-based contrarian portfolio.....	35

# CHAPTER I

## INTRODUCTION

### 1.1 Background of the Study

The weak form of efficient markets hypothesis (EMH) states that it is impossible to earn abnormal risk-adjusted profit based on the past prices and returns. Such strong statements portend reversals, and the EMH is no exception. In the last two decades, there have been considerable evidences to suggest that trading strategies based on the past prices and returns data can be profitable. These results strongly suggest that financial markets are not efficient. The two main strategies which trading based on past prices and returns are momentum and contrarian strategies.

There are many researchers in developed markets (e.g., DeBondt and Thaler (1985, 1987), DeLong et al. (1990), Jegadeesh (1990), Balvers, Wu, and Gilliland (2000)) state that a contrarian strategy produce returns that exceed market average returns in long-horizon. An alternative explanation of this evidence, advanced by DeBondt and Thaler (1985, 1987), Chopra et al. (1992) and Lakonishok, Shleifer and Vishny (1994) is that stock prices overreact. DeBondt and Thaler point the contrarian profit to a stock market overreaction for the disparity in the risk-price relation and the asymmetric price-reverting pattern. Under their overreaction hypothesis, investors overreact to market news, and their systematic mispricing generates a price momentum, which later reverses and can be exploited by the contrarian strategy. Subsequently, Barberis, Shleifer and Vishny (1998), Hong and Stein (1999) and Daniel, Hirshleifer and Subrahmanyam (1998) try to construct models to predict the stock price reversal following the overreaction. If this explanation is true, I expect a stronger contrarian effect in less transparent markets such as the SET. Because few analysts follow the SET, information diffusion is not as strong as in other developed markets. Therefore, I expect higher overreaction and higher contrarian profitability in the SET.

In addition, this research also studies the long-term contrarian strategy with trading volume as the analytical variable. I examine the difference in returns of contrarian profitability among stocks with different levels of trading volume. The using of trading volume stems from both theoretical and empirical considerations. The

trading volume serves many functions: it reflects divergence of opinion, reveals private information, is used as a measure of liquidity and facilitates the price discovery process. Blume, Easley and O'Hara (1994), Campbell, Grossman and Wang (1993), Datar Naik and Radcliffe (1998) and Tkac (1999) develop theoretical models in which past trading volume is related to return. They show that low (high) volume firms earn higher (lower) future return and a stock price decline on a high-volume day is more likely than a stock price decline on a low-volume day to be associated with an increase in the expected stock return. These results are interpreted as providing support for the liquidity hypothesis. These findings are supported by Lee and Swaminathan (2000), Hvidkjaer (2006), and Llorente, Michaely, Saar and Wang (2002). They also find that trading volume can be used to predict the stock returns.

Focusing on momentum strategies, Lee and Swaminathan (2000) state that past trading volume can predict both magnitude and persistence of the price momentum. Price reversals are more pronounced among low volume losers and high volume winner. Conversely, price momentum is more pronounced among high volume losers and low volume winners. These observations suggest two volume-based price momentum strategies. They refer to the first, which involves buying low volume winners and selling high volume losers, as the early-stage momentum strategy, to capture the idea that stocks in these portfolios exhibit future price momentum over a longer horizon. They refer to the second strategy, which involves buying high volume winners and selling low volume losers, as the late-stage momentum strategy to capture the notion that the price momentum in these stocks reverses faster. They find that the early stage momentum strategy is more profitable than the late stage momentum strategy. From their idea, I adapt their two volume-based momentum strategies to two volume-based long term contrarian strategies which are early-stage contrarian strategy (buys low volume losers and sells high volume winners) which is expected faster reversal and late-stage contrarian strategy (buys high volume losers and sells low volume winners) which is expected longer horizon reversal.

Another interesting point in their study, they use the ranking periods from 3 to 12 months and they find that the return reversals increase monotonically with the length of the ranking period. This finding suggests that the contrarian strategy is

expected to be profitable when the return ranking period is extended. The existing research on trading volume only focuses on interaction of returns and lagged volume up to a year. Therefore, I study on the long-term trading volume plays in enhancing the profitability of long term contrarian profits by using the ranking period and invest period from 1 year to 7 years.

Furthermore, this study also combines the way to classify winner and loser stocks of George and Hwang (2004) to my study. In their study, they classify the winner and the loser stocks based on 52-week high price instead of using past returns that is the winner (loser) stock is the stock which has the highest (lowest) ratio of current price and 52-week high price. In their study, they focus on the momentum strategy and find that the 52-week high price explains a large portion of the profits from the momentum investing. Buying stocks that are near to their 52-week high price and selling stock that are far from their 52-week high price generate positive returns in U.S. market. Contradict to George and Hwang's study, Alsubaie and Najand (2008) find the reversal in stocks that have reached their 52-week high price in the Saudi Stock Market (SSM). They explain the different result obtain from the SSM compared to the results from well developed financial market such as U.S. that it can be attributed to the diffusion of information and investors overreaction. Thus, I adjust the strategy of the 52-week high price momentum to the long-term contrarian strategy enhanced with trading volume in the SET which is one of the developing markets and investigate whether the price reverses when a stock reaches its 52-week high price as same as in the SSM.

In conclusion, my studies are as follows. First, I examine the returns of simple contrarian portfolio for ranking periods and investment periods of 1, 3, 5 and 7 years. Second, I examine the returns of contrarian portfolios enhanced with the trading volume for 1 to 7 years which are similar to the first study. Third, I study on the early stage contrarian strategy (buys low volume losers and sells high volume winners) and the late stage contrarian strategy (buys high volume losers and sells low volume winners) by investigating the time-series and the investment period returns of the early and the late stage contrarian strategies comparing to the returns of simple contrarian strategy portfolio. Finally, I repeat three steps above based on the 52-week

high price instead of using the past return. All data used in this study is collected from the Stock Exchange of Thailand.

In Thailand, prior researchers on the contrarian strategy profitability (e.g., Nuttawat (1998), Punnee (1998), Thanawat et al. (1996) and Krissana et al. (1994)) state that the contrarian strategy can make abnormal returns in SET but they do not enhance trading volume to their study. Since Thailand is the developing market and lack of research about the contrarian strategy and trading volume, this study would be useful for market practitioners especially retail investors to make a decision to invest in the SET by using the contrarian strategy. Moreover, it would also be useful for academics to investigate the profitability of the contrarian strategy in Thailand. I hope that this study would be useful for everyone who is interested in contrarian strategy and the investment in Thailand.

## **1.2 Statement of Problem/Research Questions**

Since the existing researches about strategy based on past returns and past trading volume focusing on momentum strategy, this research adapts the volume-based momentum strategy to the long term volume-based contrarian strategy to study that the past trading volume information can provide additional profits to the simple contrarian strategy or not. In addition, the existing researches about contrarian strategy use the ranking period up to 1 year but this study extends the ranking period up to 7 years to investigate the profitability of contrarian strategy in longer ranking period and investment period. Moreover, this research would answer the question that buying stocks far from their 52-week high price and selling stocks near their 52-week high price can make the abnormal return in long horizon or not (contrarian strategy based on 52-week high price).

### 1.3 Objective of the study

Since the Stock Exchange of Thailand (SET) is the developing market and lack of research about the behavioral finance, the objectives of this study are to study the contrarian strategy which buys past losers and sells past winners in the SET and also add the new study to the main body of contrarian strategy study in Thailand which are volume-based contrarian strategy and contrarian strategy based on 52-week high price. This study is intended to deepen our understanding of the SET, which is characterized by different structures from the developed markets.

### 1.4 Contribution

This study contributes to the literature on contrarian strategy by provides the empirical result on the long term volume-based contrarian strategy which adapted from the volume-based momentum strategies that are early-stage contrarian strategy and late-stage contrarian strategy and also provides the first empirical result about the long term volume-based contrarian strategies based on 52-week high price. Moreover, this study also exhibits the contrarian strategy profitability when the ranking period is extended more than 1 year.

### 1.5 Research Hypotheses

#### **Hypothesis 1:**

Early-stage contrarian strategy outperforms Late-stage contrarian strategy in long horizon.

#### **Hypothesis 2:**

Buy stocks far from their 52-week high price and sell stocks near their 52-week high price can make abnormal returns in long horizon.

## CHAPTER II LITERATURE REVIEW

### 2.1 Contrarian Strategy and Overreaction

In recent year, a number of researchers have presented that the long-term contrarian strategy can make superior returns that exceed the market average returns. In one of the pioneering papers on long-term contrarian profits, DeBondt and Thaler (1985) state that extreme losers outperform extreme winners over the next 3 to 5 years. For each year since 1933, they form portfolios of the best and the worst performing stocks over the previous three years. They then compute the returns on these portfolios over the 5 years following portfolio ranking period and compare the performance of these two portfolios. This difference in returns is not explained by the greater riskiness of the extreme loser, at least using the standard risk adjustments such as CAPM. DeBondt and Thaler document that the excess returns are the result of price overreaction. The extreme losers have become too cheap and bounce back, whereas the extreme winners have become too expensive and earn lower following returns.

Subsequent to DeBondt and Thaler's findings, Chopra, Lakonishok and Ritter (1992) find an economically-important overreaction effect even adjusted for size and beta. They show that the past losers outperform the past winners by 5-10 % per year during the subsequent 5 years and the overreaction effect is stronger for smaller firms than the larger firms. Furthermore, Fama and French (1993 and 1996) document that their three-factor model can capture the long-term reversals. They form winners and losers monthly based on their prior long-term returns and hold the portfolio only for a single month.

More recently, there are some researchers trying to construct belief-based models to explain the stock price reversals. Daniel, Hirshleifer and Subrahmanyam (1998) develop a model based on the investor overconfidence in their own ability. They argue that the investors are more likely to be overconfident about private information they have worked hard to generate than about public information. If the private information is positive, overconfidence means that investors will push prices

up too far relative to fundamentals and public information will slowly pull prices back to their value, thus generating the long-term reversals. Barberis, Shleifer and Vishny (1998) develop a model which allows for representativeness and conservatism. They argue that when an earnings surprise is followed by another of the same sign, the investors assume that a trending regime holds and they overreact but when a surprise is followed by a surprise of the opposite sign, the investors assume that they are in the mean-reverting regime and they underreact.

Using stock indexes of 18 countries, Balvers, Wu and Gilliland (2000) report the mean reversion across the national stock markets with a positive reversion half-life of three to three and a half years. Using the industry portfolios, Gropp (2004) concludes that the longer ranking period is needed to capture higher industry contrarian profits in view of the long half-lives for industry portfolios to reverse their returns. These two studies suggest that longer information periods should be explored to enhance contrarian profits. Therefore, I extend the ranking up to 7 years.

In Thailand, there are several researchers study about the contrarian strategy and the overreaction of investor in the SET. Krissana, Wirat and Danaipun (1994) study about the overreaction in the SET by form the portfolio of 10 winner and loser stocks and 10% of stocks in the SET. They find that there is the overreaction in the SET especially for the period of 60-72 weeks. Nevertheless, the difference of the returns between loser and winner stocks decreases when they add more stocks into the winner and loser portfolios. Subsequently, Tanawat, Atikarn and Chatree (1996) expand the Krissana et al.'s study. They state that the overreaction in the SET is found only for 1991 to 1996 but they do not find the overreaction before 1991. More recently, Punnee (1998) study about the overreaction in the SET in 1990 to 1995, she find that the overreaction occur both in short term and long term when there is the good news in the market but the overreaction is not clearly occur when there is the bad news in the market. She point this phenomenal to the restriction for short sale in the SET. Thus the overreaction for good news clearly and durable occur because investors cannot easily to exploit from the overreaction by using contrarian strategy (short winner stocks). Prior research about the contrarian strategy and the overreaction in the SET does not enhance the trading volume to the study and there is not the existing research about the 52-week high price in Thailand.



## 2.2 Trading volume and volume-based momentum strategy

Focusing on the use of trading volume, there are theoretical papers suggesting that the past trading volume may be used to predict the stock price movements. Campbell, Grossman and Wang (1993) investigate the relationship between aggregate stock market trading volume and daily stock returns. They present a model in which the trading volume provide information about the demand of liquidity traders and they find that stock price changes are led by high-volume trades which tend to be reversed more often than those led by low-volume trades. Blume, Easley and O'Hara (1994) investigate the role of trading volume for technical analysis by developing a model in which the aggregate supply is fixed and the traders receive signals with varying quality. They show the relation between volume, information precision and price movements and they find that the traders can profit from using volume information in addition to the historical price information in making projections about future price changes, suggesting an information signaling role of volume in return predictability.

In a related study, Datar et al. (1998) show that low turnover stocks generally earn higher returns than high turnover stocks. They interpret this result as providing support for the liquidity hypothesis of Amihud and Mendelson (1986). According the liquidity hypothesis firms with relatively low trading volume are less liquid and therefore command a higher expected return. I build on the finding of Datar et al. by examine the interaction between past price contrarian and trading volume in predicting cross-sectional returns.

Based on U.S. sample, Lee and Swaminathan (2000) show that (1) the past trading volume can predict both magnitude and persistence of the price momentum, (2) firms with high (low) past turnover ratios show many glamour (value) characteristics, and (3) the price momentum in high-volumes stocks is largely attributable to the investor overreaction. They assign stocks to one of ten portfolios based on the past return and one of three based on the past trading volume. Therefore, 30 portfolios are formed based on the past returns and trading volume. They then investigate the returns of these portfolios over the next five years by using the ranking up to 1 year and find that firms with high past volume underperform low past volume over the next few years. Moreover, they also investigate the returns of the early stage momentum stock (low volume winners and high volume losers) and the late stage

momentum stock (high volume winners and low volume losers) which experience the faster reversals. They find that the early stage momentum strategy is more profitable than the late stage momentum strategy. Their study also shows that the losers with high prior volume lost more and longer than low volume losers and the winner with high prior volume underperform low volume winners over the next 2 to 5 years. Using the trading volume-enhanced information, they show the link between the short-term momentum and the long-term return reversals.

Tkac (1999) develop the theoretical models in which past trading volume is related to returns. She show that changes in price volatility are often accompanied by changes in trading volume and that trading volume is a proxy for changes in key market information induced by investors' liquidity and their risk aversion. She also provides a theoretical of the portfolios' benchmark for trading volume that connects trading activity of individual stocks to that of the market. Based on the two-fund theorem, she shows that volume measures that distinguish between normal and abnormal volume provide good proxies for information trading. Empirically, Conrad, Hameed and Niden (1994) report that contrarian strategy is profitable only for high-transaction securities which experience price reversals. Hameed and Ting (2000) also report that the contrarian profits on actively traded stocks are significantly higher than on less traded stocks, and that predictability of the volume-return relation is more pronounced in the smaller stocks. Connolly and Strivers (2003) report regularity in the pattern of stock-return reversals following unexpectedly high or low stock turnover.

### **2.3 Momentum strategy based on 52-Week high price**

Using the way to classify the winners and the losers based on the 52-week high price, George and Hwang (2004) show that momentum strategy based on the 52-week high price which buys stocks near their 52-week high price and sells stocks far from their 52-week high price is more profitable than Jegadeesh and Titman's (1993) momentum strategy. Base on the stock in the Center for Research in Security Prices (CRSP) database, they suggest that investors use the 52-week high price as a reference and when a stock reaches its 52-week high price, investors are reluctant to bid the price higher even if the information warrants it. The information of good new

eventually prevails and pushes the stock prices higher, whereas when the stock price falls far from its 52-week high, investors are reluctant to sell but the information eventually prevails and the price falls. Similar to George and Hwang, Marshall and Cahan (2005) find that the momentum strategy based on the 52-week high price is highly profitable on Australian Stock Exchange (ASX) and outperform both Jegadeesh and Titman's (1993) price momentum strategy and Moskowitz and Grinblatt's (1999) industry momentum. In contrast to these two studies, Alsubaie and Najand (2008) show that the 52-week high price momentum strategy for the Saudi Stock Market (SSM) contradicts the empirical result of George and Hwang. They find a reversal in stocks that have reached their 52-week high.

In sum, prior studies have documented the long-term reversals and develop models to explain this market anomaly. Other studies have examined the relation between trading volume and future return. For the momentum strategy, the prior studies also investigate the volume-enhanced momentum strategy's profitability and the momentum strategy returns based on the 52 week-high price. I integrate all these lines of research and adjust methodology for the contrarian strategy. From this methodology, I hope to add more specific strategy to the body of the contrarian strategy study.

ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย

## CHAPTER III SAMPLE DATA AND METHODOLOGY

### 3.1 Sample Data

This empirical study investigates the profitability of the long term volume-based contrarian strategy and the 52-week high price long term contrarian strategy in the Stock Exchange of Thailand (SET). Data of all listed firms in the SET over period 1988 – 2007 are used. The stock data are collected from the Datastream Database. The data used are daily stock price, monthly return and trading volume of each stock. The monthly return used is the holding period return with dividends reinvested and it is calculated as follow<sup>1</sup>:

$$RI_t = RI_{t-1} * \frac{P_t}{P_{t-1}}$$

Except when  $t$  = ex-date of the dividend payment  $D_t$  then:

$$RI_t = RI_{t-1} * \frac{P_t + D_t}{P_{t-1}}$$

Where:

$P_t$  = price on day t

$P_{t-1}$  = price on day t-1

$D_t$  = dividend payment associated with ex-date t

Gross dividends are used where available and the calculation ignores tax and re-investment charges. Adjusted closing prices are used throughout to determine price index and hence return index.

---

<sup>1</sup> From Datastream definition

For daily price calculation, I use the closing price of each trading day. These stored prices are adjusted for subsequent capital actions such as rights offering and stock split.

To avoid the size effect, trading volume is defined as the average daily turnover in percentage during the portfolio formation period, where daily turnover is the ratio of the number of shares traded each day to the number of shares outstanding at the end of day.

The portfolios returns are measured using buy-and-hold return for the whole of the investment period to reduce transaction cost. I set the ranking period be the same as to the investment period that are 1-year, 3-year, 5-year and 7-year. Overlapping periods are used instead of nonoverlapping periods to increase the number of runs and to enhance the precision of point estimates of the coefficients of the regression that I study. For 1-year period, the first ranking period, the first investment period, the last investment period and the number of runs are (1988, 1989, 2007, 19) respectively. For 3-year, 5-year and 7-year period, the corresponding periods and the number of runs are (1988-1990, 1991-1993, 2005-2007, 15), (1988-1992, 1993-1997, 2003-2007, 11) and (1975-1981, 1982-1988, 2001-2007, 7) respectively.

Only stocks that are continuously listed on SET for the whole ranking period and investment period are used. The stocks that are delisted, suspended and no trade between ranking and investment periods are excluded. Although excluding these stocks will lead to the survivorship bias but in this study, I only focus on the performance of the contrarian strategy portfolio. The stocks which are delisted from SET do not mean that all of those firms face the bankruptcy. Sometime firms are delisted by tender offer of some people. Another reason for excluding delisted stock is that in Thailand the information of liquidating dividend which firms pay to shareholders when stock are delisted is unavailable. Therefore, I use only stocks that are continuously listed and traded on SET in this study.

## 3.2 Methodology

### 3.2.1 Simple contrarian strategy based on prior return

For baseline study, stocks are assigned to one of 5 portfolios based on their ranking period returns. Stock in the worst performing deciles are grouped in the loser portfolio (R1). Those in the best performing deciles are grouped in the winner portfolio (R5). A simple contrarian strategy is one that buys the losers (R1) and sells the winners (R5). I examine the returns of each portfolio (R1 to R5) and the return of simple contrarian portfolio for ranking and investment periods of 1, 3, 5 and 7 years. The returns of each portfolio are calculated by using buy-and-hold return of the portfolio whole the investment period. Transaction costs and taxes on the investment are not included in the return calculation.

In addition, I investigate the CAPM alpha for measure the residual returns after controlling for risk. The Ordinary Least Squares regression is used to obtain the CAPM alpha and beta of a return-volume portfolio. I regress the portfolio's annual return against the annual market excess returns (across all runs) as follows:

$$R_{p_t} - R_{f_t} = \alpha_p + \beta_p [Mkt_t - R_{f_t}] + e_{p_t}$$

where  $R_{p_t}$  is the annual return of the return-volume portfolio under study,  $R_{f_t}$  is the risk free rate,  $\alpha_p$  is the CAPM alpha ( a measure of CAPM risk-adjusted return and is equal to zero if there is no mispricing)  $\beta_p$  is the CAPM beta,  $Mkt_t$  is the return of value weighted index of stocks listed on the SET and  $e_{p_t} \sim N(0, \sigma_p)$

Moreover, I also find the risk adjusted return of each portfolio by using Fama and French three factors model. The return of common stock can be expressed as follows:

$$R_{p_t} - R_{f_t} = \alpha_p + \beta_{p,Mkt} [Mkt_t - R_{f_t}] + \beta_{p,SMB} SMB_t + \beta_{p,HML} HML_t + e_{p_t}$$

where  $R_{P_t}$  is the return of the study portfolio,  $R_{f_t}$  is the risk free return rate,  $\beta_{P,Mkt}$  is the factor loading for the market excess return,  $Mkt_t$  is the return of value weighted index of stocks listed on the SET,  $\beta_{P,SMB}$  is the factor loading for  $SMB_t$  (return on the mimicking portfolio for risk related to size),  $\beta_{P,HML}$  is the factor loading for  $HML_t$  (return on the mimicking portfolio for risk related to book-to-market-equity). If contrarian profit cannot be exploited by the Fama and French three-factor model, the alpha of the regression of stock excess return on excess market return, return of the SMB and HML portfolio will be significantly different from zero. This will then indicate a positive or negative risk-adjusted return.

### 3.2.2 Volume based contrarian strategy

Similar to the first finding, stocks are assigned to one of 5 portfolios based on their ranking period return. In each winner and loser portfolios, stocks with the lowest prior trading volume are grouped in the V1 portfolio, and those with the highest trading volume are grouped in the V3 portfolio. Those whose volumes are in the middle-third are grouped in the V2 portfolio. The independent sorting by prior return and trading volume gives rise to 15 return-volume portfolios which are equally weighted. The ranking and investment periods are 1, 3, 5 and 7 years same as the first finding. The investment period returns and risk adjusted returns are calculated as same as the first finding. Then I compare the return of each portfolio which has different trading volume in each winner and loser portfolio (R1 to R5) and also examine the return of an early stage contrarian strategy and a late stage contrarian strategy. An early stage contrarian strategy is one that buys low volume losers (R1V1) and sells high volume winners (R5V3), while a late stage contrarian portfolio buys high volume losers (R1V3) and sells low volume winners (R5V1). The investment period returns and risk adjusted returns of early stage and late stage portfolio are also examined and I then compare the return of these two portfolios with the simple contrarian portfolio in each period for investigate the impact of the past trading volume.

### 3.2.3 Contrarian strategy based on 52-week high price

The last but not least, this study investigates the return of contrarian strategy based on their 52-week high price ratio. I repeat the first two findings above but change the way to classify the winner and the loser stocks by using their 52-week high price ratio instead of using their prior return. In this step, the winner stock is defined as the stock which has high ratio of the close price to their 52-week high price as shown in the formula below:

$$\frac{P_{i,t-1}}{high_{i,t-1}}$$

where  $P_{i,t-1}$  is the price of stock  $i$  at the end of day  $t-1$ ,  $high_{i,t-1}$  is the highest price of stock  $i$  during the 52-week period that ends on day  $t-1$  and  $t$  is the first day of investment period. This finding should be useful and help us to find the robustness of the contrarian strategy in the SET.

ศูนย์วิจัยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย



## CHAPTER IV EMPIRICAL RESULTS

### 4.1 Simple contrarian strategies

#### 4.1.1 Simple contrarian strategy based on prior return

Table 1 presents the prior return, test return and portfolio characteristics for the prior return simple contrarian strategy. Consistent with DeBondt and Thaler (1985, 1987), the loser portfolios outperform the winner portfolios in long term. The returns of loser portfolios are higher than the return of winner portfolios for the investment period of 3 years, 5 years and also for 7 years investment period that this study extends from the prior research. The returns of simple contrarian strategy based on prior return (buys R5 and sells R1) are -3.30%, 6.75%, 25.39% and 14.82% per annual for the investment period of 1, 3, 5 and 7 years respectively. All simple contrarian portfolios provide significantly (90% confidence interval)<sup>2</sup> positive returns except for 1 year investment period that provides insignificant negative return. For the characteristics of portfolios, the stocks in loser portfolios have lower size, price and prior return than the stocks in winner portfolios for all ranking periods.

#### 4.1.2 Simple contrarian strategy based on 52-week high price

Table 2 presents the prior return, 52-week high price ratio and portfolio characteristics for the 52-week high price simple contrarian strategy. For 52-week high price simple contrarian strategy, the loser portfolios outperform the winner portfolios for all investment periods. The returns of simple contrarian strategy based on 52-week high price (buys R5 and sells R1) are 3.94%, 7.67%, 7.42% and 7.88% per annual for the investment period of 1, 3, 5 and 7 years respectively. All simple contrarian portfolios provide significant positive returns except for 1 year investment period. The result shows that the reversal timeline of 52-week high price simple contrarian strategy is shorter than the prior return simple contrarian strategy but lower magnitude in long term (5 and 7 years investment period). For the characteristics of portfolios, the stocks in loser portfolios also have lower size, price than the stocks in winner portfolios as same as the prior return simple contrarian strategy but the differences of price and size of loser and winner portfolio are smaller than prior return simple contrarian portfolios in long term investment period.

---

<sup>2</sup> This study always uses 90% confidence interval to check the statistic significance.

**Table 1 Return of simple contrarian portfolios based on prior return and portfolio characteristics**

Table 1 presents the prior return, investment period return (test return) and portfolio characteristics for prior return contrarian portfolios formed from stocks listed on the SET during the period from 1988 to 2007. Stocks are sorted into 5 equally-weighted prior return portfolios. *R1* represents the winner portfolio (highest prior return) while *R5* is the loser portfolio (lowest prior return). *R5-R1* is the simple contrarian portfolio (buy past loser and sell past winner). *Prior return* and *test return* are the annual return of the equally-weighted portfolios during the ranking period and investment period respectively. *Price* is the time-series average of the median stock price of the portfolio in THB as of the end of the ranking period. *Size* is the time-series average of the median stock size in million THB as of the end of the ranking period. *Number of Observations* is the accumulate number of stocks in each portfolio for all ranking periods. The numbers in parentheses represent *t*-statistics value.

Investment Period	Portfolio	Test Return	Price	Size	Prior Return	Number of Observations
1-Year	R1 (winner)	30.03% (3.66)	25.6	2,349	115.40%	811
	R3	20.55% (3.78)	19.0	1,246	15.27%	813
	R5 (loser)	26.73% (4.83)	11.7	1,220	-33.73%	811
	R5 – R1	-3.30% (-0.72)				
3-Year	R1	16.93% (3.69)	26.4	4,173	101.74%	558
	R3	20.03% (4.69)	17.8	1,316	13.08%	559
	R5	23.67% (3.80)	10.8	892	-13.05%	558
	R5 – R1	6.75% (2.32)				
5-Year	R1	10.53% (2.46)	33.4	5,356	69.97%	357
	R3	28.71% (4.17)	20.7	1,010	8.22%	356
	R5	35.93% (4.21)	11.5	652	-10.57%	357
	R5 – R1	25.39% (4.83)				
7-Year	R1	20.59% (2.96)	41.3	4,671	43.62%	166
	R3	46.38% (3.95)	15.2	926	6.66%	166
	R5	35.41% (4.74)	8.3	363	-8.92%	166
	R5 – R1	14.82% (3.35)				

**Table 2 Return of simple contrarian portfolios based on 52-week high price and portfolio characteristics**

Table 2 presents the ranking 52-week high price ratio, investment period return (test return) and stock characteristics for ranking portfolios formed from stocks listed on the SET during the period from 1988 to 2007. Stocks are sorted into 5 equally-weighted 52-week high price ratio portfolios. *R1* represents the winner portfolio (highest ratio) while *R5* is the loser portfolio (lowest ratio). *R5-R1* is the simple contrarian portfolio (buy past loser and sell past winner). *52-week high price ratio* is average of the ratio of current stock price to its 52-week high price as at end of the ranking period. *Test return* is the annual return of the equally-weighted portfolios during the ranking period. *Price* is the time-series average of the median stock price of the portfolio in THB as of the end of the ranking period. *Size* is the time-series average of the median stock size in million THB as of the end of the ranking period. *Number of Observations* in the accumulate number of stocks in each portfolio for all ranking periods. The numbers in parentheses represent *t*-statistics value.

Investment Period	Portfolio	Test Return	Price	Size	52-week high price ratio	Number of Observations
1-Year	R1 (winner)	25.93% (4.05)	25.56	2,509	0.94	916
	R3	21.06% (3.93)	16.75	1,452	0.73	905
	R5 (loser)	29.87% (3.82)	10.07	947	0.45	906
	R5 – R1	3.94% (1.09)				
3-Year	R1	17.31% (5.12)	26.12	2,459	0.94	760
	R3	22.49% (4.58)	18.18	1,322	0.72	749
	R5	24.98% (4.71)	11.07	930	0.45	750
	R5 – R1	7.67% (3.26)				
5-Year	R1	20.65% (4.90)	25.87	2,071	0.94	631
	R3	27.42% (5.28)	19.57	1,225	0.71	618
	R5	28.07% (4.32)	11.63	866	0.44	620
	R5 – R1	7.42% (2.64)				
7-Year	R1	12.73% (3.73)	24.26	2,129	0.93	520
	R3	22.03% (4.56)	17.33	1,291	0.70	506
	R5	20.61% (3.70)	12.42	902	0.43	509
	R5 – R1	7.88% (2.34)				

## **4.2 Volume-based contrarian strategies**

### **4.2.1 Contrarian strategy based on prior return and past trading volume.**

Focusing on prior return-volume based contrarian strategy as shown in Table 3, in contrast to Lee and Swaminathan (2000), the results show that losers (winners) with high past trading volume outperform losers (winners) with low past trading volume for long-term contrarian strategy. For loser portfolios, the returns of high volume portfolios are higher than low volume portfolios 5.15%, 24.79% and 18.32% for the investment period of 3, 5 and 7 years respectively. Similarly for winner portfolios, the return of high volume portfolios higher than low volume portfolios 5.97%, 4.55% and 16.4% for investment period of 3, 5 and 7 years respectively. The returns of early stage contrarian portfolios (buy R5V1 and sell R1V3) are lower than late stage portfolios (buy R5V3 and sell R1V1) for all investment periods.

Looking at portfolio characteristics, steady to simple contrarian portfolios, the winner portfolios have higher size than the loser portfolios. For price, average price of winner portfolios are also higher than loser portfolios and in each winner-loser portfolio, the high past trading volume portfolios have a lower price than the low past trading volume portfolios. For volume, the highest volume portfolios for all investment periods are the portfolio R5V3 (high volume loser). Prior returns of high volume winner portfolios higher than low volume winner portfolios for all investment periods except for 7 years investment period and prior returns of high volume loser portfolio lower than low volume loser portfolios except for 7 year investment period as well.

ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย

**Table 3 Return of prior return-volume based contrarian portfolios and portfolio characteristics**

Table 3 presents the prior return, investment period return (test return) and stock characteristics for return-volume based portfolios formed from stocks listed on the SET during the period from 1988 to 2007. Stocks are sorted into 5 equally-weighted prior return portfolios and in each winner-loser portfolio stocks are sorted into 3 volume portfolios. Average yearly turnover over the ranking period is taken as a proxy for trading volume. *R1* represents the winner portfolio (highest prior return) while *R5* is the loser portfolio (lowest prior return). *V1* (*V3*) is the lowest (highest) trading volume. The intersections of the stock in these two portfolio types give rise to the return-volume based portfolios. *Prior return* and *test return* are the annual return of the equally-weighted portfolios during the ranking period and investment period respectively. *Price* is the time-series average of the median stock price of the portfolio in THB as of the end of the ranking period. *Size* is the time-series average of the median stock size in million THB as of the end of the ranking period. *Volume* is the average yearly trading turnover of the stocks in the portfolio over the ranking period. *Number of Observations* in the accumulate number of stocks in each portfolio for all ranking periods. The numbers in parentheses represent *t*-statistics value. Panel A, B, C and D show the results for the 1-, 3-, 5- and 7-year investment period respectively.

Panel A: Ranking/Investment Period of 1 Year							
Prior return portfolio	Volume Portfolio	Test Return	Price	Size	Volume	Prior Return	Number of observations
R1 (winner)	V1 (low)	21.63% (2.77)	43.57	1,834	0.25	106.19%	270
	V2	31.90% (4.25)	27.23	3,637	1.54	118.36%	271
	V3 (high)	36.24% (3.80)	12.70	2,845	15.26	121.98%	270
R3	V1	15.31% (3.35)	28.99	1,169	0.17	15.59%	273
	V2	24.06% (4.61)	19.98	2,084	1.24	15.28%	267
	V3	21.97% (3.25)	9.75	1,748	12.81	15.04%	273
R5 (loser)	V1	31.27% (5.67)	20.01	1,247	0.36	-33.29%	270
	V2	24.61% (3.83)	13.83	1,633	1.91	-33.89%	271
	V3	25.44% (4.73)	5.20	1,124	39.28	-34.14%	270
Early stage return (R5V1-R1V3)		-4.97% (-0.76)		Late stage return (R5V3-R1V1)			3.81% (0.57)
Panel B: Ranking/Investment Period of 3 Years							
Prior return portfolio	Volume Portfolio	Test Return	Price	Size	Volume	Prior Return	Number of observations
R1 (winner)	V1 (low)	13.35% (3.20)	53.05	5,407	0.56	92.17%	187
	V2	18.23% (4.21)	27.99	6,111	2.06	99.78%	184
	V3 (high)	19.32% (3.33)	11.56	3,525	13.34	113.45%	187
R3	V1	16.57% (3.83)	41.49	1,127	0.17	13.43%	185
	V2	17.43% (4.35)	21.23	2,132	1.19	13.54%	189
	V3	25.97% (4.51)	5.62	1,375	16.03	12.30%	185
R5 (loser)	V1	22.33% (3.89)	20.28	1,086	0.40	-12.57%	187
	V2	21.75% (3.36)	9.90	896	1.96	-13.48%	184
	V3	27.38% (4.00)	4.71	1,086	22.23	-13.15%	187
Early stage return (R5V1-R1V3)		2.91% (0.92)		Late stage return (R5V3-R1V1)			14.03% (3.95)

Table 3 - Continue

Panel C: Ranking/Investment Period of 5 Years							
Prior return portfolio	Volume Portfolio	Test Return	Price	Size	Volume	Prior Return	Number of observations
R1 (winner)	V1 (low)	6.09% (1.57)	78.62	9,346	0.64	62.49%	120
	V2	14.82% (2.83)	33.15	5,504	1.94	74.60%	117
	V3 (high)	10.64% (2.54)	16.36	5,498	8.32	73.53%	120
R3	V1	26.03% (4.01)	38.17	957	0.37	7.89%	118
	V2	23.47% (4.11)	24.31	5,382	1.50	9.10%	120
	V3	36.70% (4.06)	8.25	3,702	14.98	7.87%	118
R5 (loser)	V1	23.72% (4.71)	21.92	767	0.46	-10.66%	120
	V2	35.58% (4.31)	11.09	1,113	1.99	-9.58%	117
	V3	48.51% (3.60)	5.07	957	15.24	-11.30%	120
Early stage return (R5V1-R1V3)		13.08% (5.18)	Late stage return (R5V3-R1V1)			42.42% (3.887)	
Panel D: Ranking/Investment Period of 7 Years							
Prior return portfolio	Volume Portfolio	Test Return	Price	Size	Volume	Prior Return	Number of observations
R1 (winner)	V1 (low)	13.93% (3.37)	96.57	7,079	0.65	42.38%	57
	V2	16.81% (2.14)	42.59	13,999	1.93	46.84%	54
	V3 (high)	30.33% (2.94)	23.54	13,595	8.01	41.21%	57
R3	V1	30.15% (3.69)	33.91	1,140	0.57	5.82%	57
	V2	49.82% (3.71)	12.88	1,541	1.75	4.45%	56
	V3	59.87% (4.10)	6.91	3,354	15.04	7.21%	57
R5 (loser)	V1	29.88% (3.43)	15.22	538	0.45	-8.82%	57
	V2	30.76% (6.61)	8.48	336	1.96	-8.85%	54
	V3	48.20% (4.17)	3.35	392	16.04	-8.04%	57
Early stage return (R5V1-R1V3)		-0.44% (-0.05)	Late stage return (R5V3-R1V1)			34.27% (4.05)	

#### **4.2.2 Contrarian strategy based on 52-week high price and past trading volume**

Table 4 shows the test returns and portfolio characteristics of 52-week high price-volume based contrarian portfolios, similar to prior return-volume based contrarian portfolios, the losers (winners) with high past trading volume also outperform the losers (winner) with low past trading volume for all investment periods. The returns of high volume loser portfolios are higher than low volume portfolio 2.91%, 12.53%, 17.08% and 6.20% for 1, 3, 5 and 7 years investment period respectively. For winner portfolios, the high volume portfolios also outperform the low volume portfolio except for 5 years investment period. The returns of high volume loser portfolios subtract by the return of low volume portfolio are 17.12%, 5.45%, -3.12% and 7.82% for 1, 3, 5 and 7 years investment period respectively. The returns of early stage contrarian portfolios (buy R5V1 and sell R1V3) are also lower than late stage portfolios (buy R5V3 and sell R1V1) for all investment periods as same as prior return-volume based contrarian strategy.

Portfolio characteristics of 52-week high price-volume based contrarian strategy are analogous with the prior return-volume based contrarian strategy. The average price of winner portfolios are higher than loser portfolios and in each winner-loser portfolio, the high past trading volume portfolios have a lower price than the low past trading volume portfolios. The highest volume portfolios for all investment periods are the portfolio R5V3. The 52-week high price ratios are close among all volume portfolios in each winner-loser portfolio. This information shows that 52-week high price ratio is not related with the volume of the stock.

**Table 4 Return of 52-week high price-volume based contrarian portfolios and portfolio characteristics**

Table 4 presents the investment period return (test return), 52-week high price ratio and stock characteristics for 52-week high price-volume based portfolios formed from stocks listed on the SET during the period from 1988 to 2007. Stocks are sorted into 5 equally-weighted portfolios based on their 52-week high price ratio and in each portfolio stocks are sorted into 3 volume portfolios. Average yearly turnover over the ranking period is taken as a proxy for trading volume. *R1* represents the winner portfolio (highest price ratio) while *R5* is the loser portfolio (lowest price ratio). *V1* (*V3*) is the lowest (highest) trading volume. The intersections of the stock in these two portfolio types give rise to the 52-week high price ratio-volume based portfolios. *Test return* is the annual return of the equally-weighted portfolios during the investment period. *Price* is the time-series average of the median stock price of the portfolio in THB as of the end of the ranking period. *Size* is the time-series average of the median stock size in million THB as of the end of the ranking period. *Volume* is the average yearly trading turnover of the stocks in the portfolio over the ranking period. *Ranking ratio* is the ratio of close price at the end of ranking period to the 52-week high price. *Number of Observations* is the accumulate number of stocks in each portfolio for all ranking periods. The numbers in parentheses represent *t*-statistics value. Panel A, B, C and D show the results for the 1-, 3-, 5- and 7-year investment period respectively.

Panel A: Ranking/Investment Period of 1 Year							
Prior return portfolio	Volume Portfolio	Test Return	Price	Size	Volume	Ranking ratio	Number of observations
R1 (winner)	V1 (low)	22.70% (2.88)	42.99	1,500	0.22	0.94	277
	V2	19.57% (4.72)	35.30	5,735	1.37	0.94	287
	V3 (high)	39.82% (4.13)	15.46	3,704	16.34	0.94	277
R3	V1	18.29% (4.07)	32.51	1,589	0.31	0.73	282
	V2	21.62% (4.18)	16.93	1,586	1.40	0.73	278
	V3	23.15% (3.08)	7.24	1,834	11.86	0.73	282
R5 (loser)	V1	29.44% (3.55)	16.70	1,041	0.33	0.46	276
	V2	25.76% (3.60)	12.02	1,178	1.97	0.45	286
	V3	32.35% (4.08)	4.06	942	31.53	0.45	276
Early stage return (R5V1-R1V3)		-10.38% (-2.50)		Late stage return (R5V3-R1V1)			9.65% (1.39)
Panel B: Ranking/Investment Period of 3 Years							
Prior return portfolio	Volume Portfolio	Test Return	Price	Size	Volume	Ranking ratio	Number of observations
R1 (winner)	V1 (low)	15.92% (4.55)	44.94	1,225	0.25	0.94	232
	V2	22.25% (5.53)	33.70	5,543	1.56	0.93	232
	V3 (high)	21.37% (4.84)	13.55	4,413	17.32	0.93	232
R3	V1	15.88% (4.70)	36.37	1,095	0.27	0.72	232
	V2	21.99% (4.56)	20.30	1,580	1.43	0.72	234
	V3	25.36% (3.83)	6.83	2,163	12.06	0.71	232
R5 (loser)	V1	19.30% (3.67)	20.91	990	0.38	0.46	231
	V2	21.47% (4.73)	13.39	1,280	2.19	0.45	231
	V3	31.83% (5.03)	4.06	1,024	31.53	0.45	231
Early stage return (R5V1-R1V3)		-2.07% (-0.78)		Late stage return (R5V3-R1V1)			15.91% (4.22)



Table 4 - Continue

Panel C: Ranking/Investment Period of 5 Years							
Prior return portfolio	Volume Portfolio	Test Return	Price	Size	Volume	Ranking ratio	Number of observations
R1 (winner)	V1 (low)	21.67% (4.66)	47.36	948	0.28	0.93	192
	V2	26.59% (5.52)	34.32	2,151	1.70	0.93	194
	V3 (high)	18.55% (4.56)	13.99	3,472	20.09	0.93	192
R3	V1	17.78% (4.29)	35.99	901	0.32	0.70	193
	V2	30.74% (5.22)	18.07	2,091	1.71	0.69	191
	V3	31.35% (4.78)	7.01	2,023	11.11	0.70	193
R5 (loser)	V1	14.17% (3.84)	22.98	908	0.36	0.36	192
	V2	23.36% (4.26)	14.69	1,949	2.11	0.43	194
	V3	31.25% (4.79)	4.32	1,336	33.47	0.42	192
Early stage return (R5V1-R1V3)		-4.38% (-1.35)	Late stage return (R5V3-R1V1)			9.58% (2.42)	
Panel D: Ranking/Investment Period of 7 Years							
Prior return portfolio	Volume Portfolio	Test Return	Price	Size	Volume	Ranking ratio	Number of observations
R1 (winner)	V1 (low)	11.07% (3.65)	49.03	876	0.32	0.93	157
	V2	16.01% (4.43)	36.89	2,334	1.90	0.92	156
	V3 (high)	18.89% (3.84)	16.02	3,641	21.02	0.92	157
R3	V1	14.91% (4.27)	38.88	1,149	0.45	0.69	157
	V2	22.09% (4.03)	19.78	2,107	1.95	0.69	160
	V3	24.23% (4.02)	7.43	1,940	11.29	0.69	157
R5 (loser)	V1	14.58% (3.30)	22.78	855	0.35	0.44	157
	V2	26.71% (3.78)	16.34	1,328	1.97	0.43	156
	V3	20.78% (3.15)	4.95	1,939	29.81	0.43	157
Early stage return (R5V1-R1V3)		-4.30% (-1.31)	Late stage return (R5V3-R1V1)			9.71% (1.68)	

จุฬาลงกรณ์มหาวิทยาลัย

### 4.3 The comparison of simple, early stage and late stage contrarian strategies

Looking at the simple, early stage and late stage contrarian strategy, the results are consistent with prior researches, past losers outperform past winners in long run (simple contrarian). However, contradict to prior study of Lee and Swaminathan (2000), the result shows that late stage contrarian portfolios outperform simple contrarian portfolios for all investment periods while an early stage contrarian portfolios underperform for both prior return-volume based and 52-week high price-volume based contrarian strategies as shown in Table 5. For prior return-volume based contrarian strategy, the returns of late stage contrarian strategy are higher than the returns of simple contrarian strategy 7.11%, 7.28%, 17.03% and 19.45% and the returns of early stage contrarian strategy underperform simple contrarian strategy 1.67%, 3.84%, 12.31% and 15.26% for the investment period of 1, 3, 5 and 7 years respectively. Similar to prior return-volume based contrarian strategy, the returns of late stage contrarian strategy are higher than the returns of simple contrarian strategy 5.71%, 8.24%, 2.16% and 1.83% and the returns of early stage contrarian strategy are lower than the returns of simple contrarian strategy 14.32%, 9.74%, 11.80% and 12.18% for the investment period of 1, 3, 5 and 7 years respectively.

**Table 5 Investment period return of simple, early stage and late stage contrarian strategies**

Table 5 shows the investment period return (test return) of the simple, early stage and late stage strategy for both prior return-volume based and 52-week high price-volume based contrarian strategies. A simple strategy buys past losers (R5) and sells past winners (R1). An early stage strategy buys low volume losers (R5V1) and sells high volume winners (R1V3). A late stage strategy buys high volume losers (R5V3) and sells low volume winner (R1V1). The numbers in parentheses represent *t*-statistics value.

Investment period	Prior return-volume based			52-week high price-volume based		
	Simple	Early	Late	Simple	Early	Late
1-Year	-3.30% (-0.72)	-4.97% (-0.76)	3.81% (0.57)	3.94% (1.09)	-10.38% (-2.50)	9.65% (1.39)
3-Year	6.75% (2.32)	2.91% (0.92)	14.03% (3.95)	7.67% (3.26)	-2.07% (-0.78)	15.91% (4.22)
5-Year	25.39% (4.83)	13.08% (5.18)	42.42% (3.88)	7.42% (2.04)	-4.38% (-1.35)	9.58% (2.42)
7-Year	14.82% (3.35)	-0.44% (-0.05)	34.27% (4.05)	7.88% (2.34)	-4.30% (-1.31)	9.71% (1.68)

#### 4.4 Risk adjusted return of simple contrarian portfolio

##### 4.4.1 CAPM regression

Table 6 and 7 report the results of the CAPM risk adjustment for prior return simple contrarian portfolios and 52-week high price contrarian portfolios respectively. The CAPM alphas of loser portfolios of prior return simple contrarian strategy are significant at -6.11%, 3.21%, 2.47% and 5.99% for investment period of 1, 3, 5 and 7 years respectively. For winner portfolio, the CAPM alphas are significantly lower than the loser portfolios in long term that are 6.88%, -3.17%, -8.99% and -11.43% for investment period of 1, 3, 5 and 7 years respectively. The results show the high profitability of prior return simple contrarian even adjusted for market premium risk that are 6.38%, 11.46% and 17.42% for investment period of 3, 5 and 7 years respectively.

For 52-week high price simple contrarian strategy, the alphas of loser portfolios are much lower than the prior return simple contrarian strategy. From the result, the CAPM alphas of loser portfolios of 52-week high price simple contrarian strategy for investment period of 1, 3, 5 and 7 years are -10.05%, -4.54%, -6.95% and 5.99% respectively and for the winner portfolios, the CAPM alphas are 11.34%, 4.23%, -1.04% and -5.96%. The risk adjusted returns of loser portfolios are negative except for 7 years investment period which provides insignificant positive alpha. This result can be interpreted to high market premium risk of loser portfolios as we can see from the high beta of loser portfolios.

**Table 6 CAPM regression of simple contrarian portfolio based on prior return**

The annual excess returns of prior return simple contrarian portfolios are regressed against the market premium as follows:

$$R_{P_t} - R_{f_t} = \alpha_p + \beta_0 [Mkt_t - R_{f_t}] + e_{P_t}$$

where  $R_{P_t}$  is the return of the study portfolio,  $R_{f_t}$  is the risk free return rate,  $\alpha_p$  is the CAPM alpha.  $\beta_0$  is the factor loading for the market excess return,  $Mkt_t$  is the return of market.

Investment period	Return portfolio	Alpha	$\beta_0$	Contrarian excess return
1-Year	R1 (winner)	0.0688***	1.0045***	
	R3	0.0011	0.9310***	-0.1299
	R5 (loser)	-0.0611**	1.2496***	
3-Year	R1	-0.0317*	0.9388***	
	R3	0.0001	0.9861***	0.0638**
	R5	0.0321***	1.0934***	
5-Year	R1	-0.0899***	0.7795***	
	R3	0.0204***	1.0900***	0.1146***
	R5	0.0247**	1.2333***	
7-Year	R1	-0.1143***	0.8654***	
	R3	0.0212***	1.3841***	0.1742***
	R5	0.0599***	0.8683***	

**Table 7 CAPM regression of simple contrarian portfolio based on 52 -week high price**

The annual excess returns of 52-week high price simple contrarian portfolios are regressed against the market premium as follows:

$$R_{P_t} - R_{f_t} = \alpha_p + \beta_0 [Mkt_t - R_{f_t}] + e_{P_t}$$

where  $R_{P_t}$  is the return of the study portfolio,  $R_{f_t}$  is the risk free return rate,  $\alpha_p$  is the CAPM alpha.  $\beta_0$  is the factor loading for the market excess return,  $Mkt_t$  is the return of market.

Investment period	Return portfolio	Alpha	$\beta_0$	Contrarian excess return
1-Year	R1 (winner)	0.1134***	0.6926***	
	R3	-0.0206*	0.9760***	-0.2139***
	R5 (loser)	-0.1005***	1.4673***	
3-Year	R1	0.0423***	0.8871***	
	R3	0.0156***	0.9647***	-0.0877***
	R5	-0.0454***	1.2783***	
5-Year	R1	-0.0104	0.8652***	
	R3	0.0210	1.1618***	-0.0591
	R5	-0.0695***	1.3193***	
7-Year	R1	-0.0596***	0.7466***	
	R3	0.0330***	1.0479***	0.0717*
	R5	0.0121	1.0846***	

#### 4.4.2 Fama-French 3 Factors regression

Table 8 and 9 show the Fama-French 3 factors model regression results of prior return simple contrarian strategy and 52-week high price simple contrarian strategy respectively. In table 8, the result of prior return simple contrarian strategy shows the significantly positive excess returns (alphas) of loser portfolios and negative excess returns for winner portfolios in long horizontal investment period (3 years or more). These results could be interpreted that the prior return simple contrarian strategy provides positive excess return in long term even adjusted for market risk, size risk and market to book value effect. The result show the excess return of prior return simple contrarian strategy equal to -21.84%, 4.89%, 10.84% and 10.35% for ranking and investment period of 1, 3, 5 and 7 years respectively.

Looking at 52-week high price simple contrarian strategy's result in table 9, it shows the lower excess returns after adjusted for market risk, size risk and market to book value effect. The result shows the significantly positive excess return only for investment period of 5 years. The excess returns of 52-week high price simple contrarian strategy are -11.75%, -10.08%, 7.60% and 0.58% for investment period of 1, 3, 5 and 7 years respectively.

**Table 8 Fama-French 3 Factors regression of simple contrarian portfolio**

The annual excess returns of prior return simple contrarian portfolios are regressed against the market premium, SMB and HML return as follows:

$$R_{P_t} - R_{f_t} = \alpha_p + \beta_0[Mkt_t - R_{f_t}] + \beta_1SMB_t + \beta_2HML_t + e_{P_t}$$

where  $R_{P_t}$  is the return of the study portfolio,  $R_{f_t}$  is the risk free return rate,  $\alpha_p$  is the FF alpha.  $\beta_0$  is the factor loading for the market excess return,  $Mkt_t$  is the return of market,  $\beta_1$  is the factor loading for  $SMB_t$  (return on the mimicking portfolio for risk related to size),  $\beta_2$  is the factor loading for  $HML_t$  (return on the mimicking portfolio for risk related to book-to-market-equity).

Investment period	Return portfolio	Alpha	$\beta_0$	$\beta_1$	$\beta_2$	Contrarian excess return
1-Year	R1 (winner)	0.0775	0.9744***	-0.1438	-0.1684	-0.2184***
	R3	0.0335	0.9476***	0.2291	-0.1110	
	R5 (loser)	-0.1409*	1.3026***	-0.0070	0.6514	
3-Year	R1	-0.0231***	0.9860***	-0.5365***	-0.0607	0.0489*
	R3	0.0007	0.8724***	-0.2056***	0.1607	
	R5	0.0258***	1.0355***	0.3571***	0.0773	
5-Year	R1	-0.0323*	0.9605***	-0.2657***	-0.3683*	0.1084
	R3	0.0207	1.1229***	0.1110	-0.0978	
	R5	0.0761*	1.1958***	-0.3463***	0.6176***	
7-Year	R1	-0.0215	1.1446***	-0.0382	-0.6756**	0.1035***
	R3	-0.0025	1.3085***	-0.1008	0.2201	
	R5	0.0820*	0.8984***	-0.9902*	0.2568	

**Table 9 Fama-French 3 Factors regression of 52-week high price simple contrarian portfolio**

The annual excess returns of 52-week high price simple contrarian portfolios are regressed against the market premium, SMB and HML return as follows:

$$R_{P_t} - R_{f_t} = \alpha_p + \beta_0[Mkt_t - R_{f_t}] + \beta_1SMB_t + \beta_2HML_t + e_{P_t}$$

where  $R_{P_t}$  is the return of the study portfolio,  $R_{f_t}$  is the risk free return rate,  $\alpha_p$  is the FF alpha.  $\beta_0$  is the factor loading for the market excess return,  $Mkt_t$  is the return of market,  $\beta_1$  is the factor loading for  $SMB_t$  (return on the mimicking portfolio for risk related to size),  $\beta_2$  is the factor loading for  $HML_t$  (return on the mimicking portfolio for risk related to book-to-market-equity).

Investment period	Return portfolio	Alpha	$\beta_0$	$\beta_1$	$\beta_2$	Contrarian excess return
1-Year	R1 (winner)	0.0651**	0.7507***	0.2711	-0.1419**	-0.1175*
	R3	-0.0047	0.8876***	0.3219	-0.0063	
	R5 (loser)	-0.0524*	1.4674***	-0.9781**	0.0857	
3-Year	R1	0.0498***	0.9438***	-0.3342**	-0.1735**	-0.1008***
	R3	-0.0010	0.8687***	0.1749*	0.1697**	
	R5	-0.0510***	1.2475***	0.0344	0.0477	
5-Year	R1	-0.0231***	0.8992***	-0.7640**	0.1746***	0.0760***
	R3	0.0067	1.0228***	0.2810	0.2535***	
	R5	0.0529***	1.1820***	0.5911	-0.8794***	
7-Year	R1	-0.0083	0.8805***	-0.5299**	-0.0398	0.0058
	R3	0.0816***	1.5684***	-0.2605	-0.5503***	
	R5	-0.0025	1.0073***	0.5279	-0.1524	

## 4.5 Risk adjusted return of volume-based contrarian portfolio

### 4.5.1 CAPM regression

Table 10 and 11 report the results of the risk adjusted return by using CAPM model for prior return-volume based contrarian portfolios and 52-week high price-volume based contrarian portfolios respectively. Looking at prior return-volume based contrarian strategy, the result in Table 10 shows the significantly positive profit of high volume loser portfolio in long investment period after adjust for market risk and show negative returns for low volume winner portfolios. This points to the high market risk adjusted excess return of late stage contrarian strategy. The excess returns of late stage contrarian strategy for investment period of 3, 5 and 7 years are 4.36%, 20.54% and 21.03% respectively. For early stage contrarian strategy, the result also show the positive market risk adjusted returns; 14.55%, 5.13% and 9.43% for 3, 5 and 7 years investment period respectively.

For 52-week high price-volume based contrarian strategy, the result in Table 11 shows much lower excess return of both late stage contrarian strategy and early stage contrarian strategy. The excess return of late stage contrarian strategy is significantly positive only for investment period of 3 years, whereas the excess return of early stage contrarian strategy mostly negative except for 7 years investment period. The excess returns of late stage contrarian strategy for investment period of 1, 3, 5 and 7 years are -16.90%, 11.97%, 6.71% and 7.44% respectively. For early stage contrarian strategy the excess returns are -19.02%, -17.43%, -7.47% and 4.11% for 1, 3, 5 and 7 years investment period respectively.

**Table 10 CAPM regression of prior return volume-based contrarian portfolio**

The annual excess returns of prior return-volume portfolios are regressed against the market premium, as follows:

$$R_{p_t} - R_{f_t} = \alpha_p + \beta_0 [Mkt_t - R_{f_t}] + e_{p_t}$$

where  $R_{p_t}$  is the return of the study portfolio,  $R_{f_t}$  is the risk free return rate,  $\alpha_p$  is the CAPM alpha.  $\beta_0$  is the factor loading for the market excess return,  $Mkt_t$  is the return of market.

Investment period	Return portfolio	Volume portfolio	Alpha	$\beta_0$	Investment period	Return portfolio	Volume portfolio	Alpha	$\beta_0$
1-Year	R1 (winner)	V1 (low)	0.0010	0.8642***	5-Year	R1	V1	-0.1587***	0.7194***
		V2	0.1434	0.7884**			V2	-0.1424***	0.8158***
		V3 (high)	0.0622***	1.3657***			V3	0.0356***	0.7989***
	R3	V1	-0.0520***	0.7360***		R3	V1	0.0485***	0.9769***
		V2	0.0933***	0.9471***			V2	0.0136***	0.9262***
		V3	-0.0097	1.0988***			V3	-0.0033	1.3782***
	R5 (loser)	V1 (low)	0.0289	1.2133**		R5	V1	0.0869***	0.9655***
		V2	-0.0942***	0.9976***			V2	0.0125***	1.2031***
		V3 (high)	-0.1172***	1.5636***			V3	0.0467***	1.4378***
Early Stage Excess Return			-0.0333		Early Stage Excess Return			0.0513***	
Late Stage Excess Return			-0.1182***		Late Stage Excess Return			0.2054***	
3-Year	R1	V1	-0.0091	0.8123***	7-Year	R1	V1	-0.0887***	0.6670***
		V2	-0.0180	0.7863			V2	-0.1669***	0.8120**
		V3	-0.0869***	1.2681***			V3	-0.0889***	1.0912***
	R3	V1	0.0259**	0.5506***		R3	V1	-0.0541***	1.0813***
		V2	-0.0156	1.4151***			V2	0.0784**	1.1594***
		V3	-0.0097	1.0920***			V3	0.0389***	1.7767***
	R5	V1	0.0586*	0.7982**		R5	V1	0.0054	0.9341***
		V2	0.0153	1.0249***			V2	0.0440	0.3623
		V3	0.0345***	1.4180***			V3	0.1216***	1.0300**
Early Stage Excess Return			0.1455***		Early Stage Excess Return			0.0943*	
Late Stage Excess Return			0.0436*		Late Stage Excess Return			0.2103***	



**Table 11 CAPM regression of 52-week high price volume-based contrarian portfolio**

The annual excess returns of 52-week high price-volume portfolios are regressed against the market premium as follows:

$$R_{p_t} - R_{f_t} = \alpha_p + \beta_0 [Mkt_t - R_{f_t}] + e_{p_t}$$

where  $R_{p_t}$  is the return of the study portfolio,  $R_{f_t}$  is the risk free return rate,  $\alpha_p$  is the CAPM alpha.  $\beta_0$  is the factor loading for the market excess return,  $Mkt_t$  is the return of market.

Investment period	Return portfolio	Volume portfolio	Alpha	$\beta_0$	Investment period	Return portfolio	Volume portfolio	Alpha	$\beta_0$
1-Year	R1 (winner)	V1 (low)	0.0771***	0.4299**	5-Year	R1	V1	-0.0720***	0.6948***
		V2	0.1437***	0.3408			V2	0.2260***	1.9942***
		V3 (high)	0.1206***	1.1501***			V3	-0.0499**	0.5034**
	R3	V1	-0.0238**	0.8353***		R3	V1	-0.0962***	0.4630**
		V2	0.0287**	0.9837***			V2	0.0910**	1.4848***
		V3	-0.0840***	1.0690***			V3	-0.0601*	1.1115***
	R5 (loser)	V1 (low)	-0.0696**	1.2275***		R5	V1	-0.1246***	0.4209*
		V2	-0.1377***	1.4498***			V2	-0.0659***	0.7069***
		V3 (high)	-0.0919**	1.6718***			V3	-0.0049	1.1298***
Early Stage Excess Return			-0.1902***		Early Stage Excess Return			-0.0747***	
Late Stage Excess Return			-0.1690***		Late Stage Excess Return			0.0671*	
3-Year	R1	V1	-0.0220*	0.6654***	7-Year	R1	V1	-0.0615***	0.6733***
		V2	0.0933***	1.1921***			V2	-0.0287	0.8229**
		V3	0.0521***	1.2085***			V3	0.0069	1.0681***
	R3	V1	-0.0902***	0.2286		R3	V1	0.0163	0.6993***
		V2	0.0698***	1.1661***			V2	0.0630***	1.0900***
		V3	-0.0840***	0.8528**			V3	-0.0029	1.2452***
	R5	V1	-0.1222***	0.8425**		R5	V1	0.0480*	0.9407***
		V2	-0.0354***	1.0667***			V2	-0.0020	1.2762***
		V3	0.0977***	1.9450***			V3	0.0129	0.9921***
Early Stage Excess Return			-0.1743***		Early Stage Excess Return			0.0411	
Late Stage Excess Return			0.1197**		Late Stage Excess Return			0.0744	

#### 4.2.3.2 Fama-French 3 Factors regression

Table 12 and 13 present the results of Fama-French 3 factors model regression of prior return-volume based contrarian strategy and 52-week high price-volume based contrarian strategy respectively. In table 12, the regression result of prior return-volume based contrarian strategy shows the positive excess return for high past trading volume loser portfolios in long term investment period and shows lower or negative excess return for low past trading volume winner portfolios. These result lead to high positive excess return of late stage contrarian strategy. The excess returns of late stage contrarian after adjusted for market risk, size risk and book to market value effect are -23.07%, 2.34%, 10.82% and 22.33% for investment period of 1, 3, 5 and 7 years respectively. For early stage contrarian strategy, the Fama-French 3 factors alphas are lower than late stage contrarian strategy in long term but higher for short term. The excess returns of early stage contrarian strategy are -19.09%, 13.56%, 0.48% and -9.03% for investment period of 1, 3, 5 and 7 years respectively.

Similar to the result of CAPM regression, the result of Fama-French 3 factors model excess returns of 52-week high price-volume based contrarian strategy are lower than prior return-volume based contrarian strategy as shown in Table13. The excess returns of late stage contrarian strategy for investment period of 1, 3, 5 and 7 years are -25.87%, -8.38%, 10.13% and 7.73% respectively. For early stage contrarian strategy the excess returns are -27.71%, -4.61%, 16.02% and -8.47% for 1, 3, 5 and 7 years investment period respectively.

**Table 12 Fama-French 3 Factors regression of prior return volume-based contrarian portfolio**

The annual excess returns of prior return-volume portfolios are regressed against the market premium, SMB and HML return as follows:

$$R_{P_t} - R_{f_t} = \alpha_p + \beta_0 [Mkt_t - R_{f_t}] + \beta_1 SMB_t + \beta_2 HML_t + e_{P_t}$$

where  $R_{P_t}$  is the return of the study portfolio,  $R_{f_t}$  is the risk free return rate,  $\alpha_p$  is the FF alpha.  $\beta_0$  is the factor loading for the market excess return,  $Mkt_t$  is the return of market,  $\beta_1$  is the factor loading for  $SMB_t$  (return on the mimicking portfolio for risk related to size),  $\beta_2$  is the factor loading for  $HML_t$  (return on the mimicking portfolio for risk related to book-to-market-equity).

		1 Year Investment Period				5 Years Investment Period			
Return portfolio	Volume portfolio	Alpha	$\beta_0$	$\beta_1$	$\beta_2$	Alpha	$\beta_0$	$\beta_1$	$\beta_2$
R1 (winner)	V1 (low)	0.0447	0.8952***	0.3602	-0.1155	-0.0717***	0.8307***	-0.4037	-0.4255
	V2	0.0851	0.7395**	-0.5248	0.1241	0.0153	0.8591***	-1.4989*	0.0583
	V3 (high)	0.1032*	1.2948***	-0.2545	-0.5097	-0.0655***	0.9843***	0.8481*	-0.4512
R3	V1	-0.0021	0.7569***	0.3249***	-0.1905***	0.0022	0.8410***	0.0847	-0.0852
	V2	0.0902**	0.9808***	0.1873	0.1525	0.0438	1.1112***	0.0970	-0.4883
	V3	0.0009	1.0929***	0.1584	-0.2880***	0.0145	1.3715***	-0.2604*	0.0904
R5 (loser)	V1 (low)	-0.0877	1.2835***	-0.0532	0.9227	-0.0607***	0.7373***	0.4989	0.6939
	V2	-0.1497**	1.0141***	-0.1254	0.3710	0.0099	0.8613***	-0.7831	1.0811
	V3 (high)	-0.1860*	1.6384***	0.1657	0.6785	0.0365**	1.2386***	-0.7468	0.8346**
Early stage excess return		-0.1909***				0.0048*			
Late stage excess return		-0.2307***				0.1082***			
		3 Years Investment Period				7 Years Investment Period			
Return portfolio	Volume portfolio	Alpha	$\beta_0$	$\beta_1$	$\beta_2$	Alpha	$\beta_0$	$\beta_1$	$\beta_2$
R1	V1	0.0011	1.1537***	-0.1570	-0.4769*	-0.0863	0.6798*	0.1564	-0.0907
	V2	0.0117	1.1098***	-0.9827*	-0.5210	0.0060	1.2921*	0.1171	-1.3151
	V3	-0.0890***	0.7234**	-0.3389*	0.7120**	0.0856	1.5274**	-1.1005	-0.7577
R3	V1	0.0244***	0.8066***	0.2612***	-0.3261***	-0.2065**	0.7369***	1.8852**	0.2297
	V2	-0.0177	0.7069**	-0.4667	0.9236	-0.0400	0.8309	-0.0696	0.8960
	V3	0.0009	1.0724***	-0.4546	-0.0112	0.1685	2.0859**	-1.1897	-0.3888
R5	V1	0.0466***	0.9312***	0.5994***	-0.1311	-0.0047	0.8660**	-1.0201	0.5503
	V2	0.0112	1.0573***	0.1934	-0.0280	0.0143	0.3747	2.3761	-0.8937
	V3	0.0245***	1.1256***	0.1888*	0.4129***	0.1370	1.0058	-1.6787	0.6723
Early stage excess return		0.1356***				-0.0903			
Late stage excess return		0.0234				0.2233**			

**Table 13 Fama-French 3 Factors regression of 52-week high price volume-based contrarian portfolio**

The annual excess returns of prior return-volume portfolios are regressed against the market premium, SMB and HML return as follows:

$$R_{P_t} - R_{f_t} = \alpha_p + \beta_0[Mkt_t - R_{f_t}] + \beta_1SMB_t + \beta_2HML_t + e_{P_t}$$

where  $R_{P_t}$  is the return of the study portfolio,  $R_{f_t}$  is the risk free return rate,  $\alpha_p$  is the FF alpha.  $\beta_0$  is the factor loading for the market excess return,  $Mkt_t$  is the return of market,  $\beta_1$  is the factor loading for  $SMB_t$  (return on the mimicking portfolio for risk related to size),  $\beta_2$  is the factor loading for  $HML_t$  (return on the mimicking portfolio for risk related to book-to-market-equity).

Return portfolio	Volume portfolio	1 Year Investment Period				5 Years Investment Period			
		Alpha	$\beta_0$	$\beta_1$	$\beta_2$	Alpha	$\beta_0$	$\beta_1$	$\beta_2$
R1 (winner)	V1 (low)	0.0629*	0.4403**	-0.0249	0.1769	-0.0303***	0.8208***	-0.8879	0.7252***
	V2	0.1361**	0.3398	-0.0452	0.0648	-0.0715***	0.7516***	-1.3445***	0.8315***
	V3 (high)	0.1411***	1.0685***	-0.2863	-0.5545	-0.0757***	0.7118***	-0.6395	0.7840**
R3	V1	0.0135	0.8100***	0.0754	-0.4554***	0.0118	0.8789***	0.7460	-0.9960***
	V2	0.0486**	0.9514***	-0.0510	-0.3274	0.0876***	1.3174***	0.6396	-0.8899***
	V3	0.0055	1.1413***	0.6234**	-0.1461	0.1333***	1.6389***	1.0244	-1.3181***
R5 (loser)	V1 (low)	-0.1360**	1.2737***	-0.1289	0.8159	0.0845***	1.1741***	1.1070	-1.6490
	V2	-0.1935***	1.4089***	-0.4946*	0.3269	0.0631***	1.1799***	0.9980	-1.5666*
	V3 (high)	-0.1958**	1.6130***	-0.8368*	0.6867	0.0710***	1.3695***	-0.0605	-0.8860***
Early stage excess return		-0.2771***				0.1602***			
Late stage excess return		-0.2587**				0.1013***			
Return portfolio	Volume portfolio	3 Years Investment Period				7 Years Investment Period			
		Alpha	$\beta_0$	$\beta_1$	$\beta_2$	Alpha	$\beta_0$	$\beta_1$	$\beta_2$
R1	V1	0.0337**	0.9460***	0.1771	-0.2779**	-0.0439	0.6031**	-0.2986	0.2377
	V2	0.0844**	1.1685***	-0.4338	-0.1095	-0.0999**	0.4432*	-0.8297**	1.1465**
	V3	-0.0024	0.9674***	-0.8029***	0.0324	0.0678	1.3121***	-1.1461	-0.4271
R3	V1	0.0253**	0.8237***	0.1345	-0.6658***	0.0180	0.9667***	0.0751	-0.3979
	V2	0.0094	0.8336***	0.3274***	0.4996***	0.1072**	1.8768***	-0.1564	-0.8591**
	V3	0.0055	1.3084***	0.2065	-0.4770***	0.0840**	1.7243***	0.1376	-0.4252*
R5	V1	-0.0485**	1.2168***	0.1913	-0.3850**	-0.0169	0.9320***	0.6926*	-0.3241
	V2	-0.0503**	0.9773***	0.2209	0.1765	0.0399	1.2669***	0.7536	-0.5446
	V3	-0.0501***	1.1992***	-0.4636***	0.7408***	0.0334	1.0423**	-0.1649	-0.0701
Early stage excess return		-0.0461*				-0.0847**			
Late stage excess return		-0.0838***				0.0773			

## **CHAPTER V CONCLUSION**

For simple contrarian strategy, the result consist with prior researches that the returns of loser portfolios higher than the returns of winner portfolios for long term investment period (3 years or more) both prior return simple contrarian portfolios and 52-week high price simple contrarian portfolios. However, after adjust for risks by using CAMP and Fama-French 3 factors models, the excess returns of prior return long term contrarian strategy are still positive but the returns of 52-week high contrarian strategy are much lower or even negative. This can be interpreted that the prior return contrarian strategy is more efficient than 52-week high contrarian strategy in the SET.

Focusing on volume based contrarian strategy, results found on this study show that volume relays important information about future return. The future return of loser (winner) with high past trading volume is higher than the future return of loser (winner) with low past trading volume. Moreover, a late stage contrarian strategy which buy high volume loser and sell low volume winner outperforms a simple contrarian strategy and an early stage contrarian strategy which buy low volume loser and sell high volume winner for all investment periods and both prior return and 52-week high price volume based contrarian strategies. The profitability of late stage contrarian portfolios remains positive for long-term investment period even controlling for market risk, size effect and book value effect. These results reveal a puzzle about the volume-based contrarian strategy in Thailand, since prior researches in developed market show that the low volume loser (winner) outperforms the high volume loser (winner) and an early stage contrarian strategy is more profitable than a late stage contrarian strategy.

An alternative explanation for the results is related to the information diffusion in Thailand and investors overreaction. Since Thailand is an emerging market and lack in information diffusion and analyst, the existing researches mostly focus on the large firms that lead the market. Because contrarian excess return stem from market overreaction to news, contrarian strategists can exploit asymmetric price movement associated with high-volume stocks, which signify investor overreactions to news and

information during the portfolio formation period (Wongchoti, and Pyun (2005)). Therefore, the relation between past trading volume and price reversal should be more pronounced for smaller and less widely followed firm. This idea conform to Campbell, Grossman, and Wang (1993) and Blume, Easley, and O'Hara (1994), they show that stock price changes are led by high-volume trades that tend to be reversed more often than those led by low-volume trades. They also show that the relation between past volume and concurrent prices is higher for small stocks. Similarly, Nam, Pyun, and Avard (2001) document that information trading volume could be defined as another source of contrarian profits attainable from stocks of small and medium size firms. From this explanation, it suggests to higher return of high volume losers which mostly are small stocks than low volume losers.

For winner portfolios, the return of high volume portfolio is higher than the low volume portfolio, this result also supports the market overreaction hypothesis. Since the stocks in winner portfolio mostly are the large firms and there are many analysts follow them, thus the trading volume less signifies the market overreaction for the large firms in winner portfolio. Moreover, many of large firms in winner portfolio are in the SET50 list (50 largest firms in the SET) which are well-known for foreign investors and there is a regulation for some institutions or funds that limit them to buy stock only in the SET50, these reasons also cause the high volume of winner portfolio that are not stem from market overreaction and support the notion that trading volume less signifies the market overreaction for large firms in winner portfolio. Another explanation for higher return of high volume stocks in winner portfolio raised by Punnee (1998), she state that since there is a restriction for short sale in Thailand, therefore overreaction for good news durable occur because investors cannot easily to exploit from the overreaction by using contrarian strategy (short winner stocks).

Further research could be done in order to check the robustness of this study and try to answer this puzzle. For example, this study should be redone again when there is longer term of data available to increase the accuracy of the regression. If possible, the highly return of the small stocks with high trading volume should be checked whether it caused by the price manipulation.

## REFERENCES

- Alsubaie, A. and M. Najand, 2008. Trading volume, price momentum, and the 52-week high price momentum strategy in the Saudi Stock Market. *Working paper*.
- Amihud, Y., and H. Mendelson, 1986. Asset pricing and the bid-ask spread. *Journal of Financial Economics* 17: 223-249.
- Ball, R., S.P. Kothari, and J. Shanken, 1995. Problems in measuring portfolio performance: An application to contrarian investment strategies. *Journal of Financial Economics* 38: 79-107.
- Balvers, R., Y. Wu, and E. Gilliland, 2000. Mean reversion across national stock markets and parametric contrarian investment strategies. *Journal of Finance* 55: 745-772.
- Barberis, N., A. Shleifer, and R. Vishny, 1998. A model of investor sentiment. *Journal of Financial Economics* 49: 307-343.
- Blume, L., D. Easley, and M. O'Hara, 1994. Market statistics and technical analysis: The role of volume. *Journal of Finance* 49: 153-181.
- Campbell, J., S. Grossman, and J. Wang, 1993. Trading volume and serial correlation in stock returns. *Quarterly Journal of Economics* 107: 905-939.
- Chopra, N., J. Lakonishok, and J.R. Ritter, 1992. Measuring abnormal performance: Do stocks overreact?. *Journal of Finance Economics* 31: 235-268
- Connolly, R. and C. Stivers, 2003. Momentum and reversals in equity-index returns during period of abnormal turnover and return dispersion. *Journal of Finance* 58: 1521-1555.
- Conrad, J., A. Hameed, and C. Niden, 1994. Volume and autocovariances in short-horizon individual security returns. *Journal of Finance* 49: 1305-1329.
- Daniel, K., D. Hirshleifer, and A. Subrahmanyam, 1998. A theory of overconfidence, self-attribution, and security market under- and overreactions. *Journal of Finance* 53: 1839-1886.
- Datar, V., N. Naik, and R. Radcliffe, 1998. Liquidity and asset returns: An alternative test. *Journal of Financial Markets* 1: 203-220.

- DeBondt, W. and R. Thaler, 1985. Does the stock market overreact?. *Journal of Finance* 40: 793-805.
- DeBondt, W. and R. Thaler, 1987. Further evidence on investor overreaction and stock market seasonality. *Journal of Finance* 42: 557-581.
- DeLong, J.B., A. Shleifer, L.H. Summers, and R.J. Waldmann, 1990. Positive feedback investment strategies and destabilizing rational expectation. *Journal of Finance* 45: 379-396.
- Fama, E. and K.R. French, 1993 Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics* 33: 3-56.
- Fama, E. and K.R. French, 1996. Multifactor explanations of asset pricing anomalies. *Journal of Finance* 51: 55-84.
- George, T., Hwang, C.Y., 2004. The 52-week high and momentum investing. *Journal of Finance* 59: 2145–2176.
- Grinblatt, M., S. Titman, and R. Werners, 1995. Momentum strategies, portfolio performance, and herding: A case of mutual fund behavior. *American Economic Review* 85: 1088-1105.
- Gropp, J., 2004. Mean reversion of industry stock returns in the U.S., 1926– 1998. *Journal of Empirical Finance* 11: 527–551.
- Hameed, A. and S. Ting, 2000. Trading volume and short-horizon contrarian profits: Evidence from the Malaysian market. *Pacific Basin Finance Journal* 8: 67-84.
- Hong, H. and J.C. Stein, 1999. A unified theory of underreaction, momentum trading and overreaction in asset markets. *Journal of Finance* 54: 2143–2184.
- Hvidkjaer, S., 2006. A Trade-Based Analysis of Momentum. *Review of Financial Studies* 19: 457-491.
- Jegadeesh, N., 1990. Evidence of predictable behavior of security returns. *Journal of Finance* 45: 881–898.
- Jegadeesh, N., and S. Titman, 1993. Returns to buying winners and selling losers: Implications for stock market efficiency. *Journal of Finance* 48: 65–91.
- Lee, M.C.C. and B. Swaminathan, 2000. Price momentum and trading volume. *Journal of Finance* 55: 2017-2069.
- Llorente, G., R. Michaely, G. Saar, and J. Wang, 2002. Dynamic volume-return relation of individual stocks. *Review of Financial Studies* 15: 1005-1047.



- Marshall, B.R., and R.M. Cahan, 2005. Is the 52-week high momentum strategy profitable outside the US?. *Applied Financial Economics* 15: 1259–1267.
- Moskowitz, T. J. and M. Grinblatt, 1999. Do industries explain momentum?. *Journal of Finance* 54: 1249–1290.
- Nam, K., C.S. Pyun, and S.L. Avar, 2001. Asymmetric reverting behavior of short-horizon stock returns: An evidence of stock market overreaction. *Journal of Banking and Finance* 25: 807–824.
- Tkac, A.P., 1999. A trading volume benchmark: Theory and evidence. *Journal of Financial and Quantitative Analysis* 34: 89–114.
- Wongchoti, U. and C.S. Pyun, 2005. Risk-adjusted long-term contrarian profit: Evidence from non-S&P 500 high volume stocks. *The financial review* 40: 335-359.



ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย

## BIOGRAPHY

Piriya Kamtip, graduated from Faculty of Engineering in major of Mechanical Engineer, Chulalongkorn University in 2007. After graduated in 2007, he entered to full time program of the Master of Science in Finance (MSF) program at Faculty of Commerce and Accountancy, Chulalongkorn University. Now he is working as an actuary at Ayudhya Allianz C.P. Life Plc.



ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย