Which types of investor investment flow affect Thailand Stock Market Index

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ประเภทของนักลงทุนที่ส่งผลต่อผลตอบแทนดัชนีตลาดหุ้น

นายเนฐ ธีระมังคลานนท์

สารนิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาศิลปศาสตรมหาบัณฑิต
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เนฐ ธีระมังคลานนท์ : ประเภทของนักลงทุนที่ส่งผลต่อผลตอบแทนดัชนีตลาดหุ้น. (Which types of investor investment flow affect Thailand Stock Market Index) อ.ที่ปรึกษาหลัก : ผศ. ดร.ยอง ยูน

งานวิจัยนี้ได้ศึกษาผลกระทบของกระแสเงินทุนของนักลงทุนแต่ละประเภท ที่มีผลต่อผลตอบแทนของดัชนีตลาดหุ้น โดยใช้ข้อมูลรายวันของนักลงทุนสถาบัน นักลงทุนต่างชาติ นักลงทุนบัญชีหลักทรัพย์ และนักลงทุนรายย่อย ในช่วงระหว่างปี 2015 ถึง 2020 ผลลัพธ์ที่ได้จากการใช้ OLS โมเดลแสดงว่านักลงทุนประเภทบัญชีหลักทรัพย์มีผลกระทบต่อดัชนีตลาดหุ้นมากที่สุด เราได้ทำการรวมรวบวิธีทดสอบทาง Granger causality เพื่อทำความเข้าใจถึงความสัมพันธ์ของดัชนีตลาดหุ้นและ การลงทุนของนักลงทุนแต่ละประเภท บทวิจัยนี้ยังได้ทดสอบความสัมพันธ์ระหว่างความผันผวนของดัชนีตลาดหุ้น และพฤติกรรมของนักลงทุน โดยพบว่าเมื่อดัชนีมีความผันผวนสูงขึ้น นักลงทุนจะมีการซื้อขายที่มีส่วนร่วมกับตลาดเพิ่มขึ้น

สาขาวิชา	เศรษฐศาสตร์และการเงินระหว่างประเทศ	ลายมือชื่อนิสิต .....
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Net Teeramungcalanon : Which types of investor investment flow affect Thailand Stock Market Index . Advisor: Asst. Prof. Dr. Yong Yoon

This study examines the effect of types of investor investment flow on Thailand Stock Market Index returns. Daily data on investment types, namely, foreign investors, institutional investors, proprietary investors, and retail investors from the Stock Exchange of Thailand for the period 2015 to 2020 is used. The results from the OLS model show that proprietary investors dominate the SET index. We also conduct a Granger causality test to understand the relationship between the SET index and investor investment flow. This study also examines the relation between SET volatility and investor behavior. The result shows that when the SET index has high volatility investors more actively participate in the market.

Field of Study:	International Economics and Finance	Student's Signature .....
Academic Year:	2019	Advisor's Signature .....

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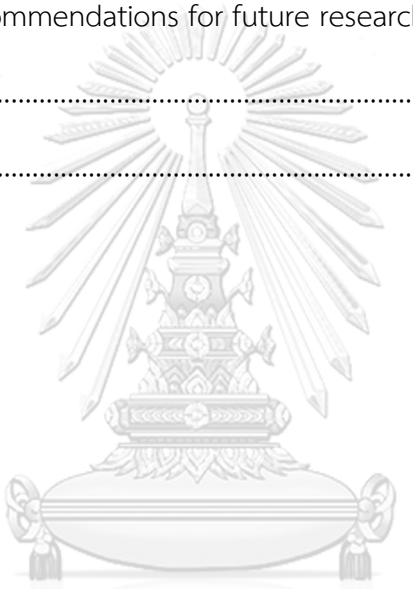
TABLE OF CONTENTS

Page



1. Introduction

1.1. Background of Study

Background

I used to work in the financial field in the department of proprietary traders. My job has received the order from the fund manager and executes an order in the stock market. The fund manager instructs traders to use technical analysis because they believe that the chart contains all the information. My assumption is the Efficient market is not true, the market is not efficient especially in the Thailand Stock Market. For example, if the CEO knows the earning in their company will drop they will sell the stock, but at that time no one will know why the stock is drop. I do not know too but I can notice it. After the period of time, I can notice that foreign investors always make the right decision in the markets and want to prove is it true all not.

Rational/Problems

The stock market index is a combination of public firms in the country and listed by regulation for funding so it can be said that the stock market represents the status of that country. The stock market index contains all information in the current situation of the economy. and also the future information about the economy too. So many variables can determine the stock market index.

This paper will focus on types of investor performance. It can categorize into 4 types by type of account that regular from SEC (The Securities and Exchange Commission). Each type of investor has different purpose either short term investment or long term investment. It can be a purpose in speculation or hedging. but if base on everybody comes to find extra return in the stock market it will be loser and winner said by zero-sum game. the explanation is everybody carries money into the market but only the winner will take it all. So we can track on trading volume at the end of the day for example if today Foreign have net buy on stock the result of a stock index is increasing on that day too. So this may interpret that foreign investor is the winner.

On a zero-sum game, the result is more clearly on SET50 future because each contract had to have pair to trade, for example, if Institutions investors open a Long position it had to be Individuals investors open a Short position too. so at the end of the series future contract, it will see clearly who is lose and win.

The benefit of doing this topic is if we can see who is the winner can what is their characteristic we can follow them and get benefit from it.

1.2. Objectives or Research Questions

Other papers use to study on this topic but they use data until 2004 in that time an individual investor is around 80% of the trading volume market shared but now it reduces to around 40%. So the market shared of other types of investors is increase and it may or may not change in the impact so I want to find which type of investors has a major impact on the SET index return in terms of magnitude and direction. The object will be testing the hypothesis such as:

Do Foreign investors have a major impact on the SET index?

data show that foreign is not a major player in the market but they may have a significant impact on to SET index. for example, if foreign investor buy-in that day SET index always increases.

Do Institutions have a lagging impact on to SET index?

it is known that institutions are long term investments so it may have a correlation impact on the SET index but have a lag time. for example, if institutions investors buy stock during this week stock SET index is not increasing immediately

but will increase in next 4 weeks(or more than that) because institution investor sees opportunity in the future.

There are many theories to valuate stock value to find which stock has the growth potential in the future or which stocks are undervalued right now. They are many investor types in the market. Each investor type has different objectives when they come to the market. Some can look for speculation opportunities get gain from capital gain. Some look for long term investment that gets to gain from the dividend. Some can be arbitrage look for a trading opportunity that has no risk. SEC (The Securities and Exchange Commission) can divine investors in Thailand into 4 types which is correct when they register into the systems.

My hypothesis in the short term of the stock market is a zero-sum game, loss form someone will transfer to gain to someone. That means they will be a winner among them. Many lit said that Foreign investor can beat that market.

The Efficient Market Hypothesis theory said that it can be 2 cases. One market is efficient everybody knows all of the information and it hard to get an extra return from it since everybody will hear the news or opportunity and immediately invest in that asset. So they will the room to find an extra return from the market. On the other hand, it said that the market is not efficient, they will be a lag time before

everybody hears the news or opportunity to invest and you can get an extra return from the market.

The main purpose I do this topic is I want to find who is the winner and use this data to make a decision on investment. Capitalism said the will be few rich people and many poor people this is the fact or else it will not be a Capitalism. I want to test the hypothesis that few Foreign investors can steal wealth from the other, which mainly Retail investors in Thailand. The reason behind this is Foreign may get better information on the macro variables or micro variables so they can beat the market.

Also, I have a hypothesis on the Institution investor. Institution investor aims for the long term investment so I short term performance measurement there can be a loss but finally, they can gain from the investment when the time is passing. So the model will run with the lag time to see the hypothesis is true or not.

1.3. Summary Review Literature

Many literature studies on investor types behavior Ryan Wood & Judith Lynne (2004) examine on Attitudes and Trading Behavior of Stock Market Investors characterizes of individual investors to find that what effect that impact the decision and found that they are factors about risk-averse or risk-tolerant that determine they will invest or not invest.

Furthermore the paper of Phansatan S, Powell JG, Tanthanongsakkun S, Treepongkaruna S., (2012) study on Investor type trading behavior and trade performance: Evidence from the Thai stock market. they conclude that each type of investor has different behavior. They do a model VAR system to find the correlation of Set index return and the net investment flow and found that Foreign investor is superior in the long term investment and the individual investor is superior in short term investment. The reason comes from individual investors have more local information that the foreign investor.

The paper of A Kamesaka, J Wang (2004) study on The Asian crisis and investor behavior in Thailand's equity market. They investigate the short-term speculative trade performance of an individual, institutional and foreign investors

using daily buying and selling flows from Thailand's equity market by using VAR analysis. They focus on the period of Thailand's financial crisis in 1997 and focus mainly on Foreign investors and domestic investors. They found that Wealth transfer by short-term speculation from Thailand's domestic investors to foreign investors. This is another result that found that Foreign investors are gain from trade in the Stock market.

Another paper is from Han, Bing and Lee, Yi-Tsung and Liu, Yu-Jane (2009) study on Investor Trading Behavior and Performances: Evidence from Taiwan Stock Index Options. This paper didn't focus on the equity market or stock market but focus on the derivatives market which is options. They focus on individual investors and foreign institutions and found that on average individual investors lose money and foreign institutions profit from trading options. Another result that said Foreign is the winner even in a different market.

The paper from Saeideh N., Zadollah F., Abbas S., Len T. (2019) study on Investor Type Trading Behavior and Trade Performance in the Tehran Stock Exchange. They look to trading patterns of individual investors and institutional investors in weekly data and using an Auto-Regressive model and a Grinblatt & Titman portfolio performance measure from 2008 to 2012. They found that individual investors have resulted in a poor trading performance.

The paper from Saeideh N., Zadollah F., Abbas S., Len T. (2019) study on Investigating the effect of the framework of individual and group acts on the stock trading activities in Tehran stock exchange. They study on Investor Type Trading Behavior and Trade Performance in the Tehran Stock Exchange. They look to trading patterns of individual investors and institutional investors in weekly data and using an Auto-Regressive model and a Grinblatt & Titman portfolio performance measure from 2008 to 2012. They found that individual investors have resulted in a poor trading performance

The paper from Mark Grinblatta, Matti Keloharjub (2000) study on The investment behavior and performance of various investor types: a study of Finland's unique data set. Using data from Finland (1995 - 1996), They find that foreign investors tend to be momentum investors, buying past winning stocks and selling past losers. Domestic investors, particularly households, tend to be contrarians. The portfolios of foreign investors seem to outperform the portfolios of households, even after controlling for behavior differences.

The paer from Bae, K., Yamada, T., Ito, K., (2006) study on How do individual, institutional, and foreign investors win and lose in equity trades? Evidence from Japan. They show that the trading gains of proprietary traders on the Japanese market tend to increase when domestic investors' trading gains decrease, thus

indicating the potential for interesting dynamics between proprietary traders and other investor types.

2. Conceptual Framework (Theoretical Framework)

The scope of this paper looks through The net investment flow (nif) because it is the real action that impacts the Stock Market Index. Anyone can predict or forecast the Stock Market Index but they may not do the real action or not really but or sell the stock. It can't be denied that stock will increase when someone buying it and decreases when someone selling it. By trace and tracking The net investment flow (nif) we can see which types of investor are really gain in the stock market and which types of investor is really a loss in the stock market.

The net investment flow (nif) in the number for the investor types trading volume during the day which can be calculated as follows:

nif = Buying Value - Selling Value

Buying Value = buying value in period day t

Selling Value = selling value in period day t

The net investment flow (nif) can be positive or negative, it will be positive when the investor buys more equities than sells during the day and it will be negative when the investor sells more equities than buys during the day.

The data that use in this research will be The net investment flow (nif) of 4

types of investors that is Foreign investor net investment flow (Fnif), Institution investor net investment flow (Inif), Proprietary investor net investment flow (Pnif), Retail investor net investment flow (Rnif)

2.1 Foreign investor net investment flow (Fnif)

Description:

According to SEC, The Foreign investor in person who lives in other countries outside Thailand wants to invest in Thailand Stock Market. They register as a Foreign investor account. Due to a high degree of regulation mostly Foreign investors will be a Fund, not a Foreign individual. Foreign investor net investment flow (Fnif) is a 'buy value - sell value' at the end for the day if it positive means that they buy stock on that day and if it negative means that they sell stock on that day. The number will be measure in million baht.

Explanation sign:

For Foreign investor net investment flow (Fnif), the sign will be 'Positive' because The foreign investor can contain all information macro and micro factors and do the best decision so set index will move along their position (Phansatan S, Powell JG, Tanthanongsakkun S, Treepongkaruna S., 2012).

2.2 Institution investor net investment flow (Inif)

Description:

According to SEC, The Institution investor in Fund which registers in Thailand. An institutional investor can be an investment intermediator that link between individual invest together. Institution investor is a pension fund or asset management fund that collects money from people who want to invest but not action by themself. Due to their link with many people so they will have high regulation to register to ensure that they will not harm most people. Institution investor needs to have an Investment Committee to control the strategy in they invest. Institution investor net investment flow (Inif) is a 'buy value - sell value' at the end for the day if it positive means that they buy stock on that day and if it negative means that they sell stock on that day. The number will be measure in million baht.

Explanation sign:

For Institution investor net investment flow (Inif), the sign will be 'Positive' because An Institution investor is a group of knowledge in finance. They can evaluate the value of stock and make a good investment. so they have position sign with SET index return Phansatan S, Powell JG, Tanthanongsakkun S, Treepongkaruna S., (2012).

2.3 Proprietary investor net investment flow (Pnif)

Description:

According to SEC, The Proprietary investor is the Broker which registers in Thailand. Broker or investment banking is a kind of institution to provide a facility to Retail investors to trade Stock in the Stock market. The other roll is called liquid provider. They will take care of liquidity in the market to attract all investors to trade or else they can't run the business because their business is gain for a commission fee. The Proprietary investor is a department under the Broker, instead of injecting the liquidity to market Proprietary investor can do a speculator in a short period of time or day trading to gain from capital gain. Proprietary investor net investment flow (Pnif) is a 'buy value - sell value' at the end for the day if it positive means that they buy stock on that day and if it negative means that they sell stock on that day. The number will be measure in million baht.

Explanation sign:

For Proprietary investor net investment flow (Pnif), the sign will be 'Ambiguous'

not much paper study on this type of investor. Due to their role that they are liquidity provider so the expected sign is unclear.

2.4 Retail investor net investment flow (Rnif)

Description:

According to SEC, the Retail investor is an individual investor who lives in Thailand and registers to have own account to invest in the stock. Retail investors can be anyone with different purposes. They can be long term investors or short term investors. Retail investor net investment flow (Rnif) is a 'buy value - sell value' at the end for the day if it positive means that they buy stock on that day and if it negative means that they sell stock on that day. The number will be measure in million baht.

Explanation sign:

For Retail investor net investment flow (Rnif), the sign will be 'Negative' because of a lack of knowledge, Retail investment will loss wealth to the stock market. So their investment will link to negative sign to SET index return The paper of A Kamesaka, J Wang (2004).

3. Research Methods (Methodology)

3.1 Statements of Hypotheses, and Research Methods and Techniques

Statements of Hypotheses:

which investor types will have the most effect on the SET index return.

Research Methods:

For this research, I decided to use the OLS model and the Granger causality test to find the correlation that which types of the investor will affect the Set Index return. This model not have control variable since the data we use is the daily investment flow data provided from Stock Exchange of Thailand.

$$SET\ index\ return = \alpha + \beta_1 Fnif + \beta_2 Inif + \beta_3 Pnif + \beta_4 Rnif + \varepsilon$$

SETr	=	SET index return
Fnif	=	Foreign investor net investment flow
Inif	=	Institution investor net investment flow
Pnif	=	Proprietary investor net investment flow
Rnif	=	Retail investor net investment flow

Techniques:

To compare the result I use will look to the mean return of each type of investor and their variance because sometimes high returns can come with high volatility and it needs to find the optimal. The Sharpe ratio model can be used to compare in this research because it can measure the standard deviation with the returns.

3.2 Expected Signs of the Hypotheses, and Reasons Underlying the Signs

Table 1: Expected Relationships in the Estimation Model

Independent Variables	Description of Variables	Expected Relationships	Explanation for Signs
Foreign investor net investment flow (Fnif)	Accumulation of net investment flow at the end of the day of Foreign investor	+	The foreign investor is the winner they contain all information macro and micro factors and do the best decision so set index will move along their position.
Institution investor net investment flow (Inif)	Accumulation of net investment flow at the end of the day of	+	An Institution investor is a group of knowledge in finance. They can evaluate

	Institution investor		the value of stock and make a good investment. so they have position sign with SET index return.
Proprietary investor net investment flow (Pnif)	Accumulation of net investment flow at the end of the day of Proprietary investor	+/-	Proprietary investor tends to have short term investment. they don't hold position so they don't affect SET index return.
Retail investor net investment flow (Rnif)	Accumulation of net investment flow at the end of the day of Retail investor	-	due to a lack of knowledge, Retail investment will loss wealth to the stock market. So their investment will link to negative sign to SET index return

4. Measurement of Variables, and Data Sources

Notes: Foreign investor net investment flow (Fnif), Institution investor net investment flow (Inif), Proprietary investor net investment flow (Pnif), Retail investor net investment flow (Rnif)

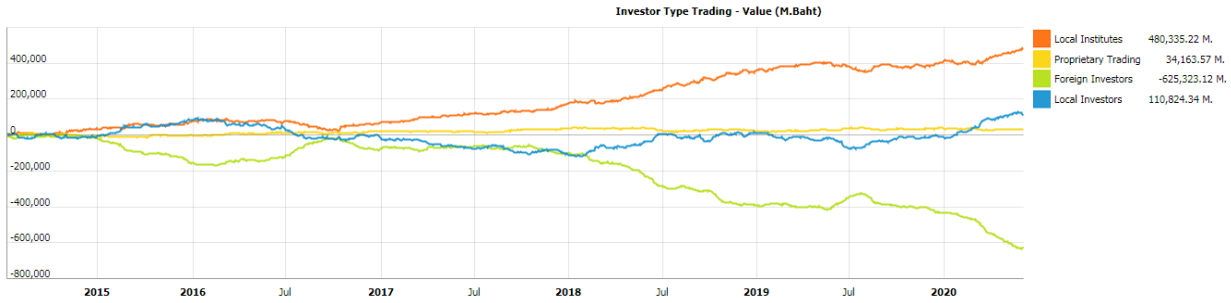
Table 2: Variables, Measurement of Variables, Data and Data Sources

Variables	**Measurement of Variables**	**Data Sources**
SET index return (SETr)	Thailand stock index return, daily data	Bisnews
Foreign investor net investment flow (Fnif)	The results of 'buy value - sell value' of Foreign investor net investment flow at the end of the day (million baht), daily data	SETSMART
Institution investor net investment flow (Inif)	The results of 'buy value - sell value' of Institution investor net investment flow at the end of the day (million baht), daily data	SETSMART

Proprietary investor net investment flow (Pnif)	The results of 'buy value - sell value' of Proprietary investor net investment flow at the end of the day (million baht), daily data	SETSMART
Retail investor net investment flow (Rnif)	The results of 'buy value - sell value' of Retail investor net investment flow at the end of the day (million baht), daily data	SETSMART

5. Methodology and Result

5.1 The overview of the investment flow of each investor types



source: SETSMART

This is the accumulative data of the investment flow of each investor type. Each line indicates the accumulation of investment flow it shows that

Local Institution (orange line) have positive accumulation in the last 5 years. This means that Local Institution has net buying stock for the amount of 480 billion baht. The direction of Local Institution is clear that they always buy a stock the accumulation is always above the zero lines. Some period Local Institution has sold the stock and make the accumulation turn downward but it's just a short period. Local Institutions will come back and start to buy the stock and make the accumulation graph turn upward again. Finally, it clear that in the last 5 years Local Institution is the major player that holding the stock most among the other investor types.

Proprietary Trading (yellow line) have positive accumulation in the last 5 years. This means that Proprietary Trading has net buying stock for the amount of 34 billion baht. The direction of Proprietary Trading is not quite clear the accumulation graph moves around the zero lines this indicates that Proprietary Trading didn't have one direction of buying or selling the stock. From the accumulation graph, it seems that the Proprietary Trading investment flow is not significant to the Set Index Return. In other words, Proprietary Trading didn't hold the stock for a long period or didn't sell the stock for a long period. Proprietary Trading tend to go in and go out quickly in the stock markets

Foreign Investors (Green line) have negative accumulation in the last 5 years. This means that Foreign Investors have net selling stock for the amount of 625 billion baht. The direction of Foreign Investors shows that they always selling the stock the accumulation is always below zero lines. Although the Foreign Investor's accumulation graph some time shows that upward direction means that Foreign Investors buying the stock in that period but lastly it only be a short period Foreign Investors continue to selling the stock after that.

Local Investors (blue line) have positive accumulation in the last 5 years. This means that Local Investors have net buying stock for the amount of 110 billion baht. The direction of Local Investors has both net buying and net selling. Some period

Local Investors have a positive direction of accumulation by buying the stock, some period Local Investors have a negative direction by selling the stock. The direction seems similar to Proprietary Trading but Local Investors have more magnitude or the area between the highest accumulations to lowest accumulation.

5.2 The trading value of each investor types (Val: M.Baht)

2015

	Institution		Proprietary		Foreign		Retail	
	Buy	Sell	Buy	Sell	Buy	Sell	Buy	Sell
Total	1,044,569.04	965,514.39	985,573.58	991,991.25	2,294,474.24	2,448,819.78	5,672,754.89	5,591,046.32
%Total	10.45	9.66	9.86	9.92	22.95	24.49	56.74	55.93
Net	79,054.64		-6,417.68		-154,345.54		81,708.57	

source: SETSMART

2016

	Institution		Proprietary		Foreign		Retail	
	Buy	Sell	Buy	Sell	Buy	Sell	Buy	Sell
Total	1,273,932.59	1,282,589.36	1,359,355.30	1,333,983.34	3,298,874.88	3,220,947.72	6,327,609.73	6,422,252.08
%Total	10.39	10.46	11.09	10.88	26.91	26.27	51.61	52.38
Net	-8,656.77		25,371.96		77,927.17		-94,642.36	

source: SETSMART

2017

	Institution		Proprietary		Foreign		Retail	
	Buy	Sell	Buy	Sell	Buy	Sell	Buy	Sell
Total	1,384,270.81	1,280,638.55	1,284,939.57	1,268,192.35	3,665,185.29	3,690,940.70	5,317,915.80	5,412,539.87
%Total	11.88	10.99	11.03	10.88	31.45	31.68	45.64	46.45
Net	103,632.25		16,747.22		-25,755.41		-94,624.07	

source: SETSMART

2018

	Institution		Proprietary		Foreign		Retail	
	Buy	Sell	Buy	Sell	Buy	Sell	Buy	Sell
Total	1,571,504.13	1,387,239.88	1,726,041.27	1,741,312.18	4,985,489.84	5,272,948.66	5,537,184.53	5,418,719.05
%Total	11.37	10.04	12.49	12.6	36.07	38.15	40.07	39.21
Net	184,264.25		-15,270.91		-287,458.82		118,465.48	

source: SETSMART

2019

	Institution		Proprietary		Foreign		Retail	
	Buy	Sell	Buy	Sell	Buy	Sell	Buy	Sell
Total	1,497,694.06	1,445,687.34	1,765,054.29	1,750,181.15	5,339,592.15	5,384,837.00	4,199,750.22	4,221,385.24
%Total	11.7	11.29	13.79	13.67	41.71	42.06	32.81	32.97
Net	52,006.73		14,873.14		-45,244.85		-21,635.02	

source: SETSMART

2020 (January – May)

	Institution		Proprietary		Foreign		Retail	
	Buy	Sell	Buy	Sell	Buy	Sell	Buy	Sell
Total	866,633.85	795,607.56	743,226.01	741,429.05	2,612,055.66	2,800,281.52	3,130,089.23	3,014,686.62
%Total	11.79	10.82	10.11	10.08	35.53	38.09	42.57	41
Net	71,026.29		1,796.96		-188,225.86		115,402.61	

source: SETSMART

The data on the trading value of each investor type show the amount of trading volume of each year. The data show on both buy-side and sell-side if at the end of the year the amount of buy-side greater that sell-side mean this type of investor have net buy in the stock, on the other hand, if the sell-side greater that buy-side mean this type of investor have net selling in the stock.

This data shows the market share of the trading volume of each investor type. The market share of each type of investor has constantly though the last 5 years. The data can divine in to 2 groups, first is the group that has minor market shared which is around 10% of the market shared and second is a group that has major market shared which is around 40% of the market shared but there has some minor change in the group of foreign investor and retail investor.

The Institution investor has around 10% of the market shared.

The Proprietary investor has around 10% of the market shared.

The Foreign investor has around 40% of the market shared.

The Retail investor has around 40% of the market shared.

The foreign investor has a market share of around 22% in 2015 and increases to around 42% in 2019. The retail investor has market share around 55% in 2015 and decreases to around 32% in 2019. Thus, the market shared of the institution investor and proprietary investor remind around 10% to 12%, this indicates that retail investors trading less in the last 5 years while foreign investor trading more in the last 5 years the market shared has transferred from retail investors to a foreign investor.

The other point is retail investors and foreign investors are the major player of the stock market since their market share is up to 30% to 50%, they should be the player that can impact the Set Index.

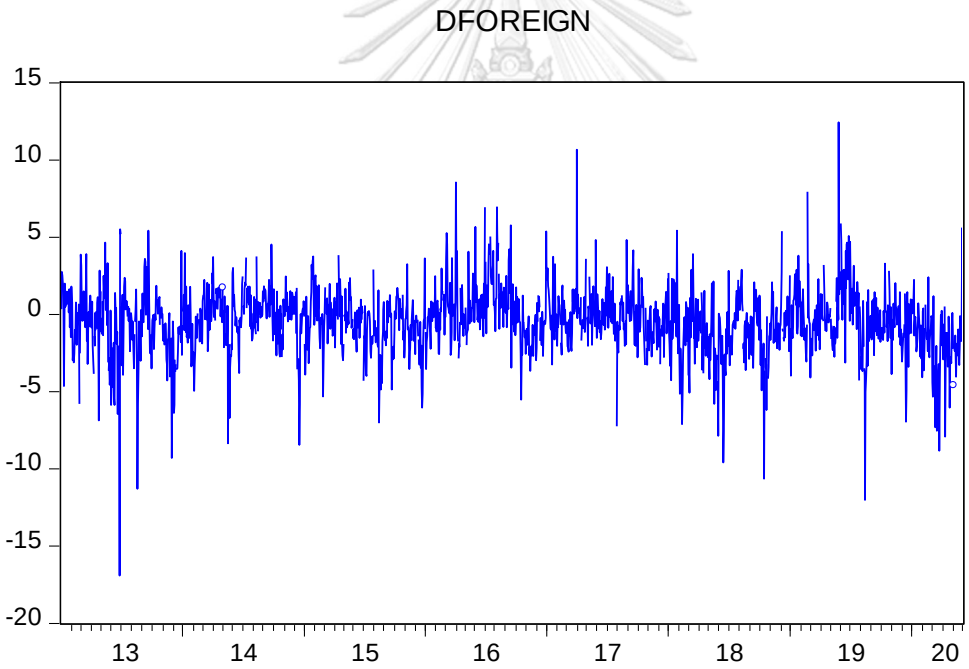
5.3 Check data for the stationary

5.3.1Investment flow of foreign investor

Null Hypothesis: DFOREIGN has a unit root
Exogenous: None
Lag Length: 3 (Automatic - based on SIC, maxlag=24)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-12.28144	0.0000
Test critical values:	1% level	-2.566241	
	5% level	-1.940999	
	10% level	-1.616582	

*MacKinnon (1996) one-sided p-values.

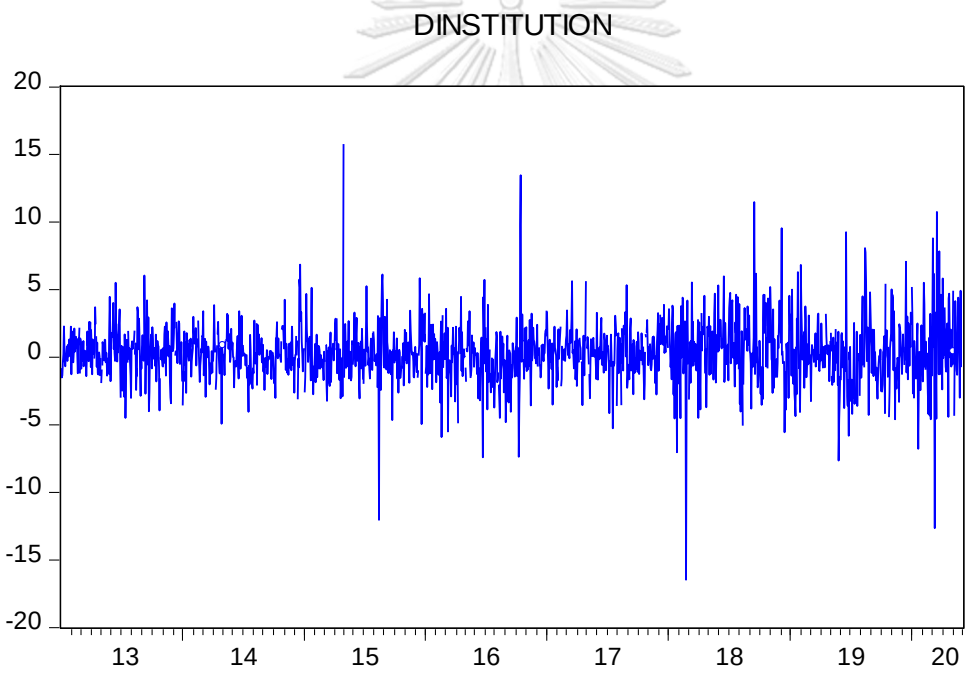


5.3.2 Investment flow of institution investor

Null Hypothesis: DINSTITUTION has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=24)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-33.96442	0.0000
Test critical values:	1% level	-2.566239	
	5% level	-1.940998	
	10% level	-1.616582	

*MacKinnon (1996) one-sided p-values.

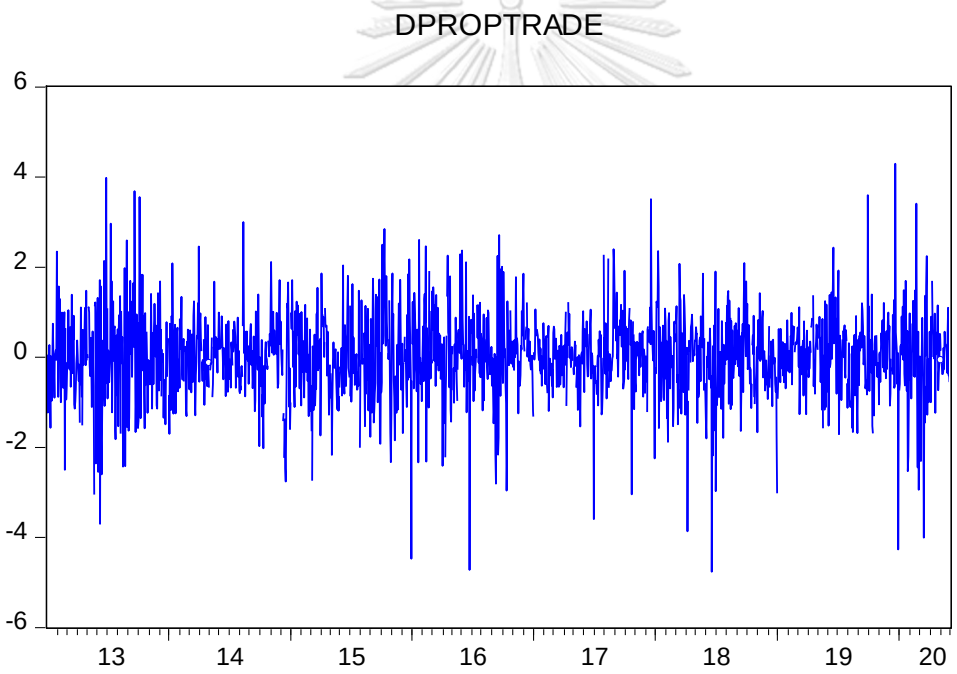


5.3.3 Investment flow of proprietary investor

Null Hypothesis: DPROPTRADE has a unit root
Exogenous: None
Lag Length: 1 (Automatic - based on SIC, maxlag=24)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-25.69517	0.0000
Test critical values:	1% level	-2.566240	
	5% level	-1.940999	
	10% level	-1.616582	

*MacKinnon (1996) one-sided p-values.

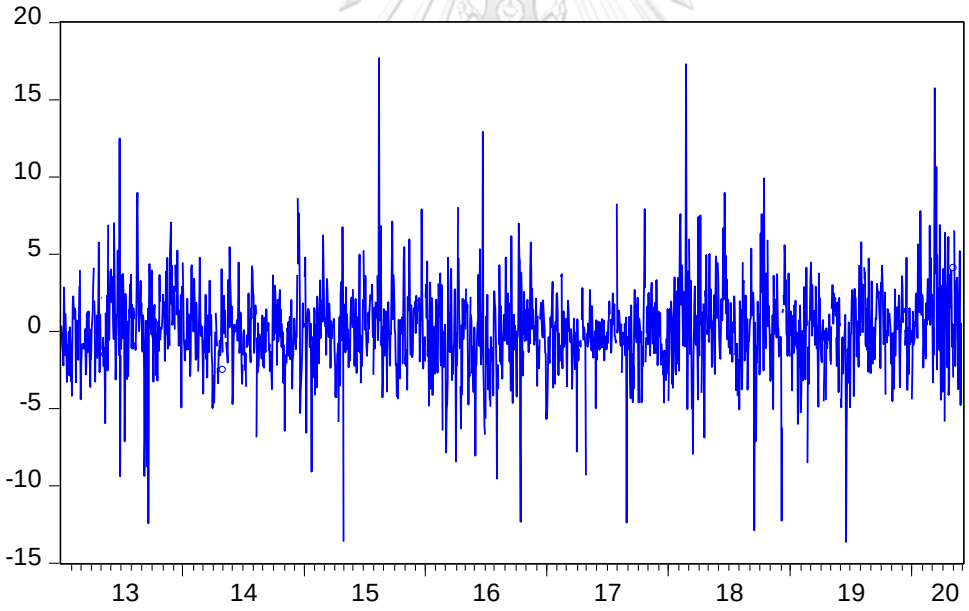


5.3.4 Investment flow of retail investor

Null Hypothesis: DRETAIL has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=24)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-30.89889	0.0000
Test critical values:	1% level	-2.566239	
	5% level	-1.940998	
	10% level	-1.616582	

*MacKinnon (1996) one-sided p-values.



5.4 Result from Eviews

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.435807	0.250098	-1.742543	0.0816
D(INS)	1.859610	1.935673	0.960705	0.3368
D(PRO)	3.260445	1.945036	1.676290	0.0939
D(FOR)	0.260704	1.928342	0.135196	0.8925
D(REA)	-2.166361	1.931457	-1.121621	0.2622

R-squared	0.482441	Mean dependent var	-0.018351
Adjusted R-squared	0.481296	S.D. dependent var	14.32627
S.E. of regression	10.31793	Akaike info criterion	7.508398
Sum squared resid	192479.2	Schwarz criterion	7.523574
Log likelihood	-6801.363	Hannan-Quinn criter.	7.513998
F-statistic	421.3307	Durbin-Watson stat	2.214663
Prob(F-statistic)	0.000000		

The data show the relation between Set Index Return (Change) and investment flow of 4 investor types which conclude with the institution investor, The Foreign investor, The Proprietary investor, The Retail investor.

The institution investor has a positive relationship with Set Index Return, it shows the coefficient at 1.859610 so the investment flow of the institution investor effect the Set Index Return, when the institution investor buys the stock Set Index Return, will increase in that day.

The Foreign investor has a positive relationship with Set Index Return, it shows the coefficient at 3.26 so the investment flow of the Foreign investor effect the Set Index Return, when the Foreign investor buys the stock Set Index Return will

increase in that day.

The Proprietary investor has a positive relationship with Set Index Return, it shows the coefficient at 0.26 so the investment flow of the Proprietary investor effect the Set Index Return, when the Proprietary investor buys the stock Set Index Return will increase in that day.

The Retail investor has a negative relationship with Set Index Return, it shows the coefficient at -2.16 so the investment flow of the Retail investor effect the Set Index Return, when the Retail investor buys the stock Set Index Return will decrease in that day.

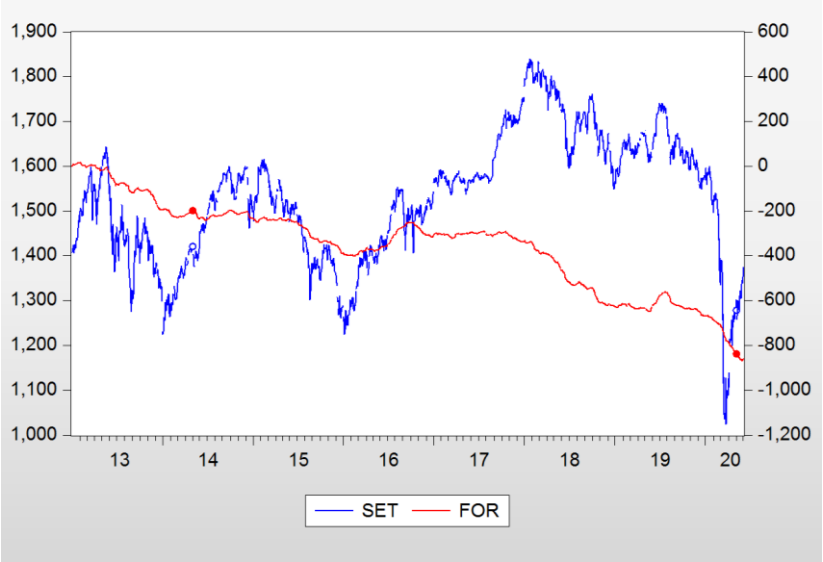
The Retail investor is the only type of investor that has a negative relationship with the Set Index Return means that when Set Index Return has a positive return on that day it's not come from Retail investor. Moreover Retail investor in the player that sell stock to the market and market is still going up.

The difference from the other investor types such as Foreign investor, Proprietary investor, Retail investor that have a positive relationship with Set Index Return means that in the day that market has positive returns those players are the group that affects the market by buying stock in that day.

5.5 The accumulation of investment flow compares with the Set Index

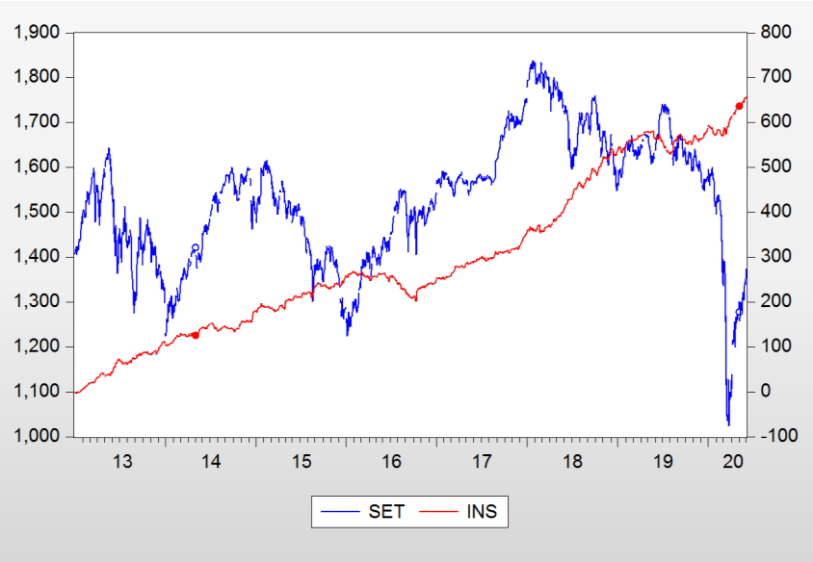
This data shows the compare the accumulation investment flow of each investor type with set Set Index. This will show approximately that the accumulation of investment flow correlate in the same direction of Set Index or not. If the accumulation graph moves together with the Set Index it means that this investor type has a positive correlation with the Set Index and or also the investment flow of this investor type has a positive correlation with the Set Index Return.

5.5.1. The accumulation investment flow of Foreign investor compares with the Set Index



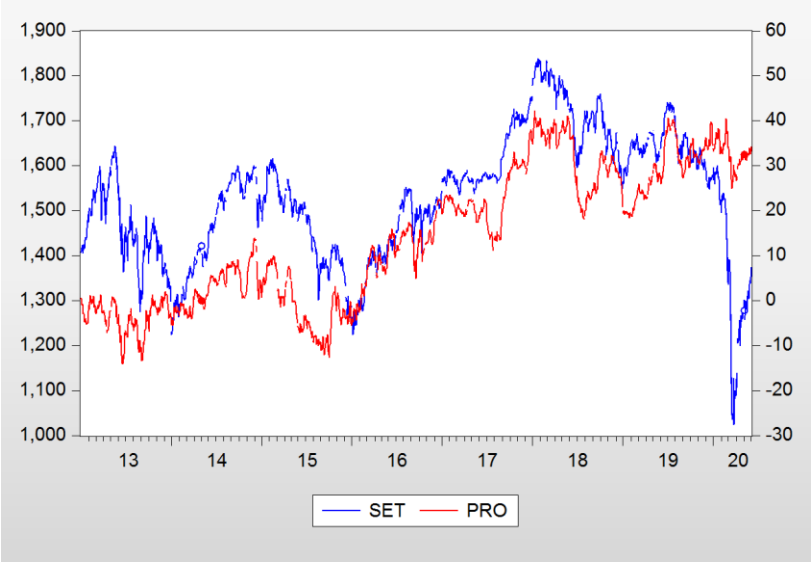
The accumulation investment flow of Foreign investors is **not a significant** correlation with the Set Index.

5.5.2. The accumulation investment flow of Institution investor compares with the Set Index



The accumulation investment flow of Institution investors is **not a significant** correlation with the Set Index

5.5.3. The accumulation investment flow of Proprietary investor compares with the Set Index



The accumulation investment flow of Proprietary investors is a **highly positive significant** correlation with the Set Index.

5.5.4. The accumulation investment flow of Retail investor compares with the Set Index

The accumulation investment flow of Retail investors is a **highly negative significant** correlation with the Set Index.

5.6 Granger causality test

The **Granger causality test** is a statistical hypothesis test to determining a one-time series that have a relation in term of cause and effect or not, for example, it's testing that variable X can cause variable Y or not, The Granger causality tests also test in back and forth by test the hypothesis that variable Y can cause variable X or not too. The Granger causality tests will test the relationship between the sample variable. In this case, we have tested the relationship between the investor investment net flow of each investor compare to the SET index return in both 2 ways test back and forth to see the relationship does SET index is causing to induce the investment flow of each investor types or not. For example, If SET index increase today investor will see it and want to invest on it so in the next day or next 2 days investor will follow to buy stock and this will make positive of that investment flow of that investor type.

On the other hand, some investors can be a cause on the SET index like if some groups of investors have superior information that the market didn't know, they will buy stock and make investment flow have positive. The next day SET index will increase because other types of investors receive the information and start to buy stock too. The effect also the same in case if the SET index declined or has investment flow negative.

1. Foreign investor

Sample: 1/05/2015 6/02/2020
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
D(FOREIGN) does not Granger Cause D(SET)	1321	6.70005	0.0013
D(SET) does not Granger Cause D(FOREIGN)		4.60171	0.0102

2. Institution investor

Sample: 1/05/2015 6/02/2020
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
D(INSTITUTION) does not Granger Cause D(SET)	1321	2.80317	0.0610
D(SET) does not Granger Cause D(INSTITUTION)		21.9591	4.E-10

3. Proprietary investor

Sample: 1/05/2015 6/02/2020
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
D(PROPRIETARY) does not Granger Cause D(SET)	1321	2.55570	0.0780
D(SET) does not Granger Cause D(PROPRIETARY)		15.5133	2.E-07

4. Retail investor

Sample: 1/05/2015 6/02/2020
Lags: 2

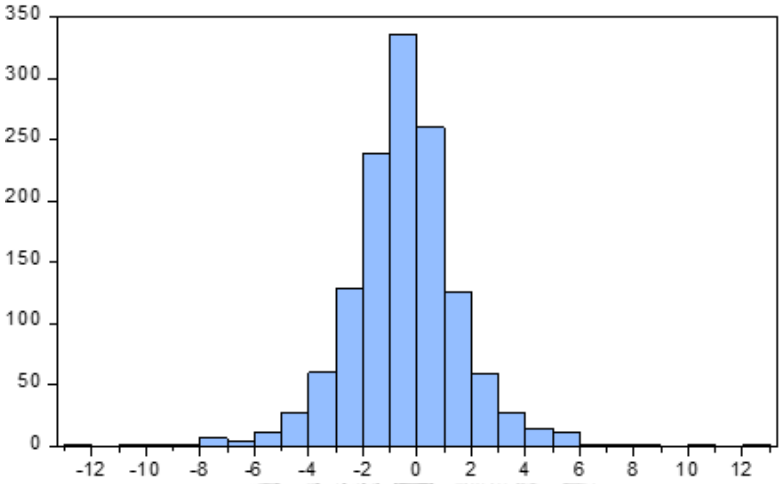
Null Hypothesis:	Obs	F-Statistic	Prob.
D(RETAIL) does not Granger Cause D(SET)	1321	4.42191	0.0122
D(SET) does not Granger Cause D(RETAIL)		1.29509	0.2742

From the data, the result shows that the SET index can be caused by the investment flow of some investor types such as institution investor, foreign investor, proprietary investor but the SET index didn't cause in Investment flow of Retail investors. This means that when the SET index increase it didn't induce the Retail investor type to come to market and buy the stock, But when the SET index increases it can induce the institution investor, foreign investor, proprietary investor to buy stock in the next day or next 2 days. The result is the same direction when the SET index is declined. On the other hand, when an institutional investor and proprietary investor have significant on the result which means that when an institutional investor and proprietary investor buys a stock, then in the next few days SET index will follow to start increase also.

This result can check the hypothesis at the beginning of the study that does some investor types can have a piece of superior information and lead the SET index by they will buy the stock when the other investor types still don't know information and finally can get benefit from SET index increase in the following day. The institution is in this hypothesis and the result can that institution can actually lead the SET index, also with the proprietary investor have the same characteristics as the institutional investor.

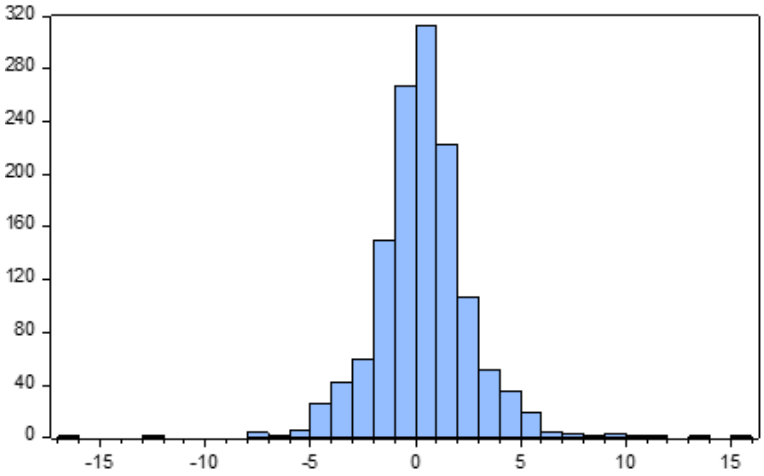
5.7 Relation between SET volatility and Investment behavior

1. Foreign investor



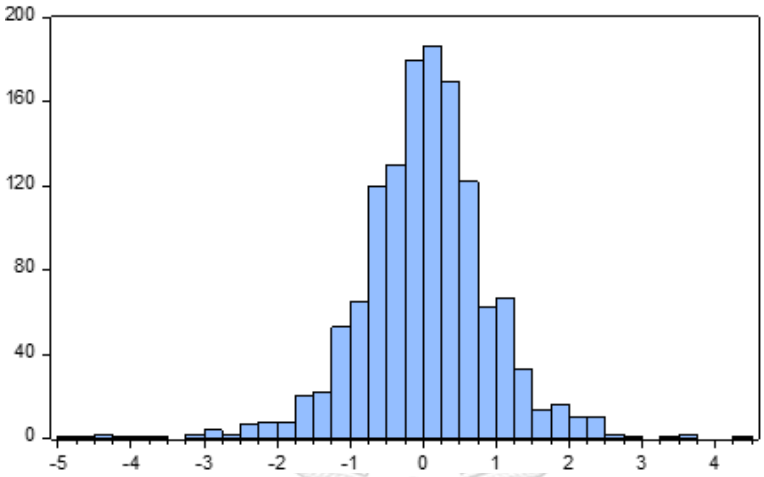
Series: D_FOREIGN	
Sample 1/05/2015 6/02/2020	
Observations 1323	
Mean	-0.473576
Median	-0.472510
Maximum	12.44095
Minimum	-12.00465
Std. Dev.	2.112955
Skewness	0.068410
Kurtosis	6.911227
Jarque-Bera	844.3175
Probability	0.000000

2. Institution investor



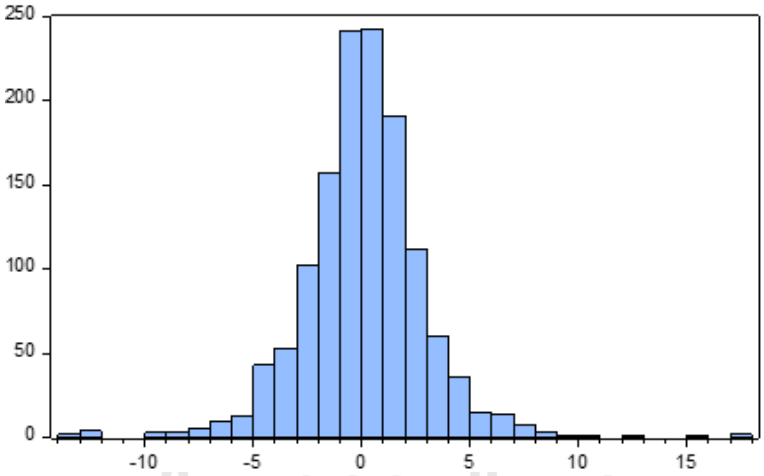
Series: D_INSTITUTION	
Sample 1/05/2015 6/02/2020	
Observations 1323	
Mean	0.362493
Median	0.350850
Maximum	15.76824
Minimum	-16.46890
Std. Dev.	2.333931
Skewness	0.122467
Kurtosis	9.526031
Jarque-Bera	2351.030
Probability	0.000000

3. Proprietary investor



Series: D_PROPRIETARY	
Sample 1/05/2015 6/02/2020	
Observations 1323	
Mean	0.024551
Median	0.054660
Maximum	4.292480
Minimum	-4.759400
Std. Dev.	0.917999
Skewness	-0.411331
Kurtosis	6.273825
Jarque-Bera	628.1331
Probability	0.000000

4. Retail investor



Series: D_RETAIL	
Sample 1/05/2015 6/02/2020	
Observations 1323	
Mean	0.081793
Median	0.126050
Maximum	17.70047
Minimum	-13.63321
Std. Dev.	2.842302
Skewness	0.136878
Kurtosis	7.976288
Jarque-Bera	1369.216
Probability	0.000000

This is a statically data of investor investment flow of each investor types. It concludes a maximum value, minimum value, mean, and Standard deviation.

The maximum is meaning that type of investor has positive net investment flow, they buy the stock with the maximum amount and it becomes the maximum value among their have to buy in the sample data.

The maximum and minimum trading volume of the Institution investor, the foreign investor has a maximum trading volume range around 12-15 Billion Baht. Also, with the minimum trading volume which is around 12-15 Billion Baht. The trading volume of these 2 groups is considered the average compare with the among of investor groups.

The maximum and minimum trading volume of the Retail investor have the mot of all 4 types of investor. The retail investor has a maximum and minimum trading volume range of around 15 Billion, which is considered to be a maximum among investor types. The retail investor didn't have the most accumulation of investor investment flow but the retail investor has the most participants to the trading volume in terms of the percentage to market share.

The maximum and minimum trading volume of the proprietary investor is around 4 Billion Baht which is considered less than other groups. This is because the proprietary investor didn't have behavior to act in a big amount of trading volume and they have less holding position compare to the other 3 types of investors, which is can see at their accumulation of investor investment flow.

The minimum is meaning that type of investor has negative net investment flow, they sell the stock with the maximum amount and it becomes the maximum value among their have to sell in the sample data.

Data for SET index with high volatility day.

DATE	SET	Change	Institution	Proprietary	Foreign	Retail	Trade volume
2-Jan-14	1,230.77	-67.94	-3,659.11	-930.69	124.59	4,465.20	33,513.75
24-Aug-15	1,301.06	-64.55	-2,508.97	450.54	-4,775.20	6,833.63	60,491.34
10-Oct-16	1457.02	-47.32	-7,268.24	-627.33	998.74	6,896.83	74142.56
14-Oct-16	1,477.61	64.79	13,524.98	1,299.96	-2,572.74	-12,252.20	105,761.63
24-Feb-20	1,435.56	-59.53	-4,229.12	-862.08	-1,673.40	6,764.61	76,431.30
26-Feb-20	1,366.41	-72.69	-4,494.27	507	-833.93	4,821.20	93,189.41
28-Feb-20	1,340.52	-54.56	-1,365.57	-638.87	-300.92	2,305.36	86,502.15
9-Mar-20	1,255.94	-108.63	-12,719.83	957.57	-3,995.82	15,758.08	103,623.75
12-Mar-20	1,114.91	-134.98	-4,636.95	-4,077.94	-1,928.87	10,643.76	101,652.04
16-Mar-20	1,046.08	-82.83	1,946.58	-1,460.32	-5,425.08	4,938.82	68,179.26
20-Mar-20	1,127.24	83.05	7,923.90	2,183.40	-8,901.22	-1,206.07	93,035.28
23-Mar-20	1,024.46	-102.78	-1,263.76	-1,344.90	-4,235.46	6,844.13	59,677.79
7-Apr-20	1,214.95	76.11	3,743.37	1,693.28	507.18	-5,943.83	98,954.92

The data that we use is the day that the SET index has high volatility. The high volatility is classified by the SET index change compare with the normal range of SET index change. The data picked up the date the SET index has change with 3 standard deviations which is considered to be a high volatility day. Normally

This part wants to examine the phenomena between SET index volatility and Investor behavior that investor behavior had changed or not in the day that the SET index has high volatility.

This study also examines the effect of the date the SET index drops dramatically had the effect on the investor behavior or not and if it has an effect on which direction that affects, increase of decrease in investor investment flow.

The result shows that after the SET index drops dramatically investor investment flow had an increase in terms of overall value, for example, normally trading volume is around 50 Billion Baht, and the day the SET index has a high volatility the trading volume is increased up to around 100 Billion Baht per day. Some investor type has increased in participate to the market, for example, normally the retail investor investment flow has around 40 percent of market shared but this number increased to around 50 percent of market share this means that the retail investor types have more participants to the market. The overall nominal value is also increased, for example, usually, the institutional investor has a trading volume around 5 Billion Baht per day this number increase to 10 Billion Baht per day meaning that The institutional investor has more participants to the market but when we compare in percentage term we may not see this change because the institutional investor investment flow is still around 10 percent of market share.

The result shows that after the day that the SET index drop dramatically the investor has more trading volume to the market on that day and also the next day. It can indicate that the investor behavior had changed in this event, after huge drop day people want to action with their portfolio with can be but stock to their

portfolio when they are the huge drop or can sell the stock out of their portfolio because they want to minimize their loss and protect their portfolio. The strategy that each type of investor uses is a difference and finally, it can determine their performance that can have profit or loss. The foreign investor sells the stock after the first dramatic drop of the SET index and the retail investor buy the stock after the first dramatic drop of the SET index to see who is correct, we need to look forward to the next day or next week. The result shows that the foreign investor is right they can protect their portfolio and can minimize the risk or damage from the drop of the SET index in the following day.

The result of the Institution investor investment flow has a high positive correlation that 14 of 15 days is matching with the SET index change. For example, the day that the SET index declined institutions investors have negative net investment flow. This indicates that the Institution investor has the most significant positive impact on the SET index return in the day that the SET index has high volatility.

The Foreign investor investment flow has a positive correlation that 11 of 15 days is matching with the SET index change. This indicates that the Foreign investor has a positive impact on the SET index return, even it less than the Institution investor but still has a high correlation.

The proprietary investor investment flow has a positive correlation that 9 of 15 days is matching with the SET index change. This indicates that proprietary investors have a positive impact on the SET index return, even this trading volume is less than the Institution investor and the foreign investor.

The retail investor investment flow has a negative correlation that 0 of 15 days is matching with the SET index change. This indicates that retail investors always had an opposite direction to the SET index or it can say that they have a negative impact on the SET index return.

Normally during the crisis, the trade volume of the markets is increasing follow by the increase in volatility of the SET index. When the SET index has change more than average which is usually around 5 - 10 points to become around 50 - 100 points in those days, the trade volume also increases from 40B to 100 Billion Baht.

On the date of 2 Jan 2014 and 23 Mar 2020, these 2 days is the bottom of the SET index during that period. This means that the SET index reaches the lowest point of the cycle and the day after that SET index starts to rise up. To explain these phenomena, we have to examine the emotion of investors on that day. At the beginning of the crisis SET index have high volatility with a change of more than 50 points on that day. The bottom of the cycle also happens in the day the SET index has high volatility, in this case, is a negative SET index return but the trade volume does not increase following the SET index volatility, the trade volume is very low

value in that day. This indicates that investor doesn't want to have an action on that day because of the fear and desperate to their investment. Many investors don't want to have participated in the Stock Markets because before this day the SET index is kept decline and decline. The people that sell Stock in that day sell at any price so it makes SET index decline with low volume this turns out to be the bottom of the SET index.

To get benefit from this data we can choose to use contrarian strategy when we receive this data by not hurry to buy Stock in the day that has high volatility and high volume but buy Stock in the day that has high volatility and low volume instead.

In particular those 2 days the trade volume in less than the average of the high volatility that is around 60Billion Baht. The trade volume in 33 Billion Baht and 59 Billion Baht, it less than the average and it becomes the bottom of the SET index.

6. Conclusions and recommendations for future research

The result shows a different view of our hypothesis at the beginning that foreign investors didn't have much impact on the Set Index Return and the surprising result is Proprietary investor has much impact on the Set Index Return in the sense of direction.

The other surprising result from the Proprietary investor has the most significant positive correlation with the Set Index Return. In the beginning, we have an assumption that proprietary investors will be no significant impact on the Set Index Return because they didn't have a long period of holding the stock. But the result turns out that the investment flow of the Proprietary investor always indicates the direction of Set Index Return.

The result from retail investor match with our hypothesis that retail investor is the loser on this game. The data show that the investment flow of retail investors has a negative impact correlation with the Set Index Return.

The retail investors and foreign investors are the major players of the stock market since their market share is up to 30% to 50%, they should be the player that can impact the Set Index but the result shows that retail investors have a negative

correlation to the Set Index Return. This can conclude that the market share of trading volume does not affect the Set Index Return. The proprietary investor that has only 10% of the market share on trading value but the proprietary investor has a significant positive correlation with the Set Index Return. Although the trading volume of proprietary investor is less than retail investors it seems that proprietary investor effect the Set Index Return the reason is that proprietary investor has a few players in this group so they have few trading volumes but if it goes to one direction it will have power. Unlike the retail investors that have many people in this group but they are all independent so the trading direction will be the difference in each other when retail investors don't have the power to go in one direction, they can't create the impact to the Set Index.

On the Relation between SET volatility and Investment behavior results, it found that the behavior of the investor has changed by has more participants to the market in terms of an increase in trading volume. The result shows that after the day that the SET index drop dramatically the investor has more trading volume to the market on that day and also the next day. It can indicate that the investor behavior had changed in this event, after huge drop day people want to action with their portfolio with can be but stock to their portfolio when they are the huge drop or can sell the stock out of their portfolio because they want to minimize their loss and protect their portfolio. The strategy that each type of investor uses is a difference

and finally, it can determine their performance that can have profit or loss. The foreign investor sells the stock after the first dramatic drop of the SET index and the retail investor buy the stock after the first dramatic drop of the SET index to see who is correct, we need to look forward to the next day or next week. The result shows that the foreign investor is right they can protect their portfolio and can minimize the risk or damage from the drop of the SET index in the following day. To get benefit from this data we can choose to use contrarian strategy when we receive this data by not hurry to buy Stock in the day that has high volatility and high volume but buy Stock in the day that has high volatility and low volume instead.

For future research, At the beginning we have assumptions that foreign investors will be the most dominant to the Set Index Return, they should have highly positive significance with the direction of the Set Index. But it turns out that the investment flow of foreign investors didn't have much significant impact on the Set Index Return. The reason from the aspects of the economic view it's probably come from the macroeconomic view, thus the foreign investors are the investor outside Thailand which can be the major country such as the USA. Since at that time, the USA use the tightening monetary policy mean that FED tries to reduce the balance sheet so the flow of money flows back to the USA which shows that from the accumulation of investment flow of foreign investor. For future research, We have the view that if other researchers do the same thing with the new data in the next 5

years they may found the difference result because since currently FED start to use the expansion of monetary policy so it may have the investment flow from the foreign investor come to Thailand and other emerging market countries.

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