THE IMPACT OF DIRECTOR'S SHARE TRADING: EVIDENCE FROM THE STOCK EXCHANGE OF THAILAND

BY

MR. PICHAYA RUANGDEJVORACHAI

AN INDEPENDENT STUDY SUBMITTED IN PARTIAL
FULFILLMENT OF THE REQUIREMENTS FOR
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PROGRAM IN FINANCE (INTERNATIONAL PROGRAM)
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ABSTRACT

This study examines the impact of director's share trading in the Thai stock market from 2013 to 2015. Directors who have more information about their firms than investors may use inside information in their trading. When directors send big stock transactions of buying or selling order, it may affects to stock price. The results in this paper show that there is only positive abnormal return briefly in small firms after directors buy their shares. The cross-sectional regression shows that job position such as Chief Executive Officer Position, abnormal trading volume, and number of day from trading date and reporting date have influence to movement of stock price.

Keywords: Director's share trading, Insider trading, Cumulative average abnormal return

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CHAPTER 1
INTRODUCTION

The Stock Exchange of Thailand (SET) has begun in 1962. It acts as the center for trading of listed securities and undertakes any business relating to the Securities Exchange such as securities registrar, securities depository center and clearing house. The Thai capital market is very important to Thai economy. The capital market is the source of funding for the entrepreneurs and the source of investing for the investors. The Securities and Exchange Commission (SEC) is a regulator of the Thai stock market. SEC had set many rules to make market transparent and efficient.

Directors, executives and auditors of the listed companies in SET have responsibility to prepare and disclose reports on each person's securities holding. This report on executive's securities holding is under section 59. It will provide investors with the information on change of securities holding by the people who have access to insider information of the company. There are 2 types of the report (Form 59). The first type of the report in Form 59-1 must be sent to SEC within 30 days from the closing date of the offer for sale of securities or the date of appointment. The second type of the report in Form 59-2 must be filed to SEC within 3 business days from the date of purchase, sale, transfer or acceptance of transfer of securities. The information about director's share trading will be show in the website of SEC. The investors can see these details and use them to make a decision to buy or sell or hold.

SEC has set the rule to directors to show their own stock transaction for fairness to the investors. Directors always have superior information about their firm, performance and current situation. They can use the inside information to make profit which is not fair to the investors. Director's share trading might be used as a signal of firm performance or transparency of company. When the directors buy a lot of stock, it might affect the stock in a positive way. When the directors sell many stock, it might be something wrong in the company and create negative reactions to the stock price. Sometimes, we see directors sell their shares before bad news happen to the company. So far a silent period has been set to control the director's share trading before the firm

performance announcement. The question is if it is enough or not. However, the directors may show information of their share transaction to trick the investors. Investors have to be careful about this information. Sometimes, we misinterpret the selling of shares. They think that there would be something bad happen in the future and affect the fundamental profitability. In fact, the directors might just sell shares to get money for their personal expenses. So the fundamentals of company do not change.

From the study in UK, Gregory et al. (1993) find that there is a significant abnormal return from director's share trading and trend to happen in small firm more than big firm. This paper shows that there is a firm size effect in UK stock market. Another evidence is from Hamill et al. (2002). They find that investors react positively when they see buy orders from the directors in small capitalized stock in the U.K. They also find small negative but statistically insignificant impact on stock price when directors sell their own company shares. Their result show a weak relationship between the financial performance and the type of trade, while Idrmuc et al. (2004) find that the magnitude of market reaction to director's share purchases is higher than that of sales. The Australia study from Hotson et al. (2007) also find the abnormal return from director's share trades. Thai paper from Boonyawat (2004) shows that there is a positive abnormal return after directors buy their shares. But another Thai study from Neeyalavera (2009) shows that there is an abnormal return in small firms from director's share sales.

This report is to study how the stock price reacts to director's share trading. We focus on two parts. First part is whether there is a significant abnormal return from director's share trading or not. The firm size or order size has effects to this event or not. There is a significant abnormal volume from director's share trading or not. The second part is cross-sectional regression to find the determinant of abnormal return.

The number of event of director's share trading in 2012, 2013, 2014 and 2015 are 1770, 5335, 4478, and 4369 respectively. The scope of this study shows the evidence in Thailand only. I collect stock prices from SET and MAI to test the abnormal return from the event and collect them in daily data. The information of director's share trading is from 59-2 report (SEC source) covering the period of January 2014 to June

2015. I use only buying and selling orders and ignore data about transferring and accepting stock transfer because we don't know the real reason behind these actions. The order which is very small value order will not be counted. The data which has an overlap event problem will not be included.

The limitation of this study is the data we obtain from the SEC website. The data in SEC website is reported from the directors. This report is not included director's share transactions in nominee names and director's share transfers or accept transfer stock.

The main benefit of this report for investors is to know the impact of directors' share trading and use this information for investment decision making. For companies, they will know the impact of directors' share transaction and can use this information to create policies to prevent someone using insider information to find benefit. For the SEC, they can use this result to develop market to be more efficient. For researchers, they have more papers to be a reference and continue researching deeper in similar topic.

CHAPTER 2
REVIEW OF LITERATURE

2.1 Literature Review

First of all, there are many studies about director's share trading and insider's trading. Gregory et al. (1993) examine the impact from UK director's share trading in the small firm. Data in this study is from the London Stock Exchange for 150 listed non-financial companies from January 1984 to December 1986. There are 2,350 director's share trades in their sample of 150 firms which 1,653 are non-option related. More than half of the non-option transactions are transactions in big firms and only 16% is in small firms. They divide the samples into three parts based on market capitalization at the beginning of the data period. They find that in case of the buy signal, the excess return is related to the firm size with high significant cumulative abnormal return (CAR) in small and medium companies (60.7% and 22.47% after 24 months) while the result in large companies reveals significantly negative CAR (-14% after 24 months). For the side of sell order, it gives significant negative CAR (-20.7% after 24 months) in large companies but significant positive CAR (44.8% after 24 months) in small companies. In the conclusion, they support previous US and UK studies that there was abnormal return from insider's trading. They find that a large portion of abnormal return are concentrated in small and medium size companies. They comment about their result that it might have a survivorship bias in their result.

Hamill et al. (2002) conduct the study about relationship between director's stock trading of their firms in UK listed companies and their firm performance in the future. The data of this study is obtained from London Stock Exchange in the small capitalized index. The period that is collected for this study is from January 1994 to October 1997. The methodology is a variance methodology. The estimation period covers 129 days before the pre-event period which had 10 days before the public announcement date. The range of a post-event period is 10 days after announcement date. In conclusion, they find that investors respond positively to buy order signal from the directors in small capitalized stock in the U.K while there is an insignificant and

small negative impact on stock prices of director's share sales. And their result tell that there is a positive relationship between firm performance and director's purchase orders of their own companies.

Idrmuc et al. (2004) examine director's share dealing and corporate control. Data in this study is from the Hemmington Scott for the period of 1991 to 1998. The raw data is 58,363 transactions. The methodology that they apply is event study. The estimation period is between 200 and 21 days before pre-event period. The range of pre-event and post-event is 20 days. They also calculate market-adjusted return to check the robustness of their result. They report that there is a strong positive market reaction to director's buy orders. For the purchase side, there is 8.37% average abnormal return over 20-days after director's transaction while -1.27% average abnormal return over 20-days in pre-event period. In the conclusion, their result show that the absolute market reaction to director's share purchases is higher than that of sales. They also find that the status of the director have influence to the share price, but there is no support from hierarchy hypothesis. They find that the market reaction from CEO's share trade is lower than that of other director categories. The purchase orders from former directors have more influence than the purchases from other types of director. For firms which don't have good performance or face with financial distress, their share prices react stronger to director's stock dealings. The signal of director's purchases (sales) is significantly positive (negative) irrespective of the shareholder structure.

Fidrmuc et al. (2010) test about relationship between market reaction to insider trades and country-level shareholder protection using data set from 15 European countries and US. The information about director's share trades in US and UK is obtained from Thomson Insider Filings and Hemscott respectively. They collect data from local stock exchange, securities and exchange commissions, and central banks for European countries. Their study period is from August 2002 to May 2007 for European countries and August 2002 to December 2006 for US and UK. Their total data set is around 100,000 insider trades. They use event study model to perform the test. They conclude that there is a positive relation between shareholder protection and post-trade cumulative abnormal return which has stronger market reaction to insider's trading in good corporate governance companies. They explain that their result is referred from

the signaling perspective based on notion that insider traders reveal private information to the market and make the stock price better reflecting fundamental value.

Chang et al. (2006) do an investigation into the impact of investor relations on the profitability of director's share trading. They take the data from S&P/ASX 300 firms from 2003 to 2004 with investor relation (IR). Their adjust sample consisted of 291 firms in S&P/ASX 300. They use standard event study approach in calculating the profitability of the director's share trades. They determine a window period as 250 days for both the pre-event and post-event periods. They expect a firm's investment in investor relations (IR) can reduce inside information that directors know which results in less profitable from stock trading. Inversely, the result show that directors in high level of investor relations firms can earn higher profit from their purchase than those in low level of investor relations firms. For sell-side, they find that the higher level of investor relation the lower losses avoided. The firm's IR policy hasd no price impact to director's share trade.

Hotson et al. (2007) examine the director's share transactions of their own companies on the Australian Stock Exchange during July to December 2005. They collect the data from DatAnalysis. The data is divided into three parts according to sizes: small, medium, and large. The criteria for the large companies are in top 150 companies according to their market capitalization. Medium companies are in top 500 excluding those in top 150, and small companies are outside the top 500. The methodology that they use is event study. In conclusion, they find that there is an abnormal return after both director's share purchases and sales in small firms. Directors can find the profit over the longer term (90 or 160 days) rather than over a shorter term (20 days). Investors are also able to find the profit from mimicking the trading patterns of director's sale and director's purchase of small listed companies.

Boonyawat (2004) studies about insider trading: evidence from Thailand. He uses the data from form 59-2 provided by SEC. The period of this study is 2003. His methodology is event study. After he gets result from event study, he do cross-sectional regression to find determinant of cumulative abnormal return. He finds that there is a significant abnormal return when directors bought their shares. He also suggests that

outsider investors can find the profit from mimicking the trading pattern of insiders. The result shows that CEO who is known as insiders has superior information. The result from regression shows that CEO variable and INTERVAL variable had influence to cumulative abnormal return (CAR).

Neeyalavera (2009) studies about the impact of management's trading to stock return. He collects the data from Stock Exchange of Thailand and form 59-2 which is in the SEC website. The period of this study is January 2005 to September 2008. He uses event study methodology to perform the test. The estimation period is 150 days before the event. He uses 5 days for short term period and 20 days for long term period. He divides his data into two parts based on market capitalization to test firm size effects. His result shows that the purchase by directors in both small firms and large firms have no impact on the stock return. There is also no impact of sales by directors in large firms. However, there is a cumulative average abnormal return in short term and long term in small firms after directors sells their shares.

Dickgieber (2010) studies about director's share dealing and strategic insider trading in German stock market. His study starts from July 2002 to October 2007. The total of study period is 54 months. The methodology that he uses is event study. He finds that pre-event cumulative abnormal return is -2.51% (1.95%) for purchases (sales) compares to a post-event of 1.99% (-3.12%). The abnormal return is statistically different from zero at the one percent level. Moreover, the market seems to strongly react to the announcement of insider sales.

In this section, I make a comparison. Most previous study methodologies are event study. They conduct their researches in different periods of time. They use different numbers of estimation period, pre-event period and post-event period. They test for abnormal return but only a few papers also test for abnormal volume. The result from UK, AU and DE papers are similar. They find that there is a significant abnormal return in small firms and in both buy side and sell side. Thai paper find that there is a significant abnormal return in small firms and only sell side but another Thai paper shows that there is a significant positive abnormal on the buy side. In addition, one thing that UK papers show the different result from the German paper is a degree of

market reaction to director's share trading side. The papers from UK mention that that the absolute market reaction to director's share purchases is higher than that of sales while the study from German find that the market seems to react to sale announcement stronger than buy announcement.

2.2 Theoretical Framework

The Efficient Market Hypothesis

The efficient market means the current share price in stock market always reflects all relevant information. According to the EMH, stocks are always traded at fair price and it is impossible to find abnormal return from deviation of stock price. No one can buy undervalued stocks or sell overvalued stocks and no one can beat the market. There are the main assumptions for efficient market as follow:

- A large number of investors analyze and calculate value of securities.
- New information that happens in the market is independent from other news and is in a random pattern.
- Stock prices reflect immediately to new information.
- Stock prices reflect all available information.
- Everyone has same information and there is no cost for getting the information

There are three forms of efficient market.

- Weak form efficiency: the asset price has already reflected only past public information. The excess return can't be earned in the long term by using historical data or technical analysis.
- Semi- strong form efficiency: the asset price reflects on public information and fundamental information that companies announce. In this form, the excess return can't be earned by using technical analysis and fundamental analysis.

- Strong form efficiency: the asset price reflects all information which is included private information. In this form of efficient market, no one can earn excess return.

If the market does not reflect the information or reflects the information slowly or with the bias, we can claim that the market is not efficient. If we find the abnormal return and make a profit from this event, it means that the market is not strong form efficiency.

In this paper, we test the market reaction to director's share trading which directors always have superior information about their firm news, performance and current situation and directors can find the abnormal return from their trading or not.

Signaling Theory

The signaling theory (Modigliani and Miller) is about transferring information from insiders to outsiders. In this case, the directors convey their own information to investors for making investors to know about company information like directors know. Directors can use this method to send the positive signal to the investors to show that their companies' performance are better than other companies and persuade investors to invest in their companies. After sending positive signal, companies may announce good news such as good performance, increasing in growth of sale, increasing of net profit or paying dividend. There are two types of signaling. They are costly signal and costless signal.

This paper will test that directors may use their stock transaction as a signal to inform the market to know the true value of the companies. Directors can use their purchase order to tell investors that the current company's stock price is undervalued. Can we use the director's share trading as a signal to find a profit?

Agency Theory

Agency theory explains the relationship between two parties. One is a principal and the other is an agent who represents the principal in taking action to third party. Agency theory is about resolving problem between principals (shareholders) and agents (directors). There are two problems. First, it is the problem that occurs when the goal of principals is not the same as the goal of agents. Second, it is the problem that occurs when principals and agents have different attitudes towards risk. Principals and agents may have different risk tolerances, so they take different actions. Giving some ownership to managers can reduce the conflict of interest between shareholders and managers.

The director's goal is to maximize the wealth of shareholders. If the director's share order affects the stock price, the conflict between director and investors may occur. When director sells shares, it will make the stock price go down and impact the wealth of shareholders.

The Linkage Among Three Theories; The Efficient Market Hypothesis, Signaling Theory and Agency Theory

First, we test the level of the efficient market. If we find the abnormal return, we can claim that the market is not in the strong form. Then it connects to the signal theory because we can find the abnormal return by using director's share trading as a signal to make an investment decision. For example, we will buy company shares when we see the directors buy their own company shares and sell shares or do a short selling when we see the directors sell their own company shares. The reason that we can find the profit from mimicking director's share trading pattern is that directors always have superior information or insider information. This is an agency problem because the directors may use the insider information to find the profit for themselves. Directors have to put shareholder's interest beyond the director's interest. Directors should not buy or sell shares that they work for. If they think that the current share price of the company is too low, the manager should announce the repurchase program to buy back

the shares to make share price higher and do it in the company name rather than using their own account to buy shares.

Firm size effect

Fama and French (1992) found that there was another factor which affect the stock return in market model. It was a firm size and book to market equity. They found that small size firms tend to have higher average return than big size firms do and high book to market firms tend to have higher average return than low book market firms do. Based on Gregory et al paper, they also found the firm size effect.

CHAPTER 3
RESEARCH METHODOLOGY AND DATA

3.1 Data

This study covers director's share transaction, value size of the director's order, stock's price, stock's volume, SET index, free float, interval of report, CEO, and company's specific information or news. The data is obtained from Stock Exchange of Thailand (SET), SETSMART, DATASTREAM, Bloomberg and SEC website (Form 59-2). The observation period is from 2013-2015. The sample in this study is 261 from 226 firms. These are the criteria used to collect the sample.

- The data of the stocks must has 120 trading days before event occurs and 20 trading days after event occurs.
- The data must be reported in form 59-2 in SEC website.
- The data which directors buy from exercise their rights is not included.
- The data which directors transfer their stocks and accept transferring is not included.
- The data which is only common share transaction is included.
- The data which has overlap-event problem is not included.
- The data which is small value order is not included. (less than 1 million Baht)

To conduct this research, we will separate the data into two cases; buy and sell. This way is to test the magnitude of each direction.

To test the firm size effect, we will separate the data into three groups by using market capitalization; small size (< 2,000 MB), medium size (2,000 – 10,000 MB) and large size (>10,000 MB).

The table 3.1 shows number of samples grouped by types of order and firm size. The total observation is 261 which is 126 buy orders and 135 sell orders.

Table 3.1 Number of Observations

	Buy order	Sell order	Total
Small size firm (< 2,000 MB)	38	48	86
Medium size firm (2,000 MB - 10,000 MB)	46	46	92
Large size firm (> 10,000 MB)	42	41	83
Total	126	135	261

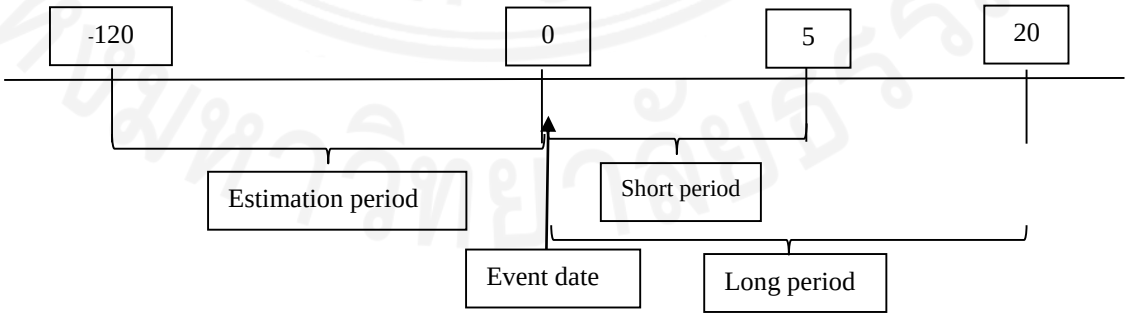
There are 6 groups. Group 1, 2 and 3 are buy order in small size firm, medium size firm and large size firm respectively. Group 4, 5 and 6 are sell order in small size firm, medium size firm and large size firm respectively.

3.2 Methodology

3.2.1Event Study

This study uses standard event study methodology to find abnormal return. There are 2 periods which are estimation period and event period.

Time windows of study: Estimation period from t = -120 to -1 (total of 120 days)
Short event period from t = 1 to 5 (total of 5 days)
Long event period from t = 1 to 20 (total of 20 days)



NOTE: We assume that there are 20 days in 1 month and we use 1 week for short event period, 1month for long event period and 6 months for estimation period.

Abnormal Return

Step 1: Market model estimation

To find expected return of event period, we will use this equation:

$$E(R_{j,t}) = \alpha_j + \beta_i R_{m,t} + \xi_{j,t}$$

Where: $E(R_{j,t})$ = The expected return of stock j at time t

$R_{m,t}$ = The return of market at time t (SET index return)

$\xi_{j,t}$ = The stochastic error term of stock j at time t

α_j, β_i = They are obtained from estimate market model using data t = -120 to -1 by using OLS

From this step, we will obtain α_j, and β_j.

Step 2: Computation of abnormal return (AR)

Abnormal Return (AR) during t = 1 to 20 can be computed by using this equation:

$$AR_{jt} = R_{j,t} - E(R_{j,t})$$

Where: $E(R_{j,t})$ = The expected return of stock j at time t from market model in step1

$R_{i,t}$ = The return of stock j at time t

Step 3: Computation of average abnormal return (AAR)

We find average abnormal return (AAR) by using the equation:

$$AAR_t = \frac{\sum_{i=1}^{N} AR_{j,t}}{K}$$

Where: $AR_{j,t}$ = Abnormal return of stock j at time t

K = Number of day

Step 4: Computation of cumulative average abnormal return (CAAR)

We find cumulative average abnormal return (CAAR) by using the equation:

$$CAAR(t_1, t_2) = \sum_{t_1}^{t_2} AAR_t$$

Step 5: Computation of t-statistic

We can find t-statistic as follow:

$$t_{AAR} = \frac{AAR_t}{S_{AAR}}$$

$$t_{CAAR(t_1,t_2)} = \sqrt{N} * \frac{CAAR}{S_{CAAR}}$$

Where: t_{AAR} = t-statistic of AAR

S_{AAR} = Standard deviation of AAR

t_{CAAR} = t-statistic of CAAR

S_{CAAR} = Standard deviation of CAAR

N = Number of sample

Step 6: Interpretation of t_{cal}

We bring the data from step 5 to compare with t-statistic. t_{cal} which are at 99%, 95% and 90% confidence level are 2.58, 1.96 and 1.65 respectively. If t_{cal} is more than 2.58(t-stat from the table at 99% confidence level), we will reject the null hypothesis. If t_{cal} is less than 2.58(t-stat from the table at 99% confidence level), we can't reject the null hypothesis.

Hypothesis

Case 1: directors buy their share

H_0: CAAR = 0 or director's share purchasing does not impact to the return of stock

H_1: CAAR ≠ 0 or director's share purchasing impacts to the return of stock

In this case, we expect to see the positive abnormal return to claim that market reacts positively to director's share purchase.

Case 2: directors sell their shares

H_0: CAAR = 0 or director's share selling does not impact to the return of stock

H_1: CAAR ≠ 0 or director's share selling impacts to the return of stock

In this case, we expect to see the negative abnormal return to claim that market reacts negatively to director's share sale.

Abnormal Volume

Step 1: Computation of mean volume in estimation period

First, we calculate mean volume in estimation period for each event. The mean volume for event j is defined as the mean daily turnover

$$\mathrm{ATO_j} = \frac{\sum TO_{j,t}}{K}$$

Where: $TO_{j,t}$ = The daily turnover (shares traded relative to shares outstanding) for stock j on day t

K = Number of days with valid volume observations in the estimation period

Step 2: Computation of abnormal volume (AV)

We calculate the abnormal volume as

$$AV_{j,t} = \frac{TO_{j,t}}{ATO_t} - 1$$

Step 3: Computation of average abnormal volume (AAV)

We find average abnormal volume (AAV) by using the equation:

$$AAV_t = \frac{\sum_{i=1}^{N} AV_{j,t}}{K}$$

Where: $AV_{j,t}$ = Abnormal volume of stock j at time t

K = Number of day

Step 4: Computation of cumulative average abnormal volume (CAAV)

We find cumulative average abnormal volume (CAAV) by using the equation:

$$CAAV(t_1, t_2) = \sum_{t_1}^{t_2} AAV_t$$

Step 5: Computation of t-statistic

We can find t-statistic as follow:

$$t_{AAV} = \frac{AAV_t}{S_{AAV}}$$

$$t_{CAAV(t_1,t_2)} = \sqrt{N} * \frac{CAAV}{S_{CAAV}}$$

Where: t_{AAV} = t-statistic of AAV

S_{AAV} = Standard deviation of AAV

t_{CAAV} = t-statistic of CAAV

S_{CAAV} = Standard deviation of CAAV

N = Number of sample

Step 6: Interpretation of t_{cal}

We bring the data from step 5 to compare with t-statistic. t_{cal} which are at 99%, 95% and 90% confidence level are 2.58, 1.96 and 1.65 respectively. If t_{cal} is more than 2.58(t-stat from the table at 99% confidence level), we will reject the null hypothesis. If t_{cal} is less than 2.58(t-stat from the table at 99% confidence level), we can't reject the null hypothesis.

Hypothesis

H_0: CAAV = 0 or there is no abnormal volume

H_1: CAAV ≠ 0 or there is abnormal volume

In this case, we expect to see significant difference from zero to claim that there is abnormal volume when directors have share transactions.

3.2.2 Determinant of the Abnormal Return (Cross-Sectional Regression Analysis)

Model for determination of cumulative abnormal return (CAR) can be shown as:

$$CAR(t_1, t_2) = a_0 + a_1(CEO) + a_2(INTERVAL) + a_3\big(CAV(t_1, t_2)\big) + a_4(FREE\ FLOAT) + a_5(OWNERSHIP) + a_6(SIZE) + a_7(VALUE)$$

Where:
- $CAR(t_1,t_2)$ = Cumulative abnormal return from day t_1 to t_2
- a = Coefficient
- CEO = Dummy variable (CEO =1, Non-CEO = 0).
- INTERVAL = Number of days between actual trade date and announcement date
- $CAV(t_1,t_2)$ = Cumulative abnormal volume from day t_1 to t_2
- FREE FLOAT = Percentage of free float of the company
- OWNERSHIP = Percentage of holding shares of director
- SIZE = Market capital of the company (unit: Baht)
- VALUE = Value order of director's share transaction (unit: Baht)

Referring to Carter et al. (2003), they found that there was higher abnormal return from buy order by CEOs. CEOs have more information about their current operations and future performances than other officers. So their share trading should convey more information to the market and may have more impact to the stock price. Based on previous papers, CEO factor is added into this model. CEO is dummy variable in the model (CEO = 1, Non-CEO = 0). We expect to get positive sign for coefficient of CEOs. It means that CEO's share transactions create greater impact to cumulative abnormal return because CEOs have more valuable information about their firms.

From Carter et al. (2003), they testes about number of days between the actual trade date and announcement date. They found that insiders tend to delay in report their transaction. They found that the longer delay in report the higher return insiders got. But The Securities and Exchange Commission (SEC) has set the rule for directors to

report their transaction within 3 business days from transaction date but some report were submitted late. The reason behind delay sending report might be an intentionally late or really forgotten. The result is expected to have a positive sign for coefficient of INTERVAL in buy case.

The volume can affect to the stock price. When the stock was bought a lot, the price of that stock will go up. If cumulative volume increases every day, something which is a good news will occur in the future. The volume may be a one factor that affects to the stock price or cumulative abnormal return. The coefficient of CAV is expected to be positive sign in buy case. It means that the higher CAV the higher CAR in buy case.

The next variable is FREE FLOAT which is percentage of free float stock in company. It describes the proportion of shares of a publicly traded company which is trade in the stock market. A larger free float can imply that the volatility of a stock is lower because there will be a lot of traders buying and selling the stocks. So a small amount of transaction will probably not affect the stock price much. Companies with a smaller free float are likely to see more price volatility, as it takes fewer trades to move the price significantly. We expect to see a negative sign in coefficient of FREE FLOAT. It means that the lower free float, the higher cumulative abnormal return.

OWNERSHIP is one of the variable in this model. It is percentage of holding stock of director who trades their shares. Director who has a high ownership may have more intention to use inside information for their own benefit. We expect to see a positive sign in coefficient of OWNERSHIP. It means that the higher ownership, the higher cumulative abnormal return.

The next variable is SIZE. It is a current market capital of that stock. I collect data in Bath. Based on Boonyawat's paper, she used this variable as a control variable. We expect to see a negative sign in coefficient of SIZE. It means that the smaller firms, the higher cumulative abnormal return. It is because of firm size effect. Another reason is that the bigger firms is well-known. Most analysts follow the information of big firms and bigger firms tend to have more strict regulation of trading stock than smaller firms,

so managers in big firms cannot trade many times and have to be careful about sending buy or sale order.

The last variable is VALUE. It is a value of trade order from manager in Baht unit. Based on Boonyawat's paper, VALUE is also a control variable. We expect to see a positive sign in coefficient of VALUE. It means that the bigger order size, the higher cumulative abnormal return. The bigger order size is a notable sign. Investors and analysts will have a question why directors take their action to their position. In some cases, directors have to tell their reason why they sell their shares. When directors buy a lot of shares, investors may think something good will occur in the future. Then investors follow directors action by buying, it will create higher cumulative abnormal return.

CHAPTER 4
RESULTS AND DISCUSSION

4.1 Event Study Result

Table 4.1 presents the cumulative average abnormal return and t-test which is in the buy side. The event period covers 21 trading days from day 0 to day 20.

Table 4.1 CAAR in Buy Side

Day	Group 1		Group 2		Group 3		Total (Buy order)	
	CAAR	t-test (t)	CAAR	t-test (t)	CAAR	t-test (t)	CAAR	t-test (t)
0	0.0114	1.1942	-0.0125	-1.4985	-0.0028	-0.6626	-0.0020	-0.4570
1	0.0162	1.5561	-0.0038	-0.5249	-0.0031	-0.4691	0.0025	0.5220
2	0.0285	* 1.8550	-0.0049	-0.6743	-0.0035	-0.5912	0.0056	0.9651
3	0.0185	1.4147	0.0054	0.5252	-0.0026	-0.4225	0.0067	1.1513
4	0.0171	1.2124	0.0041	0.4568	-0.0041	-0.6043	0.0053	0.9036
5	0.0156	0.8378	0.0037	0.3479	-0.0047	-0.594	0.0045	0.6164
6	0.0093	0.5041	-0.0023	-0.1814	-0.0081	-1.0065	-0.0007	-0.0930
7	0.0087	0.4229	-0.0029	-0.2679	-0.0098	-1.2027	-0.0017	-0.2152
8	0.0164	0.7557	0.0010	0.0894	-0.0044	-0.5968	0.0039	0.4734
9	0.0082	0.3635	-0.0064	-0.4431	-0.0016	-0.1983	-0.0004	-0.0449
10	0.0051	0.2167	-0.0119	-0.7917	0.0016	0.2086	-0.0023	-0.2465
11	0.0034	0.1357	-0.0004	-0.0282	0.0014	0.1810	0.0013	0.1421
12	0.0091	0.3612	-0.0085	-0.5673	0.0006	0.0650	-0.0001	-0.0144
13	0.0125	0.4722	-0.0007	-0.0476	0.0003	0.0305	0.0036	0.3484
14	0.0169	0.6518	-0.0113	-0.6727	0.0017	0.1551	0.0015	0.1434
15	0.0168	0.6547	-0.0098	-0.5633	0.0052	0.4346	0.0032	0.3003
16	0.0155	0.5749	0.0032	0.1911	0.0054	0.4072	0.0077	0.6934
17	0.0370	1.1146	0.0015	0.0872	0.0051	0.4010	0.0134	1.0714
18	0.0337	0.9118	-0.0052	-0.2545	0.0099	0.7072	0.0116	0.8191
19	0.0358	0.8944	-0.0031	-0.1621	0.0105	0.6862	0.0132	0.8880
20	0.0449	1.0476	-0.0029	-0.1506	0.0092	0.5847	0.0155	0.9931

Note: *** Statistically significant at 1 percent level, ** statistically significant at 5 percent level, * statistically significant at 10 percent level

From table 4.2, there is an abnormal return in short term (2-day) in small size firm. $CAAR_2$ is 2.85% which is positive and significant different from zero at 10 percent level. There are positive CAAR in group 1. On the other hand, both positive

and negative CAAR are observed in Group 2, 3. For medium size firm and large size firm, there are not significant different from zero in both short period and long period. It shows that abnormal return tend to be concentrated in smaller firms.

It is consistent with UK study by Gregory et al. (1993) that abnormal return tend to be concentrated in smaller firms. It is also consistent with Thai study from Boonyawat (2003) that there is a positive abnormal return in the buy-side. This evidence shows that small size firm directors may know inside information that the good news will occur or have superior information to know that stock price now is undervalued and then use inside information to purchase their own stock before stock price rises and gain some profit from their transactions. The corporate insiders of smaller firm.

$CAAR_t$ of each group of samples are plot into graph shown in Figure 4.1 – 4.4 below. Figure 4.1, 4.2, 4.3 and 4.4 present CAAR of group 1, 2, 3 and total (Buy side) respectively.

Figure 4.1 CAAR of Group 1

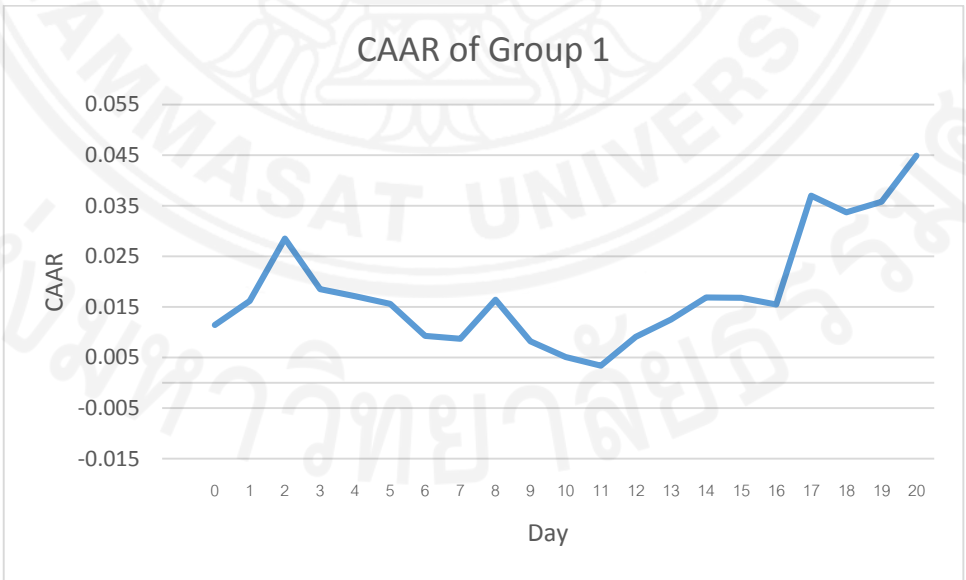


Figure 4.2 CAAR of Group 2

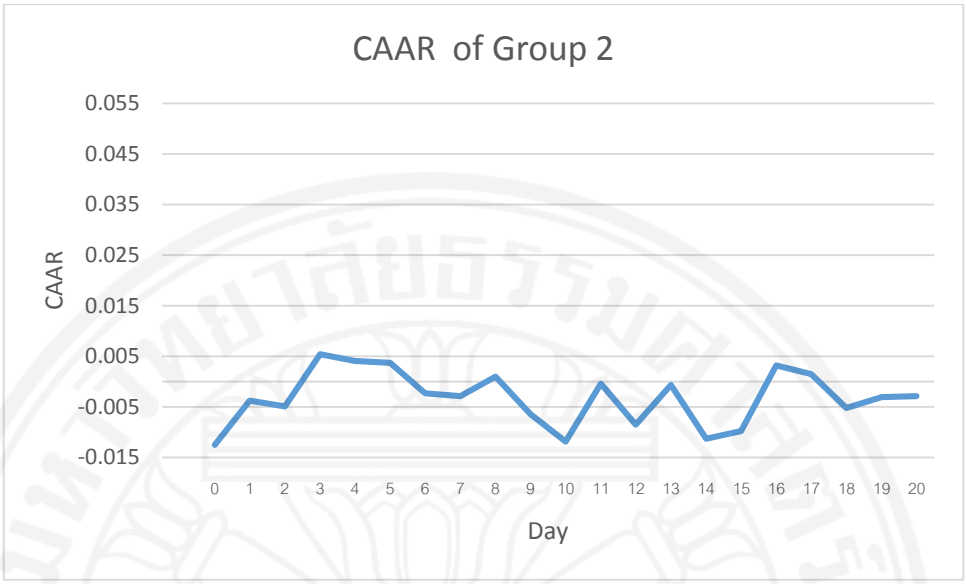


Figure 4.3 CAAR of Group 3

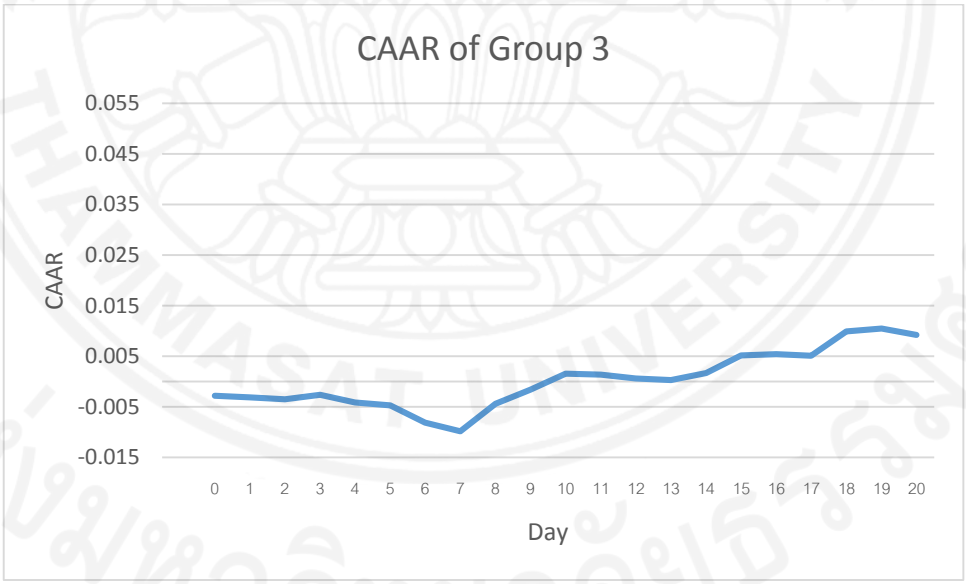


Figure 4.4 CAAR of Total Buy Order

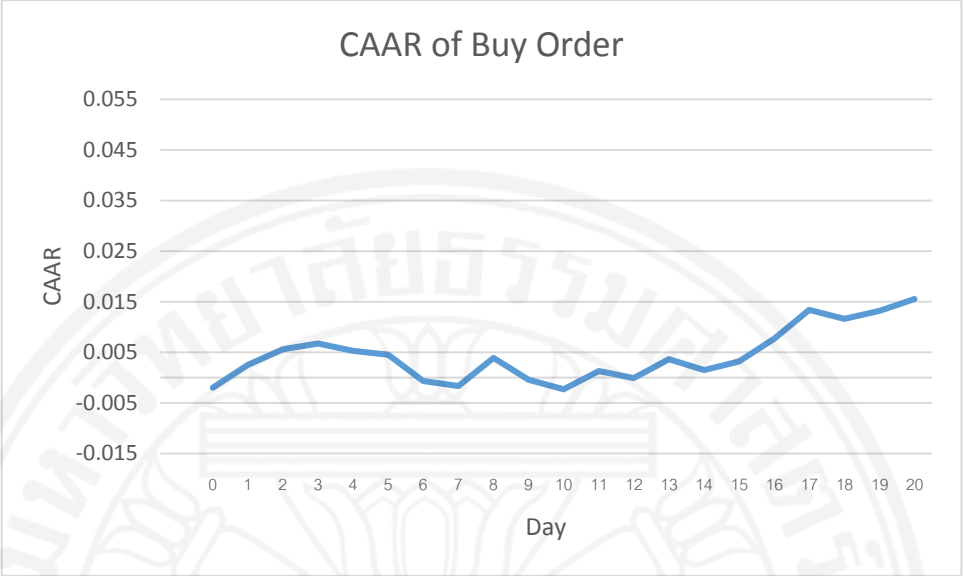


Table 4.2 presents the cumulative average abnormal return and t-test which is in the sell side. The event period covers 21 trading days from day 0 to day 20.

Table 4.2 CAAR in Sell Side

Day	Group 4		Group 5		Group 6		Total (Sell order)	
	CAAR	t-test (t)	CAAR	t-test (t)	CAAR	t-test (t)	CAAR	t-test (t)
0	0.0447	*** 3.1187	0.0273	*** 3.1652	0.0076	* 1.7896	0.0275	*** 4.4947
1	0.0490	** 2.3354	0.0234	* 1.9169	0.0104	* 1.7655	0.0285	*** 3.2534
2	0.0443	* 1.9469	0.0228	* 1.7939	0.0111	* 1.7694	0.0269	*** 2.8669
3	0.0494	** 2.0626	0.0101	0.6660	0.0076	0.9307	0.0233	** 2.2557
4	0.0409	* 1.7079	0.0127	0.6588	0.0094	0.9198	0.0217	* 1.9432
5	0.0532	* 2.0052	0.0166	0.8463	0.0096	0.8765	0.0275	** 2.2790
6	0.0454	1.4947	0.0190	0.9457	0.0201	1.8400	0.0287	2.1822
7	0.0435	1.3940	0.0159	0.7943	0.0174	1.7016	0.0262	1.9606
8	0.0335	0.9975	0.0132	0.6147	0.0134	1.1917	0.0205	1.4283
9	0.0371	1.0765	0.0078	0.3669	0.0136	1.2360	0.0200	1.3726
10	0.0424	1.1417	0.0139	0.6207	0.0156	1.3566	0.0246	1.5763
11	0.0475	1.1652	0.0174	0.8065	0.0123	1.0742	0.0265	1.6038
12	0.0449	1.0292	0.0311	1.3422	0.0067	0.5459	0.0286	1.6136
13	0.0495	1.0645	0.0272	1.2524	0.0055	0.4332	0.0286	1.5466
14	0.0409	0.8266	0.0213	0.9318	0.0065	0.4871	0.0238	1.2154
15	0.0432	0.8050	0.0181	0.7171	0.0050	0.3207	0.0230	1.0790
16	0.0489	0.8956	0.0203	0.7871	0.0005	0.0286	0.0244	1.1220
17	0.0481	0.8765	0.0217	0.8221	-0.0016	-0.0990	0.0240	1.0962
18	0.0464	0.8375	0.0220	0.8623	-0.0009	-0.0535	0.0237	1.0797
19	0.0449	0.7805	0.0136	0.5326	-0.0044	-0.2826	0.0193	0.8512
20	0.0448	0.7481	0.0105	0.4234	-0.0064	-0.4195	0.0175	0.7540

Note: *** Statistically significant at 1 percent level, ** statistically significant at 5 percent level, * statistically significant at 10 percent level

From table 4.2, there are positive abnormal returns in short term (within 3 days after event date) for all size firms. But they are not significantly different from zero in long term. Abnormal return just occurs at event date and continues decreasing or keeps constant. The result goes against the expectation that stock price should go down after directors sell their shares.

This result is inconsistent with Neeyalavera (2009) that he found negative abnormal returns in small size firms when directors sell their shares but it is consistent with Boonyawat (2003) that she found positive CAAR when directors sell their shares. This result shows that directors don't use inside information to get highest profit when they sell their shares. In my opinion, they may trade for other reasons such as for their liquidity. They might need cash for buying something or investing in another asset which has higher return or lower risk. For some cases, they might get stock option. They sell their shares immediately after they have right to exercise their options without using any inside information or forecasting future stock price. Or they may want to send the signal to market that the current stock price is overvalue or fully at fair price.

$CAAR_t$ of each group of samples are plot into graph shown in Figure 4.5 – 4.8 below. Figure 4.5, 4.6, 4.7 and 4.8 present CAAR of group 4, 5, 6 and total sell order respectively.

Figure 4.5 CAAR of Group 4

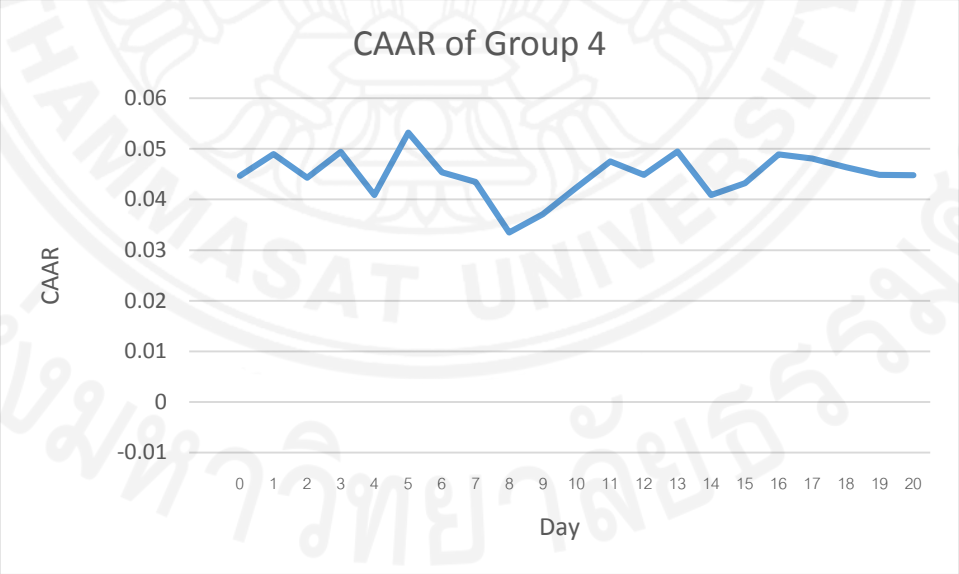


Figure 4.6 CAAR of Group 5

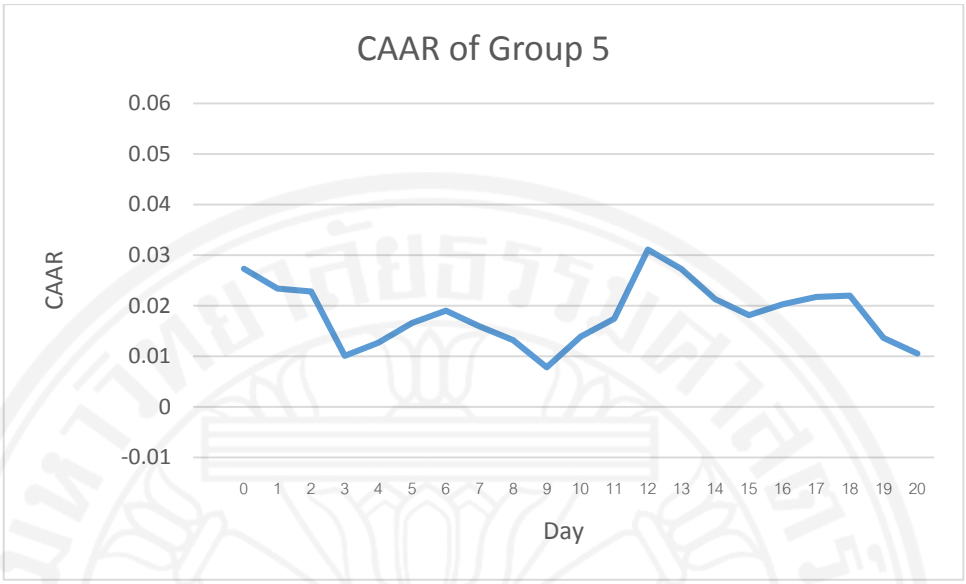


Figure 4.7 CAAR of Group 6

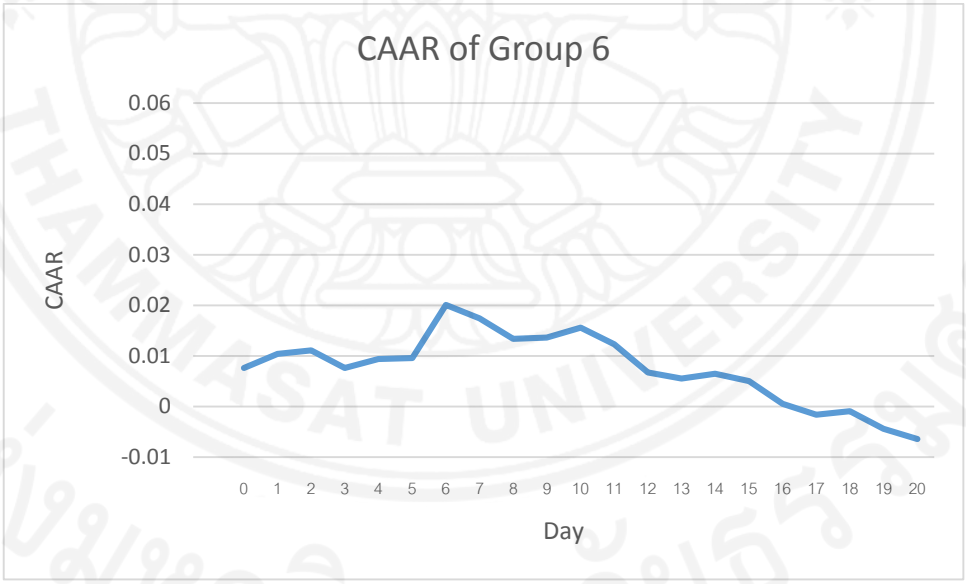


Figure 4.8 CAAR of Total Sell Order

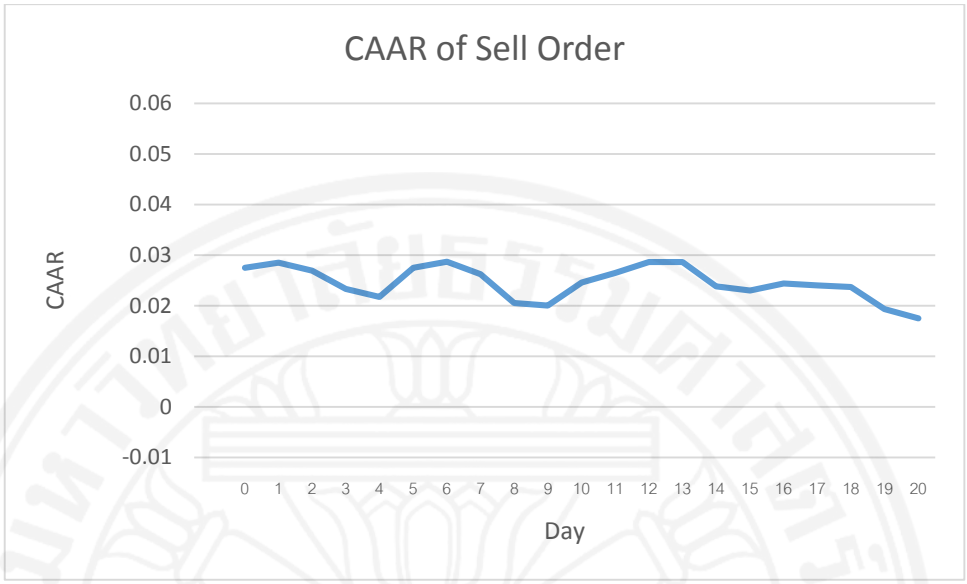


Table 4.3 presents the cumulative average abnormal volume and t-test which is in the buy side. The event period covers 21 trading days from day 0 to day 20.

Table 4.3 CAAV in Buy Side

Day	Group 1		Group 2		Group 3		Total (Buy order)	
	CAAV	t-test (t)	CAAV	t-test (t)	CAAV	t-test (t)	CAAV	t-test (t)
0	0.0125	** 2.3375	0.0063	* 1.7076	0.0005	1.4393	0.0062	*** 2.9347
1	0.0206	* 1.9437	0.0089	1.3972	0.0014	1.1987	0.0099	** 2.4854
2	0.0306	** 2.1732	0.0081	1.0969	0.0020	1.3544	0.0129	** 2.5111
3	0.0394	* 1.8455	0.0111	1.1204	0.0023	1.4585	0.0167	** 2.2374
4	0.0418	* 1.8375	0.0149	1.4306	0.0016	0.9185	0.0186	** 2.3416
5	0.0482	* 1.9325	0.0187	1.5474	0.0008	0.4450	0.0216	** 2.4496
6	0.0523	* 1.9553	0.0191	1.5409	0.0001	0.0327	0.0228	** 2.4282
7	0.0514	* 1.8507	0.0174	1.4379	-0.0010	-0.5449	0.0215	** 2.2407
8	0.0532	* 1.8580	0.0175	1.4085	-0.0003	-0.1182	0.0224	** 2.2611
9	0.0534	* 1.7943	0.0177	1.3220	-0.0002	-0.0869	0.0225	** 2.1731
10	0.0565	* 1.8063	0.0159	1.1671	-0.0007	-0.2391	0.0226	** 2.0879
11	0.0616	* 1.8896	0.0139	1.0445	-0.0013	-0.3487	0.0232	** 2.0770
12	0.0638	* 1.8822	0.0119	0.9111	-0.0012	-0.3030	0.0232	** 2.0125
13	0.0658	* 1.9171	0.0094	0.7262	-0.0021	-0.4602	0.0226	* 1.9340
14	0.0715	* 1.9744	0.0065	0.5117	-0.0030	-0.5837	0.0230	* 1.8765
15	0.0835	* 2.0246	0.0030	0.2413	-0.0038	-0.6707	0.0250	* 1.8269
16	0.0886	* 1.9065	0.0011	0.0905	-0.0047	-0.7910	0.0256	* 1.6805
17	0.1068	* 1.9966	0.0008	0.0596	-0.0058	-0.9224	0.0306	* 1.7475
18	0.1219	* 1.9870	0.0006	0.0364	-0.0062	-0.9533	0.0349	* 1.7522
19	0.1287	* 1.9410	-0.0018	-0.1175	-0.0068	-1.0322	0.0359	* 1.6773
20	0.1411	* 1.9610	-0.0038	-0.2437	-0.0070	-1.0910	0.0388	* 1.6788

Note: *** Statistically significant at 1 percent level, ** statistically significant at 5 percent level, * statistically significant at 10 percent level

From table 4.3, there are positive abnormal volume in both short term and long term in small size firm after directors buy their shares. In group 2 at event date, it is significant different from zero at 10 percent level but the rest in other period are not significant different from zero. Group 3, they are all not significant different from zero.

$CAAV_t$ of each group of samples are plot into graph shown in Figure 4.9 – 4.12 below. Figure 4.9, 4.10, 4.11 and 4.12 present CAAV of group 1, 2, 3 and total buy order respectively.

Figure 4.9 CAAV of Group 1

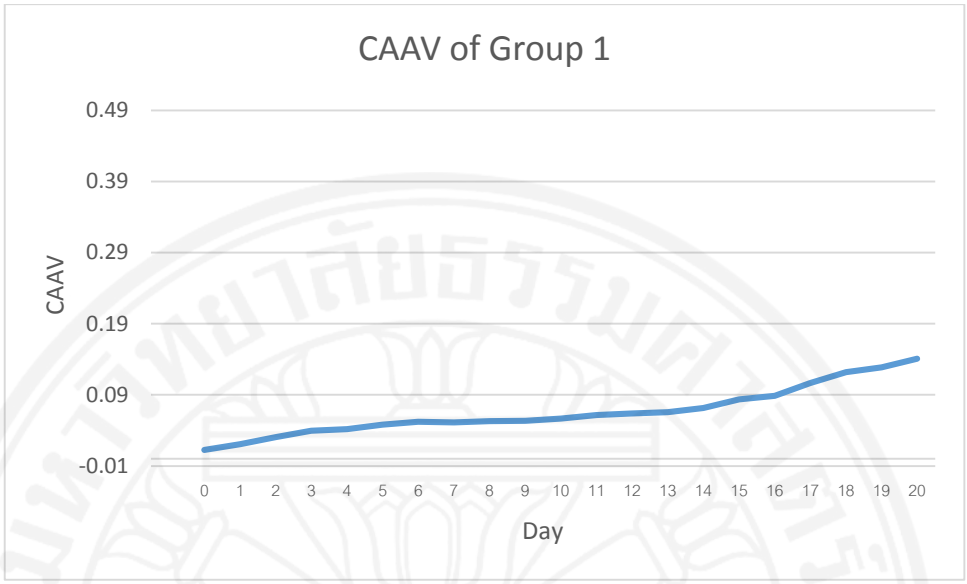


Figure 4.10 CAAV of Group 2

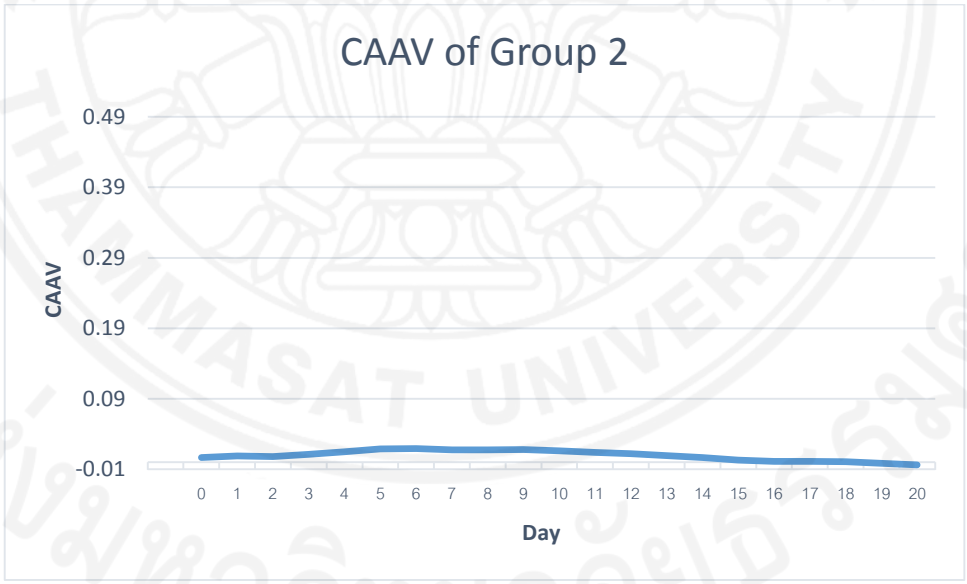


Figure 4.11 CAAV of Group 3

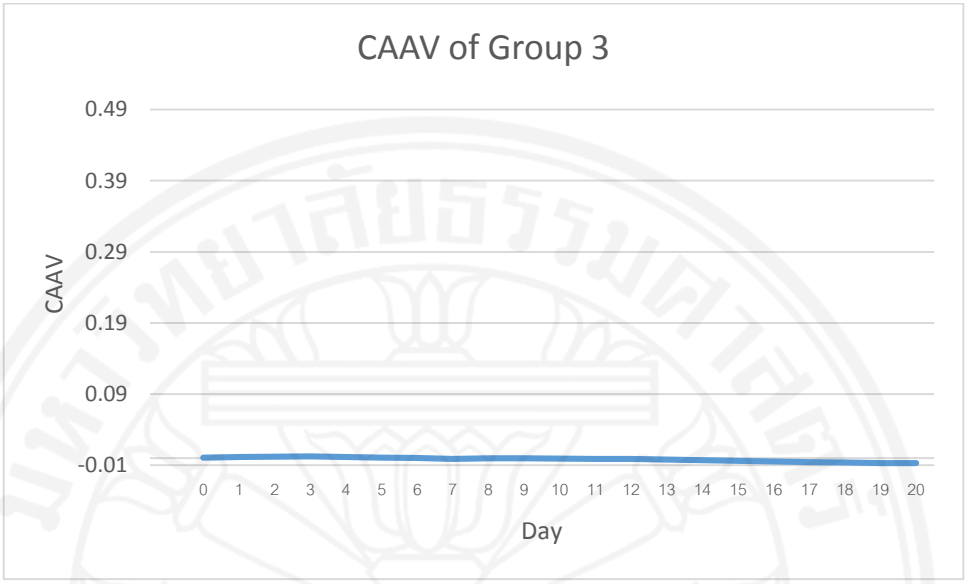


Figure 4.12 CAAV of Total Buy Order

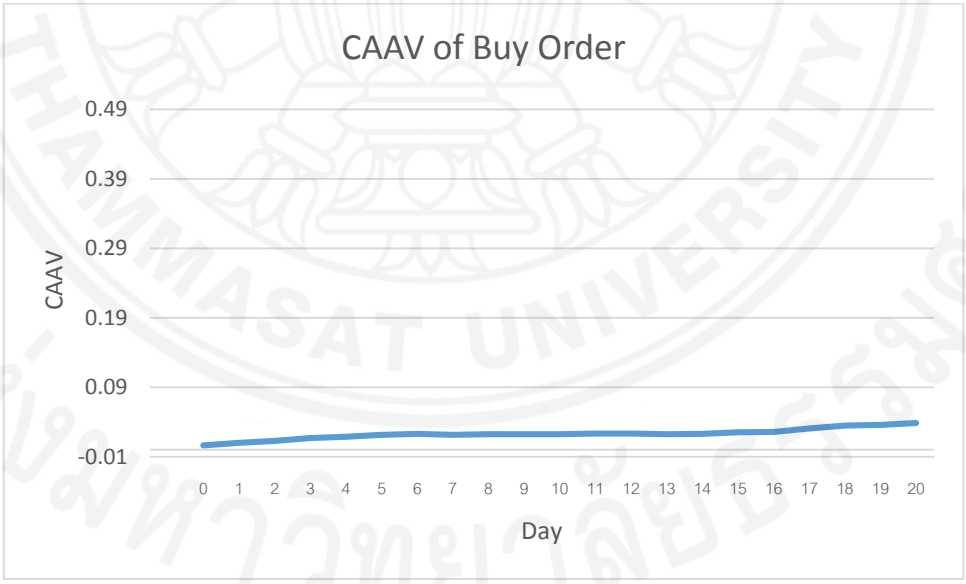


Table 4.4 presents the cumulative average abnormal volume and t-test which is in the sell side. The event period covers 21 trading days from day 0 to day 20.

Table 4.4 CAAV in Sell Side

Day	Group 4		Group 5		Group 6		Total (Sell order)	
	CAAV	t-test (t)	CAAV	t-test (t)	CAAV	t-test (t)	CAAV	t-test (t)
0	0.0783	*** 3.5292	0.0265	*** 3.1712	0.0013	1.2555	0.0373	*** 4.2419
1	0.1592	*** 3.6387	0.0410	*** 3.4978	0.0053	* 1.8174	0.0721	*** 4.2528
2	0.2057	*** 3.8659	0.0514	*** 3.7641	0.0072	1.5918	0.0928	*** 4.4707
3	0.2414	*** 3.9712	0.0607	*** 3.7563	0.0089	1.4958	0.1092	*** 4.5784
4	0.2712	*** 4.1400	0.0684	*** 3.6990	0.0109	1.3850	0.1231	*** 4.7393
5	0.2964	*** 4.1937	0.0771	*** 3.5486	0.0114	1.2670	0.1351	*** 4.7873
6	0.3325	*** 4.2567	0.0813	*** 3.4703	0.0113	1.2255	0.1494	*** 4.7829
7	0.3618	*** 4.1750	0.0921	*** 3.1877	0.0107	1.1383	0.1633	*** 4.6935
8	0.3847	*** 4.0702	0.0977	*** 3.0607	0.0098	0.9922	0.1730	*** 4.5706
9	0.3983	*** 4.0130	0.1030	*** 3.0647	0.0101	0.9803	0.1798	*** 4.5314
10	0.4125	*** 4.0180	0.1123	*** 3.1029	0.0100	0.9284	0.1880	*** 4.5652
11	0.4269	*** 4.0265	0.1171	*** 3.1207	0.0096	0.8715	0.1946	*** 4.5743
12	0.4397	*** 4.0603	0.1302	*** 3.1604	0.0103	0.8909	0.2039	*** 4.6577
13	0.4518	*** 4.0804	0.1368	*** 3.1563	0.0110	0.8776	0.2106	*** 4.6895
14	0.4566	*** 4.0658	0.1426	*** 3.1376	0.0109	0.8671	0.2143	*** 4.6908
15	0.4580	*** 4.0422	0.1474	*** 3.0792	0.0124	0.9198	0.2168	*** 4.6859
16	0.4663	*** 4.0381	0.1525	*** 3.0972	0.0125	0.8703	0.2215	*** 4.6926
17	0.4861	*** 4.0957	0.1582	*** 3.1632	0.0123	0.8195	0.2305	*** 4.7464
18	0.4941	*** 4.0330	0.1662	*** 3.2265	0.0114	0.7487	0.2358	*** 4.7162
19	0.4992	*** 3.9949	0.1699	*** 3.1636	0.0112	0.7230	0.2388	*** 4.6754
20	0.5024	*** 3.9404	0.1721	*** 3.1409	0.0105	0.6751	0.2405	*** 4.6221

Note: *** Statistically significant at 1 percent level, ** statistically significant at 5 percent level, * statistically significant at 10 percent level

From table 4.4, there are positive abnormal volume in group 4 and 5. They are all significantly different from zero at 1 percent level. In group 6, they are not significantly different from zero except $CAAR_1$. Smaller firms have higher magnitude of CAAV.

$CAAV_t$ of each group of samples are plotted into graph shown in Figure 4.13 – 4.16 below. Figure 4.13, 4.14, 4.15 and 4.16 present CAAV of group 4, 5, 6 and total sell orders respectively.

Figure 4.13 CAAV of Group 4

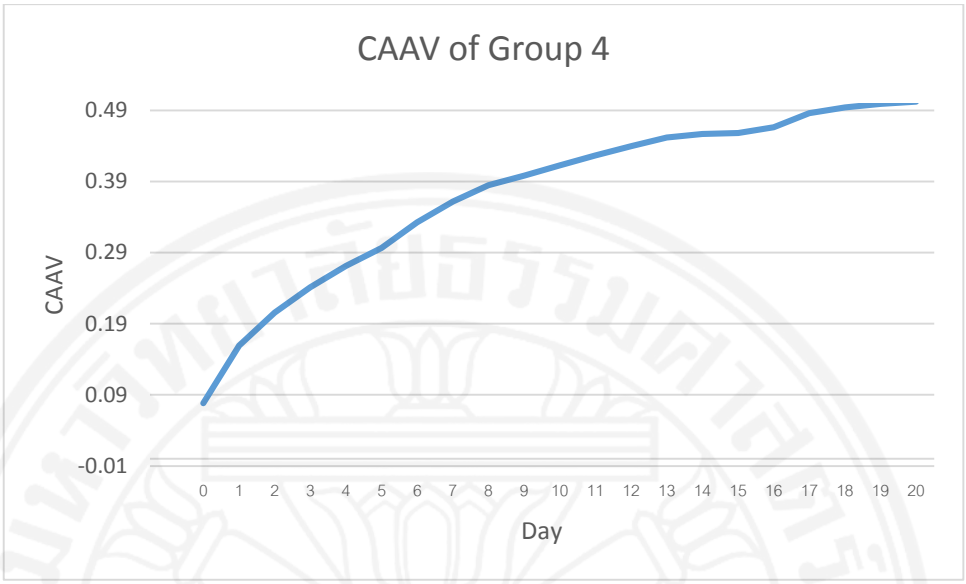


Figure 4.14 CAAV of Group 5

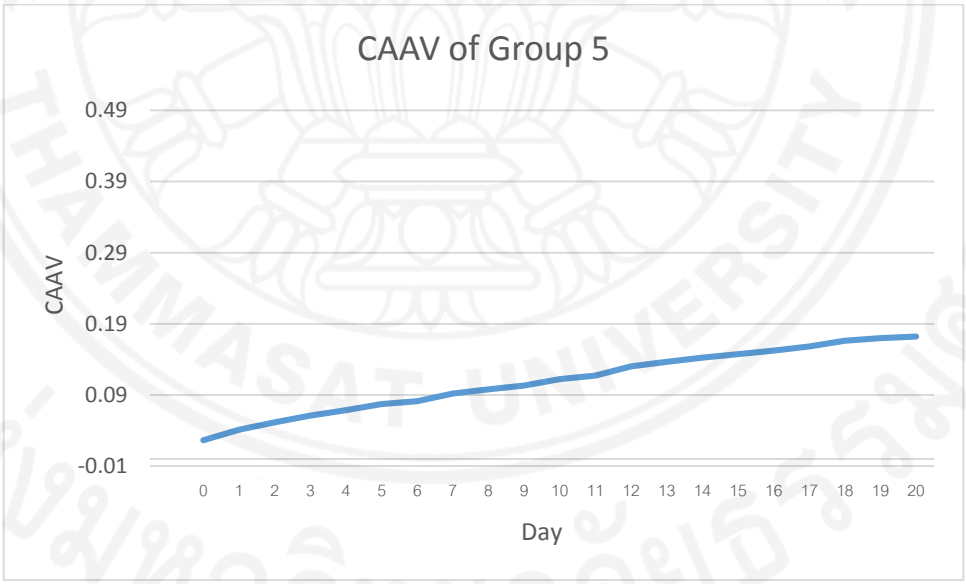


Figure 4.15 CAAV of Group 6

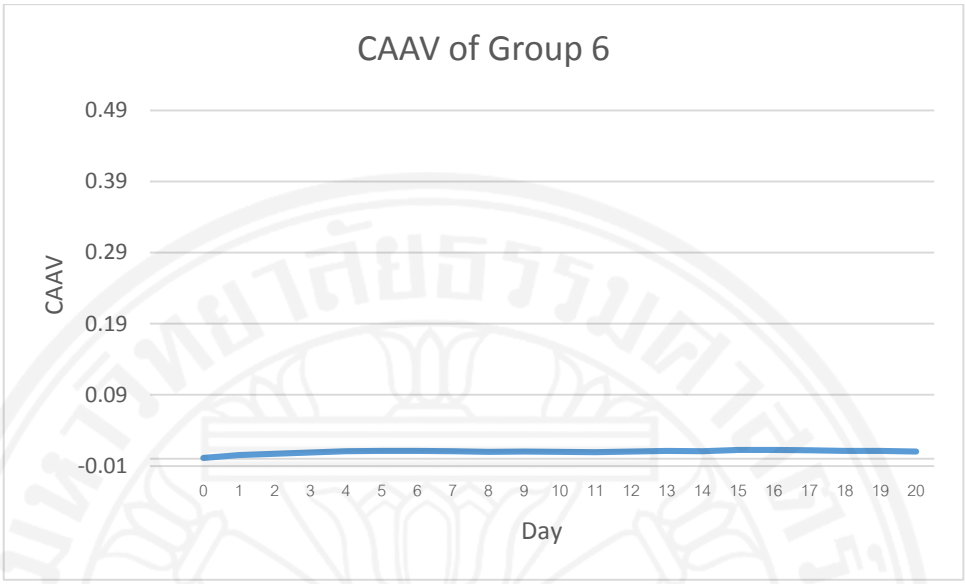
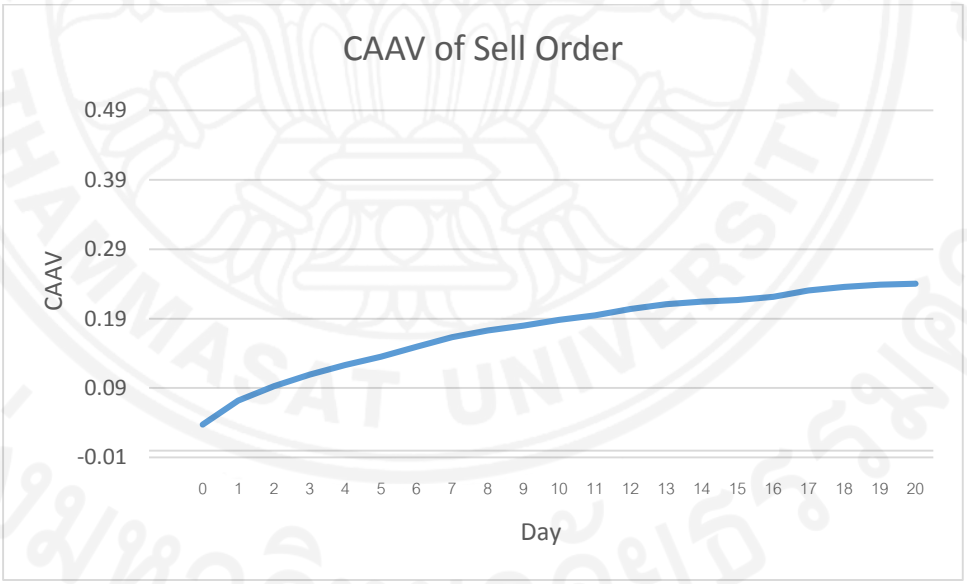


Figure 4.16 CAAV of Total Sell Order



4.2 Cross-Sectional Regression Result

Determinant of Abnormal Return

Model for determination of cumulative abnormal return (CAR) can be shown as:

$$CAR(t_1, t_2) = a_0 + a_1(CEO) + a_2(INTERVAL) + a_3\big(CAV(t_1, t_2)\big) + a_4(FREE\ FLOAT) + a_5(OWNERSHIP) + a_6(SIZE) + a_7(VALUE)$$

Table 4.5 Regression of Cumulative Abnormal Return for Buy Side

	$CAR_{(0,1)}$	$CAR_{(0,2)}$	$CAR_{(0,5)}$	$CAR_{(0,20)}$
Intercept	-0.0045	0.0111	0.0035	0.0250
(P-value)	(0.6977)	(0.3931)	(0.8544)	(0.4599)
CEO	0.0184	0.0216	0.0059	0.0012
(P-value)	*(0.0591)	**(0.0484)	(0.7138)	(0.9655)
INTERVAL	-0.0004	-0.0005	-0.0003	-0.0004
(P-value)	**(0.0404)	**(0.0416)	(0.3134)	(0.4654)
CAV(t)	0.5504	0.6871	0.3589	0.4465
(P-value)	***(0.0000)	***(0.0000)	***(0.0000)	***(0.0000)
FREEFLOAT	0.0002	-0.0001	-0.0001	-0.0006
(P-value)	(0.2845)	(0.5359)	(0.7878)	(0.3483)
OWNERSHIP	-0.0003	0.0000	0.0000	0.0007
(P-value)	(0.3442)	(0.9617)	(0.9529)	(0.4910)
SIZE	0.0000	0.0000	0.0000	0.0000
(P-value)	(0.8464)	(0.9837)	(0.8892)	(0.8713)
VALUE	0.0000	0.0000	0.0000	0.0000
(P-value)	(0.6411)	(0.5340)	(0.6465)	(0.4874)
R^2	0.3090	0.4255	0.2001	0.4565
Prob (F-statistic)	***(0.0000)	***(0.0000)	***(0.0003)	***(0.0000)

Note: *** Statistically significant at 1 percent level, ** statistically significant at 5 percent level, * statistically significant at 10 percent level

Table 4.5 presents the regression result for buy side. The CEO variables are significantly different from zero in short term ($CAR_{(0,1)}$, $CAR_{(0,2)}$). In longer period, CEO variables are not significantly different from zero. It can imply that CEOs have superior information than other insiders and CEOs gain higher abnormal return in short period after they buy their shares.

The INTERVAL variables are significantly different from zero in short term ($CAR_{(0,1)}$, $CAR_{(0,2)}$) at 5 percent level but INTERVAL variables in the long term are not significantly different from zero. The sign of coefficient of INTERVAL is negative. It means that the quicker sending transaction report can create a higher abnormal return.

The coefficient of CAV for all periods are positive and significantly different from zero at 1 percent level. It implies that the higher CAV can create higher CAR. It is consistent with our expectation that the price goes up with volume.

The coefficient of FREE FLOAT for all periods is not significantly different from zero. It means that percentage of free float has no impact to abnormal return.

The coefficient of OWNERSHIP for all periods is not significantly different from zero. It is not consistent with the expectation. My expectation is that directors who hold a large portion may have more intention to use inside information in order to gain profit. The reason may be that directors buy more shares to maintain their control power or right to vote.

SIZE variable and VALUE variable are the control variables. They are not significantly different from zero.

Table 4.6 Regression of Cumulative Abnormal Return for Sell Side

	$CAR_{(0,1)}$	$CAR_{(0,2)}$	$CAR_{(0,5)}$	$CAR_{(0,20)}$
Intercept	0.0351	0.0620	0.0582	-0.0592
(P-value)	(0.1690)	(0.0292)	(0.1061)	(0.4032)
CEO	0.0330	0.0416	0.0743	0.1257
(P-value)	(0.2392)	(0.1785)	*(0.0582)	(0.1029)
INTERVAL	-0.0001	-0.0002	-0.0001	0.0002
(P-value)	(0.8712)	(0.7289)	(0.8193)	(0.8830)
CAV(t)	0.1968	0.1109	0.1346	0.1290
(P-value)	***(0.0000)	***(0.0051)	***(0.0003)	***(0.0011)
FREEFLOAT	-0.0006	-0.0012	-0.0013	0.0006
(P-value)	(0.2564)	(0.3930)	(0.7770)	(0.6566)
OWNERSHIP	-0.0001	-0.0001	-0.0014	-0.0003
(P-value)	(0.8828)	(0.9496)	(0.2968)	(0.9219)
SIZE	0.0000	0.0000	0.0000	0.0000
(P-value)	(0.7272)	(0.6581)	(0.5842)	(0.7364)
VALUE	0.0000	0.0000	0.0000	0.0000
(P-value)	(0.8064)	(0.7982)	(0.7189)	(0.9793)
R^2	0.1635	0.1126	0.1422	0.0950
Prob (F-statistic)	***(0.0016)	**(0.0305)	***(0.0059)	*(0.0739)

Note: *** Statistically significant at 1 percent level, ** statistically significant at 5 percent level, * statistically significant at 10 percent level

Table 4.6 presents the regression result for sell side. The CEO variables are all not significantly different from zero except $CAR_{(0,5)}$.

The coefficient of INTERVAL for all periods is not significantly different from zero. It means that time of send transaction report has no impact to abnormal return.

The coefficient of CAV for all periods is positive and significantly different from zero at 1 percent level. It implies that the higher CAV can create higher CAR.

The coefficient of FREE FLOAT for all periods is not significantly different from zero. It means that percentage of free float has no impact to abnormal return.

The coefficient of OWNERSHIP for all periods is not significantly different from zero. It means that percentage of holding stock has no impact to abnormal return.

SIZE variable and VALUE variable are the control variables. They are not significantly different from zero.

The R^2 is quite low. It means that all explanatory variables can explain poorly the dependent variable. The reason is that CAR from previous test gives us an opposite sign from what we expect.

CHAPTER 5
CONCLUSIONS AND RECOMMENDATIONS

This paper examines whether the director's share trading has impact to the stock price and trading volume. This paper also attempts to find the determinant of cumulative abnormal return. The observation period is from 2013-2015. There is 261 samples which I have already solved the overlap event problem**.**

We finds that there is a positive abnormal return in small size firm in short period after directors buy their own shares. It implies that directors who work in small size firms have superior information and they can gain abnormal return when they buy their in the short period. However, there is no abnormal return after directors who is in medium and large size firms buy their shares.

For sell-side, directors don't gain profit when they sell their shares. They sell their stock before the stock rises. They may have another reasons to sell their shares such as liquidity. They may need cash to buy something or invest in other assets which give them higher return or lower risk. They may sell immediately their shares after they have right to exercise their stock option. They may send a signal to market that the current stock price is overvalued or fully at fair price.

The result in buy-side from cross sectional regression shows that CEO variable, INTERVAL variable and CAV variable have impact to abnormal return when directors buy stock. It can imply that CEO who have superior information gain the profit when they buy their shares. But we can't claim that directors use inside information to gain profit, we have to do more research by collecting news or announcement variable after directors have stock transaction. The number of days from trading date to announcement date has impact to cumulative abnormal return. The quicker sending transaction report can create a higher abnormal return. CAV variable also determines CAR. CAV variable has positive correlative with CAR.

The result in sell-side shows that CAV is an only one factor what affects to cumulative abnormal return. However, all explanatory variables in sell side can explain poorly CAR variable (dependent variable) based on R^2.

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